# RCRA FACILITY INVESTIGATION REPORT

# SITE FH-053

# FORT HOOD SANITARY SEWER SYSTEM

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In Association with
Science Applications International Corporation

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# EXECUTIVE SUMMARY

This report summarizes the findings of the Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) for Solid Waste Management Unit (SWMU) No. FH-053. This RFI includes a record search to determine probable sources of contamination to the sanitary sewer system and the determination of any likely release of this contamination to the environment from the sanitary sewer system due to line breakages or overflows.

Interviews with operational and environmental personnel and review of available records found no evidence of significant releases of hazardous materials or hazardous waste resulting from the operation of the sanitary sewer system (SWMU No. FH-053) at Fort Hood. Therefore, there is no evidence that the soils or ground water adjacent to the sanitary sewer system have been contaminated by releases from this system. No further action is recommended.

Sites that have released hazardous materials or hazardous waste to the system were identified (Table 3.1) and the sewer networks' integrity records were reviewed. The sewer system repair records (Appendix H) indicate that problem areas occurred upstream of any introduction point of hazardous materials or hazardous waste. Documentation was found that indicated that raw sewage contamination had occurred, however, there is no indication that hazardous constituents were part of the contamination.

This report was compiled from materials gathered after review of available documentation and interviews with the operational and environmental personnel at Fort Hood. Additional sampling or investigations of the system beyond the documentation review and the personnel interviews was beyond the scope of this investigation.

# 1 .0 INTRODUCTION

An ongoing RCRA Facility Investigation (RFI) at Fort Hood is being done to determine potential sources of contamination on site through standard and nonstandard past operations. This report documents a record search relating to the Fort Hood sanitary sewer system. The sanitary sewer system record search was performed to determine if the potential exists for a release to the environment to have occurred because of waste materials transported through the sanitary sewer system and to have exfiltrated through cracked or otherwise damaged sewer lines. The release records available for review were dated from 1993 through 1997. Other reports which were reviewed are from as early as 1985.

## Goal

The goals for the Sanitary Sewer RFI are to (a) identify sites (buildings and manholes) that have released hazardous materials or hazardous waste into the sanitary sewer network, (b) identify sanitary sewer lines that are severely cracked or broken, down stream from the location where hazardous materials or hazardous waste were introduced to the network, and © assess the potential for release of the hazardous materials or hazardous waste to the environment from the damaged lines or operational malfunctions.

## Approach

The approach used in this investigation was to:

- Interview site personnel to determine past standard and nonstandard practices of material disposal and areas where problems may have occurred.
- Perform a records search to identify sites and activities that have historically discharged hazardous wastes into the sanitary sewer system.

- Perform a records search to identify sanitary sewer lines that are severely cracked or broken and are located downstream of facilities likely to have discharged hazardous wastes.

# 2.0 REVIEW OF RECORDS

Records were reviewed and personnel were interviewed in order to compile a list of documented and undocumented discharges of potential hazardous contamination to the sanitary sewer system. The intent of the records review was to determine if there currently are or have been consistent releases to the sewer system of known hazardous contaminants. Other releases to be identified include large, one-time events warranting further investigation. The review also included a review of the sanitary sewer records to determine the status of the system and identify problem areas which may have provided a release point to the environment.

## 2.1 Review of Written Records

The following records were reviewed to determine locations and types of discharges to the sanitary sewer system. Except for the maps used to determine site characteristics and building and sewer locations these records are attached in Appendices A through I.

- Classification Yard, Notice of Registration for the Texas Natural Resource Conservation Commission (TNRCC) which identifies waste disposed of at the Classification Yard. (Dated 20 June, 1996) (Appendix A)
- Defense Reutilization and Marketing Office (DRMO) records. (No applicable information found for use.)
- Community Right-to-Know file. (Appendix B)
- Fort Hood land use maps, zoning maps, and current and previous master planning documents. (From Engineering - Maps are not included)
- Photochemical use/recovery records. (Appendix C)
- Tank purging correspondence. (Dated August 1994) (Appendix D)
- Sanitary sewer system release related correspondence. (Appendix E)
- Noncompliance notifications for TNRCC. (Appendix F)

- Procedures Manual - "III Corps & FH Regulation 420-2 " dated 1 May, 1993 "Environment and Natural Resources." (Appendix G)
- Sewer repair records. (Appendix H)
- Fire Department Spill Response Report (Appendix I)
- Sanitary Sewer System Analysis of Fort Hood, June 1985. (Appendix J)

## 2.2 Interviews with Fort Hood Personnel

Interviews with Fort Hood personnel were conducted to determine other possible sources of hazardous contamination to the sanitary sewer system which may not have been documented. The following personnel were interviewed:

- Mary White, Environmental Protection Specialist, Directorate of Public Works, Environmental Division, Environmental Management Office (December 12, 1996, January 22, 1997 and numerous dates in July 1998)

- Gary A. Tooke, Environmental Protection Specialist, Directorate of Public Works, Environmental Division, Environmental Management Office (December 12, 1996)

- Danny A. Murphy, Fire Chief, Directorate of Public Works, Fort Hood Fire Department (January 22, 1997)

- Bill Bodkin, Chief Environmental Management Branch, Directorate of Public Works, Environmental Division, Environmental Management Office (December 12, 1996 and through written interview in July 1998)

Each interviewee was posed with the question of identifying sources with which they are familiar which are uncommon or undocumented. A summary of these interviews follows:

Mary White - Ms. White is familiar with the management of spills and waste materials on Fort Hood. She has access to, and provided the interviewer, information regarding previous studies of the sanitary sewer system, problems regarding the system and standard operations which occur on Fort Hood. The documentation in the appendix, unless otherwise noted, was provided by Ms.

White or her immediate staff. Ms. White also directed other inquiries to the appropriate base personnel.

Gary A. Tooke - Mr. Tooke provided the interviewer with material safety data sheets as requested.

Danny Murphy - Mr. Murphy was interviewed specifically to determine his knowledge of any spills which have occurred on site and the Fire Department's standard form of response to these spills. Information obtained from Mr. Murphy indicates that currently, at least in the last six years, spills which have occurred on site and which were responded to by the Fire Department were contained and not flushed to the sanitary sewer system. These spills therefore are not considered sources within the scope of this RFI. Prior to 199 1 any spills which occurred on the airfields were flushed to the sanitary sewer system and were diluted to protect the system and the receiving treatment **works.** Mr. Murphy provided the interviewer with the Fire Department Spill Response Report contained in Appendix I.

Bill Bodkin - Mr. Bodkin, as Chief of the Environmental Branch, was interviewed to determine the appropriate personnel to contact to obtain the required information to perform the records review.

# 3.0 DISCHARGES

The documentation, summarized in Section 2.1, was analyzed to identify any discharges likely to have caused a release of hazardous constituents to the environment via the sanitary sewer system. The documented and potential undocumented sources (interview information) are provided in the following sub-sections.

## 3.1 Documented Industrial Discharges

The review of records indicates that there are numerous documented source points which could have potentially discharged hazardous constituents to the sanitary sewer system. These activities are summarized in Table 3.1 with the corresponding building numbers and type of discharge.

Figure 3-l shows the locations of these facilities. A documented discharge which is not included in Table 3.1 is the discharge of landfill leachate into the sanitary sewer system at an unknown location (see Appendix E). This practice (landfill leachate discharge) was approved by the Bell County Water Control & Improvement District No. 1 (the receiving treatment works) as long as the discharge met the requirements of the Environmental Protection Agency and the TNRCC. No data was found to indicate that the leachate was actually discharged to the sewer system but if it did occur, the characteristics would not have been hazardous according to the acceptance guidance.

The types, as referred to in Table 3.1, are:

- A - Silver residual disposal which has been discontinued, silver is now reclaimed through a canister collection system operated through Safety-Kleen
- B - ***Not Used***
- *c* - Discharge of diluted fuel to sanitary sewer from aircraft cleaning and tank purging
- D - Discharge from oil water separator into sanitary sewer system
- E - Discharge of water from neutralized batteries
- F - Discharge of neutralized chemicals from cannibalized equipment

The above listed activities are ongoing activities except as noted. Each discharge typical volume and characteristic, if ***known,*** is summarized beginning after the table.

## TABLE 3.1 - SUMMARY OF DOCUMENTED DISCHARGES

| ACTMTY | TYPE* | BUILDING NUMBER | YEAR BUILT | DATE** DISCON | DATA SOURCE |
|---|---|---|---|---|---|
| TASC Photo Lab | A | 232 | 1942 | 1995 | Appendix C |
| Map Reproduction | A | 3945 | 1979 | 1995 | Appendix C |
| Texcom Photo Processing | A | 91012 | 1988 | 1995 | Appendix C |
| Aircraft X-Ray | A | 7022 | 1981 | 1995 | Appendix C |
| Dame11 Army Hospital X-Ray | A | 36000 | 1966 | 1995 | Appendix C |
| Dental ClinicX-Ray | A | 36014 | 1980 | 1995 | Appendix C |
| Vet Clinic | A | 49020 | 1982 | 1995 | Appendix C |
| 1 CD Public Affairs (currently inactive since Spring 1996) | A | 28000 | 1983 | 1995 | Appendix C |
| 4 ID Public Affairs (currently inactive since Spring 1996) | A | 439 | 1943 | 1995 | Appendix C |
| 13 COSCOM Public Affairs (currently inactive since Spring 1996) | A | 39001 | 1977 | 1995 | Appendix C |
| III Corps Public Affairs (Sentinal) (currently inactive since Spring 1996) | A | 1001 | 1989 | 1995 | Appendix C |
| Tank Purging - Manhole outside of Motor Pools (per paragraph 5-1 l(d)(6), Fort Hood Regulation 420-2) | C | various along Central Ave. | various early dates | Current | Appendix G |
| Airfield Drains | C | N A | | Current | Appendix G |
| DPW Classification Unit | D | 1345 | 1970 | N A | Interviews |
| Battery Neutralization Point (FH-038B) | E | 11020 | 1982 | 1992 | Interviews |
| Battery Neutralization Point (FH-038D) | E | 32019 | 1982 | 1992 | Interviews |
| Battery Neutralization Point (FH-038C) | E | 15023 | 1982 | 1992 | Interviews |
| Battery Neutralization Point (FH-038A) | E | 9506 | 1982 | 1992 | Interviews |
| Battery Shop Holding Tank (FH-039) | E | | 1980 | 1995 | Interviews |
| Recycle Center (Oil House) | D | 4621 | 1986 | Current | Interviews |
| Automotive Craft Shop | D | 3202 | 1985 | Current | Interviews |
| Automotive Craft Shop (Self Help Garage) | D | 9138 | 1989 | Current | Interviews |
| Army & Air Force Exchange Service Station | D | 224 | 1959 | Current | Interviews |
| Cannibal. Point (FH-040) (removed 1986) | F | | 1980 | 1986 | Interviews |

*** See page 8 for definition of types of discharges**

**** DATE DISCON = DATE DISCHARGE DISCONTINUED**

Type A Prior to 1995 used solutions from photo processing equipment on Fort Hood (refer to Table 3.1 for building locations) were flushed with dilution water to the sanitary sewer system. The silver residual disposal to the sanitary sewer system has been discontinued. The silver is now recovered and disposed of off site. The quantities of solution are indicated by staff to be very small and were diluted during disposal to the sewer system.

Type B *Not Used*

Type C Fuel tanks are routinely cleaned prior to storage to prevent fire and explosion risks. The procedure for purging is outlined in the Procedures Manual (Appendix G, Pages 5-10 through 5-12.) The procedure allows for a typically small amount of fuel (i.e. that which is retained in liquid form attached to the walls of the tank, estimated at less than 1 gallon) to be retained in the tank. The tank is first rinsed and then the purging solution is used in small quantities to further reduce the fuels in the tank. At one time this was performed at manholes near the motor pools. This practice has been discontinued. The fuel amount in each tank cleaning is very small and was so diluted that no measurable amounts are likely to have introduced contamination outside of the sanitary sewer system.

Type D Undocumented discharges from the oil-water separators could potentially have occurred if the separators were not properly maintained . Refer to Section 3.2 for a discussion of undocumented discharges.

Type E Neutralized battery fluid from used batteries was discharged to the sanitary sewer system at the battery neutralization point. This practice was discontinued a few years ago. It is possible that lead may have been in the water in very small quantities that was discharged to the sanitary sewer. The source of the lead is the leaching from the electrode in the batteries. No known data on the concentration of this lead exists. The battery neutralization points and the service lines to the

sanitary sewer main are separate items from this SWMU but are being investigated under the Fort Hood RFI SWMU FH-038. Ordinary sanitary sewer sources would have typically diluted any flow from each of the battery neutralization points.

Type F The discharge of very small quantities of neutralized chemicals occurred in the past at the cannibalization point. The cannibalization point took used equipment and parts for resale or reuse. A concrete tank at this cannibalization point, which at one time discharged neutralized battery electrolyte was removed with its associated piping prior to 1988. Any chemicals discharged from this area were of small dilute quantities from small equipment. Large quantities of chemicals were sent to the classification yard or were sold for reuse. The cannibalization point is being investigated under SWMU FH-040.

## 3.2 Potential Undocumented Industrial Discharge Areas

Through the review of records and interviews with Fort Hood personnel, the following potential undocumented discharges to the sanitary sewer system were identified. The discharges listed here are either potential inconsistent discharges due to uninformed use of the sanitary sewer system as a disposal point or are due to large inconsistent releases of undocumented spills.

- Discharge of fuel spills at the Hood Army Airfield to the sanitary sewer system. This procedure was discontinued at least as early as 199 1 but was a method of disposal of spills prior to that time.
- Suspected discharge of waste materials to the sanitary sewer system at the motor pool sites.

### 3.3 Summary of Discharge Data

Each of the above mentioned activities was compared to the integrity of the sanitary sewer system in Section 4.0. The most likely source of contamination is the undocumented spills at the Airfield which are of unknown quantity and concentration

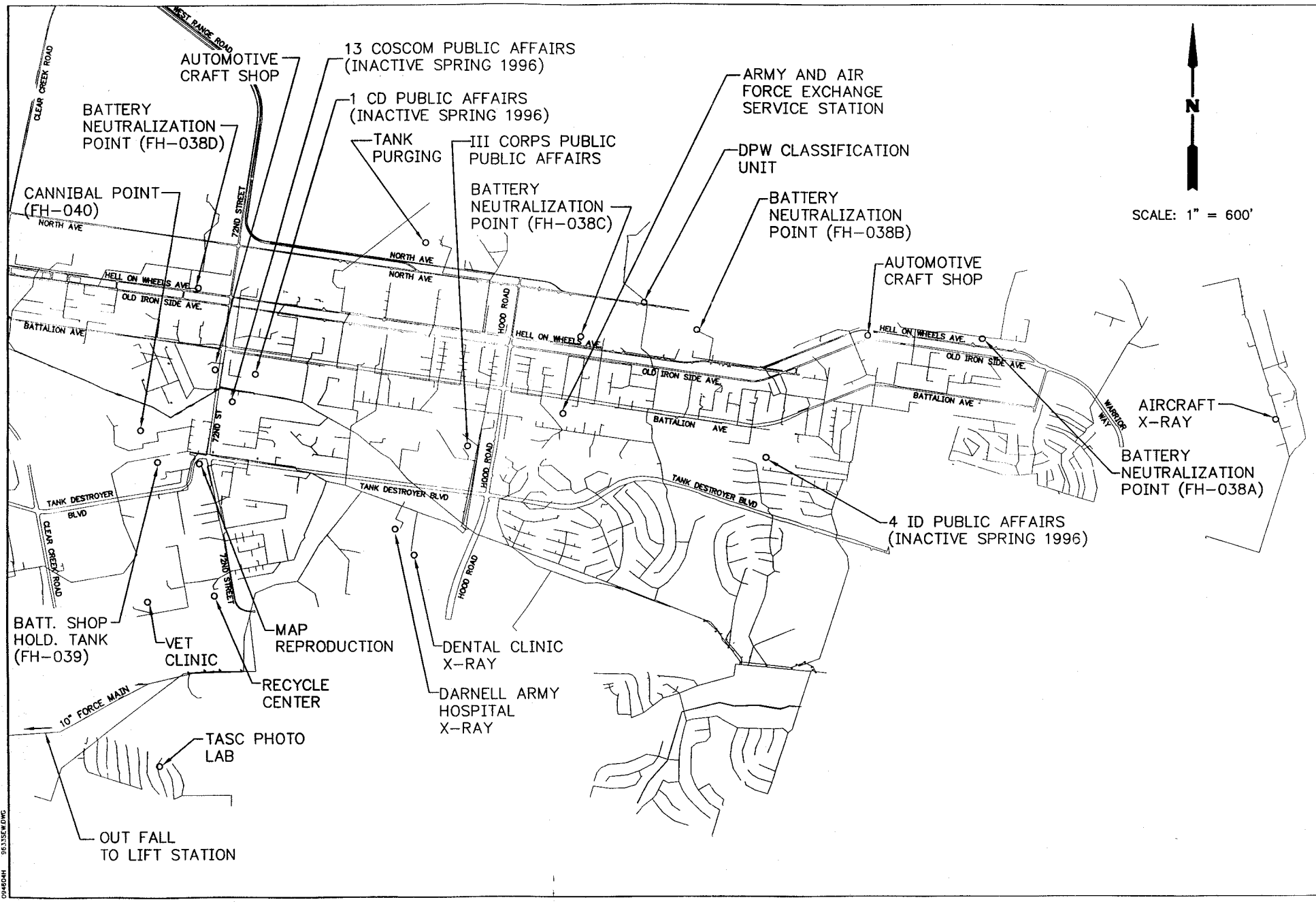
## 4.0 SANITARY SEWER SYSTEM

The sanitary sewer system is illustrated in Figure 4-1. Parts of the sanitary sewer system were initially installed up to 40 years ago, with expansions and improvements since then. This system is consistent with the typical municipal sewer system construction. As is described later in Section 4.0 and in Section 5.0 and because there have been no reported problems with the sewer system receiving municipality, no NPDES problems due to Fort Hood discharges, there is no justification for a detailed system construction study. The evaluation of the system includes a review of the system repair log (Appendix H), which is a summary of system repairs and unstoppages as documented for the last three years. The repair log gives an indication of the integrity of the system. Many repairs in an area indicate a sewer line with poor integrity and therefore points of potential release to the environment.

Another method of evaluation is a review and summary of the 1985 Sanitary Sewer System Analysis report. This was a comprehensive analysis of the system which identified problem areas and recommended courses of action for correction and repair. It is assumed that if an area was identified as a problem area, even if it has been subsequently repaired and replaced, that there is potential for a release of contaminants to the system in that area.

### 4.1 Sanitary Sewer System Repairs

The record of **sewer** line repairs includes a record of all calls received within the last three years with the date, description, and what type of action took place in response to the call. Most all calls

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AUGUST 1998

FORT HOOD, KILLEEN TEXAS
SITE FH-053
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**FORT HOOD SANITARY SEWER SYSTEM**

FIGURE
**4-1**

096604H 96335EWDWG

are referenced to the closest building that is affected by the call. These records were reviewed. A summary was made for those calls which indicated a line stoppage and those calls which resulted in a repair or replace action. A line stoppage could indicate a break. This summary was analyzed by listing any building that had more than one call associated with it or neighboring buildings. It was assumed that any time more than one call occurred, the line had a problem such as line stoppage and manhole overflow or line breakage. This resulted in a list of many buildings which were mapped on the sewer system map. It was discovered that all buildings with problem sewer lines were associated with food service or food preparation. This leads to the conclusion that the problems were likely caused by oil and grease problems and not by damaged sewer lines. All of these buildings are located along the main roadway Battalion Avenue and the affected lines were the lines leading to the sewer mains with no other services besides food service connected to them. Hazardous substances have not been documented or suspected in these lines and therefore are not considered to have been sources of releases to the environment through the sanitary sewer system.

## 4.2 Sanitary Sewer System Evaluation Report

The 1985 Sanitary Sewer System Analysis prepared by Bohannan-Huston, Inc. (Appendix J) was reviewed to determine if the report indicated any sewer lines which were in need of repair. Although the report was a thorough investigation of the sewer line capacity given sizes and slopes, it did not give an objective analysis of the condition of the lines. The report recommended televising several of the lines to get an objective assessment of the line conditions. No evidence has been found through a search of the records that the televising was performed. The review of the report indicates that, in 1985, there were no readily apparent serious line conditions which would have allowed a release of a contaminant from the system to the environment.

The report indicates that the sewer system consists of 507,670 feet of gravity sewer main ranging in diameter from 6-inch to 30-inch, 1,840 manholes, ten active lift stations, and 19 known septic tanks in use. Pipe materials are clay, concrete, reinforced concrete, polyvinyl chloride (plastic) and some ductile and cast iron" on the main post. The report also summarizes the North Fort Hood sewer system as "composed of 53,293 feet of 6-inch to 24-inch gravity sewer main, 183 manholes,

and two stage treatment lagoon with tertiary filtration and chlorination. Pipe materials are reinforced concrete, asbestos cement, clay and polyvinyl chloride." This type of system, as well as the condition of the system, is consistent with an up to 40 year old sewer system in any average city.

### 4.3 Unauthorized Discharge of Wastewater Noncompliance Notification

Appendix F contains copies of Noncompliance Notifications which were reported to the TNRCC due to a discharge of raw wastewater to the environment from the sanitary sewer system. These discharges and notifications are regulated by the National Pollutant Discharge Elimination System (NPDES). None of the notifications included testing of the wastewater discharged to the environment to determine the constituents involved. Those notifications that were a result of a lift station overflow, because of dilution factors, would most likely include only very small concentrations of hazardous contaminants as defined by RCRA. Flow to the lift stations on Fort Hood is the combined flow of a large area of mixed contribution, some industrial in nature, but mostly residential or commercial. As stated in the Summary of Work for this RFI, this sanitary sewer system can be characterized as similar to any municipal sewer system. Sanitary sewer overflows in municipalities are considered dangerous only in that they contain biological hazards and not chemical (i.e. potentially RCRA) hazards. The overflows from the lift stations can be interpreted in the same manner. The other notifications were due to line breaks. One Noncompliance Notification, dated February 14, 1995, which is included for completeness, indicates that the manhole referred to in the Notification is fed by a Killeen housing area, which is not on Fort Hood. This Notification, because it is not contributed to by Fort Hood, is not subject to consideration under this RFI. Appendix F includes a limited record of noncompliance notification. Records are available only for 1994, 1995, 1996 and 1997. Those records available indicate that releases of raw wastewater to the environment did not typically include anything other than normal sanitary sewer contamination. No evidence was found that hazardous materials or hazardous wastes were released during these occurrences.

### 4.4 Summaj of System Integrity

After review of the available records, it has been determined that as best as can be determined, no areas of the system have documentation of having line breakage problems that would result in a discharge of hazardous materials to the environment. Line breakages and stoppages occurred in areas which did not receive contributions of hazardous materials. Therefore, records and interviews indicate a network in good working condition without any major problems except in the food service areas.

## 5.0 SUMMARY OF FINDINGS

Because little evidence of poor sanitary sewer line conditions exists, no relationship matrix of discharges versus line breakage problems can be created which would indicate hazardous constituents being released to the environment. Although there are documented releases of hazardous materials to the sanitary sewer system, there is no evidence that any hazardous wastes or materials were released from the system. All documented sources of release to the system were diluted to the point that release to the environment, if it occurred, would have been negligible. No major line breakages in the collection system were noted in the lines from source areas to sewer mains. Furthermore, a good indication of the fact that there was little opportunity for release to the environment through the sanitary sewer system is that the receiving public treatment works, Bell County Water Control & Improvement District No. 1, did not during the time reviewed (records from 1993- 1996 were available in the files), report that the treatment plant was compromised by discharges from Fort Hood. Because a wastewater treatment facility depends on a healthy biological system not compromised by chemicals introduced to the process stream, the status of the receiving treatment works is a good indicator of the level of hazardous constituent contributions.

## 5.1 Areas of Concern

The only potential area of concern is the line from Hood Army Airfield which may have in times past carried quantities of spilled fuels. Interviews with site personnel indicate that spills that occurred in the past on the airfield were flushed to the drain and diluted with copious amounts of water. This practice was discontinued at least six years ago. The only line that is likely to be affected by this however is the line south of the airfield up to where it connects to the rest of the system. There is no evidence found that suggests a problem with the sewer lines. Therefore, it is unlikely the subsurface media has been affected by a release from the sewer system.

# 6.0 CONCLUSIONS AND RECOMMENDATIONS

No further action is recommended for SWMU No. FH-053 Fort Hood Sanitary Sewer System. This review of records and interviews failed to identify any significant hazardous material/waste releases from the sanitary sewer system. The records indicate a system in good condition, especially down stream from the potential introduction points of hazardous materials/wastes into the network. No problems have been identified at the treatment facility in meeting the NPDES limits and no treatment interferences that would occur if Fort Hood were releasing significant quantities of hazardous material/waste through the system.

# Appendix A

# Classification Yard, Notice of Registration for the Texas Natural Resource Conservation Commission (TNRCC)

## Appendix A

### Classification Yard, Notice of Registration for the Texas Natural Resource Conservation-Commission (TNRCC)

This Notice of Registration was reviewed to determine types of waste handled on the site and which of these wastes could have been disposed of through the sanitary sewer system. The copy obtained from the Environmental Division of the Directorate of Public Works had the marks seen on the copy in this report and the marks do not pertain to this record search.

Index to NOR for Solid Waste Registration Number 66005 Headquarters III Corps
for wastes and units

Wastes

| Waste Code | Waste Description | NOR Page | Old Texas Waste Code |
|---|---|---|---|
| ** Active Wastes ** | | | |
| 0001117H | Waste liquid mercury | 2 | |
| 0003202H | TETRACHLOROETHYLENE | 2 | |
| 0006203H | ACETONE | 2 | |
| 0007409H | WASTE PAINT CHIPS FROM EXTERIOR WALL SCRAPPING | 2 | |
| 0008003H | MIXED LAB PACK | 3 | |
| 0012209H | MIXED PAINT | 3 | |
| 0013202H | Oil contaminated w/trichlor, by product of laborat | 3 | |
| 0015203H | UNUSED METHANOL | 3 | |
| 0017203H | M256 KIT WITH METHANOL AND MECURIC CYANIDE | 4 | |
| 0018409H | Absorbent, spill cleanup | 4 | |
| 0020409H | ANTI-SEIZE/PETROLEUM OIL WITH LEAD | 4 | |
| 0021210H | INSULATING COMPOUND, EPOXY | 4 | |
| 0022219H | CORROSION RESISTANT COATING | 5 | |
| 0023210H | ADHESIVES | 5 | |
| 0024202H | EPOXY RESIN COATING | 5 | |
| 0025203H | XYLENE | 5 | |
| 0026407H | GREASE CONTAMINATED WITH LEAD | 6 | |
| 0027312H | CORROSION RESISTANT COATING | 6 | |
| 10074091 | Paint chips and contruction residue fromclean up. | 6 | |
| 1378114H | Aquesous waste containing lead and PCB's | 6 | |
| 36492961 | Used Antifreeze | 6 | |
| 4119103H | CORROSION INHIBITOR, SODIUM CHROMATE | 7 | |
| 4120106H | PAINT REMOVER WITH SODIUM CHROMATE AND METHYLENE | 7 | |
| 41241191 | Detergents, cleaning compounds, gas path | 7 | |
| 4128203H | PLASTIC POLISH, LIQUID | 7 | |
| 4136104H | COATING COMPOUND (CHROMIC ACID) | 8 | |
| 42103111 | Asbestos containing materials | 8 | |
| 42403 10H | WHETLERITE FILTERS WITH CHROMIC ACID | 8 | |
| 4912409H | Rock from burn pit, fire training unit ourn pit | 8 | |
| 4913203H | Methanol, off-specification material | 9 | |
| 4914201H | Preventive compound, off-spec material | 9 | |
| 4915101H | LIQUID/WATER/SLUDGE | 9 | |
| 4935296H | ANTIFREEZE (UNUSED) | 9 | |
| 4943409H | Soil (South), baseline analysis classification yar | 10 | |
| 4944296H | USED ANTIFREEZE | 10 | |
| 4945211H | Waste oil, drained oil of unknown origin | 10 | |
| 4947101H | WASTE WATER | 10 | |
| 4954490H | SAND BLAST PLASTIC BEADS | 11 | |
| 4955409H | Soil (north), baselink analysis classification yar | 11 | |
| 5142101H | Corrosion preventive compound, aerosol | 11 | |
| 58569992 | Plant proauction refuse | 11 | |
| 6079202H | USED PERCHLOROETHYLENE | 12 | |
| 608040 | Spent filters from dry cleaning operations contami | 12 | |
| 6081203H | Used dry clean with naphtha, dry Cleaning operatio | 12 | |
| 6084604H | Chemical agent resistant coating (paint) contamina | 12 | 990001 |
| 6085211H | Mo gas, off specification gasoline | 13 | |
| 60862 11 H | Waste paint thinner from paint generation. May in | 13 | |
| 6087203H | HOSPITAL LABORATORY WASTE CONTAINING XYLENE, ET | 13 | |
| 6088219H | Paint related waste with mineral spirits, paints c | 13 | |
| 6090219H | Paint related waste containing toluene, paint cont | 14 | |

Index to NOR for Solid Waste Registration Number 66005 Headquarters III Corps
for wastes and units

Wastes

| Waste Code | Waste Description | NOR Page | Old Texas Waste Code |
|---|---|---|---|
| 6091209H | Latex and enamel Paint, off specification mixed pa | 14 | |
| 6092301H | Grease, grease contaminated w/fuel or water | 14 | |
| 6095211H | FUEL CONTAMINATED WITH OIL | 14 | |
| 6098201H | PD680 Solvent, spent solvent that may be contamina | 15 | |
| 6135309H | Waste batteries containing mercury | 15 | |
| 6140309H | Waste batteries containing nickel cadmium and pota | 15 | 990006 |
| 6141309H | Silver oxide batteries | 15 | |
| 6601004H | M272 Water Test Kit, Chemical Agent | 16 | |
| 6665105H | Diethyl Pthalate (part C of M229 Refill kit)' | 16 | |
| 6750105H | PHOTO CHEMICALS, ACETIC ACID | 16 | |
| 6751110H | PHOTO CHEMICALS, CAUSTIC | 16 | |
| 6752219H | PHOTO CHEMICALS, FLAMMABLE | 17 | |
| 67541191 | PHOTO CHEMICALS, TONER WITH SODIUM SELENITE | 17 | |
| 6755319H | PHOTO CHEMICLAS, TONER POWDER WITH SODIUM SUL | 17 | |
| 6756409H | Silver paper | 17 | |
| 6800105H | HYDROCHLORIC ACID SOLUTIONS | 18 | |
| 6810315H | Calcium hypochlorlte (39% chlorine) | 18 | 990009 |
| 6811110H | HYDROXIDE SLUDGES AND SOLUTION (POTASSIUM | 18 | |
| '6813203H | TOLUENE . | 18 | |
| 6814203H | NAPTHA | 19 | |
| 6816203H | METHYL ETHYL KETONE | 19 | |
| 6817202H | 1., 1., 1 TRICHLOROETHANE | 19 | |
| 6819105H | SULFURIC ACID | 19 | |
| 6820202H | 0-DICHLOROBENZENE | 20 | |
| 6821203H | DECON KIT SKIN M58 TRAINER | 20 | |
| 6822001H | Water Test Reagents | 20 | |
| 6823105H | HCl used in metal cleaning | 20 | |
| 6824203H | FORMALDEHYDE | 21 | |
| 6825105H | Dimethyl-1-napthylamlne | 21 | |
| 6826105H | Sulfanilic Acid Reagent | 21 | |
| 6827409H | Phenol | 21 | |
| 6828316H | Barium Chloride | 22 | |
| 6829319H | Sodium Nitrite | 22 | |
| 6830319H | Potassium Dichromate | 22 | |
| 6831315H | SILVER NITRATE | 22 | |
| 6833315H | Dicyclohexylammonium Nitrite (Corrosion inhibitor) | 23 | |
| 6834203H | Butyl Alcohol | 23 | |
| 68353161 | Hydroxide sollds | 23 | |
| 68363151 | Lab reagents/solid | 23 | |
| 6837315H | Sodium Dichromate | 23 | |
| 6838211H | Fuel additive containing octanes and peptanes | 24 | |
| 6839312H | Potasslum Ferricyanide and Potasslum Cyanide | 24 | |
| 6841801H | WASTE FLAMMABLE INSECTICIDES MAY CONTAINN,N-DIETHY | 24 | |
| 68424021 | Herbicide with trifluralin | 24 | |
| 68434021 | Herbicide with copper hydroxide | 24 | |
| 6844401H | Hexachlorocyclohexane (gamma isomer) or Lindane Ha | 25 | |
| 68454021 | Insecticide lotion, n,n-diethyl m-toluami d | 25 | |
| 6846402H | Dursban insecticide | 25 | |
| 68418011 | Insecticide aerosol | 25 | |
| 68484021 | Pesticide pyrethrin | 25 | |
| 68494021 | RODENTICIDE, DIPHACINONE | 25 | |

Index to NOR for Solid Waste Registration Number 66005 Headquarters III Corps
for wastes and units

Wastes

| Waste Code | Waste Description | NOR Page | Old Texas Waste Code |
|---|---|---|---|
| 6850110H | Decontaminated agent (DS-2) containing Diethylenet | 26 | 990002 |
| 6851110H | CORROSION INHIBITOR | 26 | |
| 6852310H | Solvent contaminated rags | 26 | |
| 6853203H | Dimethyl Sulfate | 26 | |
| 68542031 | Phenylhydrazine | 27 | |
| 6855202H | Epichlorohydrin | 27 | |
| 6856312H | Mercury Cyanide | 27 | |
| 6857316H | Sodium Arsenite | 27 | |
| 6858315H | Zinc powder | 28 | |
| 68593191 | Dessicants | 28 | |
| 68602191 | Grease | 28 | |
| 6861206H | Oil/Sulfuric acid mix | 28 | |
| 6862409H | Blast-media | 28 | |
| 6863315H | Sodium sulfite/sulfate | 29 | |
| 6864203H | Waste solvent (PD-680) | 29 | |
| 68654891 | Polypropylene absorbents | 29 | |
| 6866319H | Conductive coating 85% silver | 29 | |
| 6867110H | Microbiocide containing potassium dimethyldi | 30 | |
| 68693161 | Copper sulfate | 30 | |
| 68703191 | Boric acid | 30 | |
| 6871112H | Hydrogen peroxide | 30 | |
| 68728011 | Spray Kit, mixture of freon 113. isobutane, | 30 | |
| 6873801H | Compressed gas cylinders (flammable) | 31 | |
| 6875110H | Hypochlorite solutions | 31 | |
| 6876316H | Calcium Hydride | 31 | |
| 6877203H | TETRAHYDROFURAN | 31 | |
| 68782021 | REFRIGERANTS LIQUID (R-11,22,113,213) | 31 | |
| 6879203H | TRICHLOROMETHANE | 32 | |
| 7001315H | CHROMIC ACID | 32 | |
| 7006319H | M229 FILTERS | 32 | |
| 7007110H | CYCLOHEXLAMINE AND SOLUTIONS | 32 | |
| 7009210H | PRIMER KIT, PRETREATMENT COATING FOR METAL: ZINC C | 33 | |
| 7010105H | CORROSION PREVENTIVE COMPOUND CONTAININGCHROMIC AC | 33 | |
| 7011203H | LUBRICANT SOLID FILM CONTAINING TOLUENE,MEK, ANTIM | 33 | |
| 7500001H | DEMILITARIZED M72A1 SKAITS KITS | 33 | |
| 7540519H | SELF-LIFE EXPIRED, USED OR DAMAGED, WET,NON-SPIL.LA | 34 | |
| 7930201H | Simple Green used for parts washing | 34 | |
| 8000117H | Spent mercuric chloride solution | 34 | |
| 8001203H | Spent xylene solution | 34 | |
| 80022031 | Neutralized formaldehyde solution | 35 | |
| 80060091 | Cytotoxic drugs; liquid and solid | 35 | |
| 8007009H | Cytotoxic drugs, solid | 35 | |
| 8008009H | Cytotoxic drugs, liquid | 35 | |
| 80102091 | Latex paint | 35 | |
| 80114091 | Paint Booth resldue (filters, coveralls,and etc.) | 35 | |
| 8030210H | ADHESIVES FLAMMABLE | 36 | |
| 8031210H | ADHESIVES CONTAINING SOOIUM FLUOROSILI | 36 | |
| 8032210H | ADHESIVES CONTAINING LEAD OR ORGANIC | 36 | |
| 8033801H | Adhesives in aerosol form | 36 | |
| 80342101 | Adhesive | 36 | |
| 8035210H | Adhesives with peroxide | 37 | |

Index to NOR for Solid Waste Registration Number 66005 Headquarters II Corps
for wastes and units

Wastes

| Waste Code | Waste Description | NOR Page | Old Texas Waste Code |
|---|---|---|---|
| 81602971 | Non hazardous liquids containing >= 50 and < 500 | 37 | |
| 81612981 | Non hazardous llquid containing >= 500 ppm PCB. | 37 | |
| 81623961 | Non hazardous electrical equipment/devices contain | 37 | |
| 81633971 | Non hazardous electrical equipment/devices contain | 37 | |
| 8200801H | Trichlorofluoromethane aerosol | 38 | |
| 8201202H | Trichloroethylene liquid | 38 | |
| 82028011 | Non-flammable, non-hazardous.aerosols | 38 | |
| 8203801H | 1,1,1 Trichloroethane aerosol | 38 | |
| 8703489H | GREASE/SLUDGE/FUEL | 39 | |
| 8704204H | OIL CONTAMINATED WITH 1., 1., 1. TRICHLOROE | 39 | |
| 8722204H | Underground tank residue, underground storage tank | 39 | |
| 8728301H | Paint chips/dirt/trash | 39 | |
| 9000388H | Fluorescent Bulbs | 40 | |
| 90012051 | Waste oil/antifreeze, engine repair | 40 | |
| 90023101 | Oil filters | 40 | |
| 90033082 | Scrap metal (empty containers) | 40 | |
| 9151206H | WASTE PETROLEUM OIL WITH CHARACTERISTIC OF FLAMMAB | 40 | |
| 93903111 | FRIABLE ASBESTOS | 40 | |
| 94303941 | Non hazardous sollds containing>=50 and < 500 | 41 | |
| 94313951 | Non hazardous solids containing >= 500 ppm PCB. | 41 | |
| 9432398 1 | Non hazardous soils containing >= 50 and < 500 | 41 | |
| 94333991 | Non hazardous soils containing >= 500 ppm PCB. | 41 | |
| 9669404H | PETROLEUM CONTAMINATED ABSORBENT | 41 | |
| 9705309H | ii:AD ACID BAtterIeS | 42 | |
| 9706203H | ISOPROPY'L ALCOHOL | 42 | |
| 9707203H | DENATURE ID ALCOHOL | 42 | |
| 9835402H | RODENTICIDE BAIT ANTICOAGULANT (WARFIN) | 42 | |
| 9836105H | NITRIC ACID | 43 | |
| 9837105H | PHOSPHORIC ACID | 43 | |
| 9930202H | METHYLENE CHLORIDE | 43 | |
| 9932203H | CARBON TETRACHLORIDE | 43 | |
| 9933309H | LITHIUM BATTERIES ✓ | 44 | |
| 9934309H | MAGNISIUM CARBION BATTERIES ✓ | 44 | |
| 9935319H | Lead contaminated battery shop sludge | 44 | |
| 99363011 | Dry Sweep | 44 | |
| 99914091 | Paint debris | 44 | |
| 99924881 | Wood debris | 45 | |
| 9993488H | Wood debris | 45 | |
| 100380 | BLEACH (HYPOCHLORITE) | 45 | |
| 100570 | PHOTOGRAPHIC CHIICAL WASTES | 45 | |
| 101790 | POTASSIUM CYANIDE., LIQUID SOLUTION | 45 | |
| 102580 | WATER-WAX EMULSION | 45 | |
| 103020 | POLYSULFIDES | 45 | |
| 103190 | BROMIDE SOLUTION | 46 | |
| 104360 | SILICONE "RELEASING" SOLUTION | 46 | |
| 104690 | AMMONIUM THIOSULFATE | 46 | |
| 109860 | INK WASTE, PRINTING | 46 | |
| 110650 | PAINT WASTE, LIQUID | 46 | |
| 111050 | ESTERS, ORGANIC (HIGH BOILING) | 46 | |
| 112310 | OIL, MINERAL | 46 | |
| 112820 | INSECTICIDE MFG. WASTE, MISC. | 46 | |

Index to NOR for Solid Waste Registration Number 66005 Headquarters.11 I Corps
for wastes and units

Wastes

| Waste Code | Waste Description | NOR Page | Old Texas Waste Code |
|---|---|---|---|
| 112850 | GLYCOLS | 47 | |
| 113810 | SEALANT | 47 | |
| 117570 | CORROSION PREVENTIVE | 47 | |
| 119270 | PETROLEUM DISTILLATE | 47 | |
| 142420 | GLAZE WASTE | 47 | |
| 170503 | MOLYBDENUM COMPOUNDS | 47 | |
| 172350 | FERRIC CHLORIDE | 47 | |
| 172700 | DETERGENT, MAKES HIGHLY ALKALINE SOLUTION | 47 | |
| 172960 | IRON OXIDE | 48 | |
| 172990 | GASKET MATERIAL | 48 | |
| 174470 | SILICA | 48 | |
| 175580 | CALCIUM CARBONATE | 48 | |
| 175960 | IODINE | 48 | |
| 176970 | SODIUM THIOCYANATE | 48 | |
| 178160 | PCB TRANSFORMER | 48 | |
| 179290 | ACID CON'TAMINATED MATERIAL | 48 | |
| 179370 | ASBESTOS CONTAMINATED MATERIAL | 49 | |
| 179430 | PCB CONTAMINATED SOLIDS | 49 | |
| 179450 | CONTAINERS, EMPTY | 49 | |
| 180440 | GREASE | 49 | |
| 182670 | DISINFECTANT - SOLID | 49 | |
| 182850 | UREA | 49 | |
| 900120 | SODIUM HYDROXIDE SOLUTION | 50 | |
| 910060 | TOLUENE | 50 | |
| 912010 | FREON | 50 | |
| 915100 | SODIUM AZIDE | 50 | |
| 916600 | SOLVENT MIXTURE, SPENT | 50 | |
| 916940 | PAINT AND SOLVENTS | 50 | |
| 970570 | BATTERIES, STORAGE & DRY CELLS, SCRAP | 51 | |
| 976810 | BATTERIES, LITHIUM | 51 | |
| 983520 | WARFARIN CONTAMINATED SOLID MATERIAL (P001) | 51 | |
| 984130 | DIMETHYL SULFATE | 51 | |
| 990003 | D003 CHARACTERISTIC OF REACTIVITY | 51 | |
| 990005 | D005 CHARACTERISTIC OF EP TOXICITY - BARIUM | 52 | |
| 990007 | D007 CHARACTERISTIC OF EP TOXICITY - CHROMIUM | 52 | |
| 990008 | D008 CHARACTERISTIC OF EP TOXICITY - LEAD | 52 | |
| 990011 | D011 CHARACTERISTIC OF EP TOXICITY - SILVER | 52 | |
| 990013 | D013 CHARACTERISTIC OF EP TOXICITY - LINDANE | 52 | |
| 991001 | THE FOLLOWING SPENT HALOGENATED SOLVENTS USED IN D | 53 | |
| 991002 | THE FOLLOWING SPENT HALOGENATED SOLVENTS: TETRACHL | 53 | |
| 991003 | SPENT NON-HALOGENATED SOLVENTS: XYLENE, ACETONE, ETHY | 53 | |
| 991004 | THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: CRES | 53 | |
| 991005 | THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: TOLU | 53 | |
| 993002 | U002 ACETONE OR 2-PROPANONE | 54 | |
| 993035 | U035 BUTANOIC ACID, 4-(BIS(2-CHLOROETHYL)AMINO)BE | 54 | |
| 993042 | U042 2-CHLOROETHYL VINYL ETHER OR ETHANE, 2-CHLOR | 54 | |
| 993044 | U044 CHLOROFORM OR METHANE, TRICHLORO- | 54 | |
| 993129 | U129 HEXACHLOROCYCLOHEXANE (GAMMA ISOMER) OR LIND | 54 | |

Index to NOR for Solid Waste Registration Number 66005 Headquarters III Corps
for wastes and unlts

Units

| Unit Sequence Number | Unit Description | NOR Page |
|---|---|---|
| * Active and Closure Pending Units * | | |
| 001 | Covered facility @ 6000 square feet. Main DRMO sl | 55 |
| 002 | Bunker 92209 | 55 |
| 003 | Open Burn/Open Detonation Unit 1000 lb/hr | 55 |
| 004 | DEH Tank FH-043 | 55 |
| 005 | DEH Hazardous Material/waste classlflcatlon/Proces | 55 |
| 006 | 1st Cavalry Dlvlslon spray paint booth (Bldg. 320 | 56 |
| 007 | 2nd Armor Division spray palnt booth 9576 (Bldg.) | 57 |
| 008 | - Dlrectorate of logistics spray paint booth, | 57 |
| 009 | <90 DAY STORAGE AREA - DOL LAUNDRY | 57 |
| 010 | <90 DAY STORAGE AREA - DEH GROUNDS AND PAVEMENTS | 57 |
| 011 | <90 DAY STORAGE AREA - NEW DOL MAINTENANC | 57 |
| 012 | Bunker 92210 | 57 |
| 013 | TASC Training Ald Fabrication Shop | 57 |
| 014 | Hood Army Air Field, Aviation Malntenanc | 57 |

# Appendix B

# Community Right-to-Know File

## Appendix B

## Community Right-to-Know File

This Community Right to Know Toxic Release Inventory was obtained from the Directorate of Public Works Environmental Management Office of the Environmental Division. It was reviewed for information about any possible releases of the chemicals listed to the sanitary sewer system. The copy obtained was from a file copy and any marks appearing on the copies in this report do not indicate anything applicable to this report.

Roy F. Weston, Inc.
Suite 107
1515 Capitol of Texas Highway South
Austin, Texas 78746-6544
312-329-6399 • Fax 312-329-5472

25 June1996

Ms. Beverly Brannan
CESWF-ED-MR, Room 6A18
U.S. Army Corps of Engineers
819 Taylor Street
Ft. Worth, Texas 76102-0300

RE: Fort Hood 1995 CERCLA Form R Reports
U.S. Army Corps of Engineers Contract No. DACA56-93-D-0008
Delivery Order No. 11, Modification No. 2
WESTON Work Order No. 03886-l 16403403040

Dear Ms. Brannan:

Attached, please find the draft Toxic Release Inventory' (TRI) Form R Reports (Form Rs) for the reporting year 1995 for Fort Hood. Reports 'were prepare for the following chemicals: methyl ethyl ketone, xylene, methanol, and toluene. This report was prepared by Roy F. Weston, Inc. (WESTON®) under the U.S. Army Corps of Engineers (USACE) Contract No. DACA56-93-D-0008, Delivery Order No. 11, Modification No. 02.

Form Rs are required by Section 313 of the Emergency Planning and Community Right-to-Know Act, to provide the public with information on the releases of TRI toxic chemicals. Facilities must report the quantities of routine and accidental releases of TRI chemicals, the maximum amount of TRI chemicals on-site during the calendar year, and the amount of wastes transferred off-site. A Form R must be submitted for each TRI chemical that is processed, manufactured, or otherwise used at a facility in excess of the reporting threshold. For Fort Hood, all chemicals on-post are "otherwise used" and the reporting threshold is 10,000 pounds of a TRI chemical on-post in a calendar year. WESTON prepared the Form Rs for Fort Hood in general accordance with the guidance published by the 'EPA, " Toxic Chemical Release Inventory Reporting Form R and Instructions", revised 1995 version.

WESTON utilized the EPA-provided software to 'complete the 1995 Form Rs. It should be noted that the EPA-provided software does not produce a final Form R document identical to the forms found in the instruction manual. According to personnel at the TRI Form R Software Support Hotline, the format produced by the software is acceptable as the final version and is to be submitted to the agencies without retyping the information on the forms in the instruction manual.

The Fort Hood Form Rs were prepared based on information obtained from the post on chemical usage and inventories. This information was obtained from the units on-post on monthly chemical inventories provided to Fort Hood Department of Public Works Environmental (DPW) staff. However, the information received from the post was not complete for the entire calendar year, with 'approximately fifty percent of the monthly inventories being completed by those units that did provide some data. Also, some of the units on-post did not provide any data. Information on waste handling and disposal was obtained from the Fort Hood DPW personnel.

As previously directed, WESTON prepared reports for those chemicals utilized by DS/GS operations on-post and took advantage of the vehicle maintenance and article exemptions. WESTON based the Form R reports on the following information:

- No information was included for the National Guard MATES unit, located on North Fort Hood. The National Guard completes Form Rs for their operations.

- Chemical inventory data was prorated to annualize the volumes of chemicals used and stored at the units for which monthly inventory data was received.

- It was assumed that approximately ten percent of the units on-post did not submit any inventory information for calendar year 1996.

- Chemical composition data for products used on-post was obtained from the HMIS database L version. Average compositions were computed for like products (i.e., enamel paints) to obtain total chemical quantities for the post.

- Information about 1994 chemical release/disposal quantities required on the Form Rs was obtained from the 1994 Form R reports and the chemical data obtained for calculating the 1994 Form R quantities.

- Estimates for the release/disposal quantity projections for 1996 and 1997 for the chemicals reported are also required on the Form Rs. Based on the Army requirement that releases be reduced by 50% by the year 1999, WESTON estimated* that measures would be implemented to reduce the releases by 25% in 1996 from those reported in 1995, and by an additional 20% in 1997.

- Air release information was based on the information contained in the Fort Hood Air Pollution Emission Statement Report, dated September 1994. For



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pain t-related chemicals, WESTON assumed that 90% of the painting operations were performed in the paint booths and 10% of the painting was performed outside the paint booths.

- Disposal/disposer information was obtained from the Fort Hood 1995 Annual Waste Summary report, dated 24 January 1996; the TNRCC Notice of Registration, dated 10 April 1996; and manifests maintained for the calendar year 1995. WESTON also contacted the disposal companies to obtain additional information on treatment methods, quantities, and disposer address.

Based on the information available, and the reporting threshold of 10,000 pounds of a TRI chemical in the calendar year, WESTON identified four chemicals for which Form Rs are required: methyl ethyl ketone, xylene, methanol, and toluene. Of these, methyl ethyl ketone and toluene were reported for this facility in the 1994 reporting year reports. Sulfuric acid and 1,1, 1-trichloroethane were also reported for 1994. However, sulfuric acid is only reportable for 1995 in. the aerosol form and there was insufficient quantity to require reporting of 1, 1, 1-trichloroethane for 1995. Draft Form Rs have been prepared for the 1995 TRI chemicals. Copies of the draft Form R reports and the codes used on the forms are attached.

Please review these forms as soon as possible and notify WESTON of any necessary changes. To meet the reporting deadline of 1 August 1996, WESTON must have comments on the draft forms no later than 19 July 1996, so that the revised Form Rs can be sent to Fort Hood for review, signature, and mail out. If you have any questions regarding the 1995 Form R report preparation, please contact me at (512) 329-8399.

Very truly yours,

ROY F. WESTON, INC.

Kristy Stewart

Kristy Stewart
Associate Engineer

Attachments

cc: Mr. Dave Wrbas, Fort Hood (5 copies)
Mr. Tom Hoskings, WESTON (1 copy)



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Form Approved OMB Number: 2070-0092
Approval Expires: 11/92

MPORTANT: Type or print; read instructions before completing form)



PA

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nvironmental
rotection
agency

FORM R

TOXIC CHEMICAL RELEASE
INVENTORY REPORTING FORM

Section 313 of the Emergency Planning and Community Right-to-Know Act of 1986, also known as Title III of the Superfund Amendments and Reauthorization Act

TRI FACILITY ID NUMBER: 76544SDPTFBLDG4

Chem., Cat., or Gen. Name: METHANOL

WHERE TO SEND COMPLETED FORMS:
1. EPCRA Reporting Center
P.O. Box 3348
Merrifield, VA 22116-3348
ATTN: TOXIC CHEMICAL RELEASE INVENTORY

2. APPROPRIATE STATE OFFICE
(See instructions in Appendix F)

Enter "X" here if this is a revision: X

For EPA use only

IMPORTANT: See instructions to determine when "Not Applicable (NA)" boxes should be checked.

PART I. FACILITY IDENTIFICATION INFORMATION

SECTION 1. REPORTING YEAR

Section 2. TRADE SECRET INFORMATION

2.1 Are you claiming the toxic chemical identified on page 3 trade secret?
[ ] Yes (Answer question 2.2; Attach substantiation forms)
[X] No (Do not answer 2.2; Go to Section 3)

2.21 If yes in 2.1, is this copy: [ ] Sanitized [ ] Unsanitized

SECTION 3. CERTIFICATION (Important: Read and sign after completing all form sections-)

I hearby certify that t have reviewed the attached'documents and that, to the best of my knowledge and belief, the submitted information is true and complete and that the amounts and values in this report are accurate based on reasonable estimates using data available to the preparers of this report.

Name and official title of owner/operator or senior management official
WILLIAM BODKIN, CHIEF ENVIRONMENTAL MANAGEMENT BRANCH

Signature: William C Bodkin

Date Signed: 24 Sep 96

SECTION 4. FACILITY IDENTIFICATION

Facility or Establishment Name: U.S. DOD U.S. ARMY FORT HOOD

TRI Facility ID Nunber: 76544SDPTFBLDG4

Street Address: BUILDING 4219, 77TH ST AT WAREHOUSE AVE

City: FORT HOOD

County: BELL

4.1

State: TX

Zip Code: 76544-5057

Mailing Address (if different from street address)
ATTN: AFZF-DU-ENV

FORT HOOD

State: TX

Zip Code: 76544-5057

PUT LABEL HERE

EPA
Ur .ates
En..onmental
Protection
Agency

EPA FORM R
PART I. FACILITY IDENTIFICATION
INFORMATION (CONTINUED)

TRI FACILITY ID NUMBER
76544SDPTFBLDG4
Chem., Cat.; or Cen. Name
METHANOL

SECTION 4. FACILITY IDENTIFICATION (Continued)

4.2 This report contains information for:
(Important: check only one) a. [X] An entire facility b. [ I Part of a facility c. [X] Federal Facility

4.3 Technical Name
Contact GARY TOOKE
Telephone Nunber (include area code) (817)288-5132

4.4 Public Name
Contact PUBLIC AFFAIRS OFFJCER
Telephone Nunber (include area code) (817)287-3703

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 4.5 | SIC Code (4-digit) | a. 9711 | b. NA | c. | d. | e. | f. |

| | | Latitude | | | Longitude | | |
|---|---|---|---|---|---|---|---|
| 4.6 | Latitude and | Degrees, | Minutes | Seconds | Degrees | Minutes | Seconds |
| | Longitude | 031 | 08 | 14 | 0 9 7 | 47 | 26 |

4.7 Dun & Bradstreet Number(s) (9 digits)
a. NA
b.

4.8 EPA Identification Number(s) (RCRA I.D. No,) (12 characters)
a. TX8214020424
b. NA

4.9 Facility NPDES Permit Number(s) (9 characters)
a. TX0002233
b. TX0063886

4.10 Underground Injection Well Code (UIC) I.D. Number(s) (12 digits)
a. NA
b.

SECTION 5. PARENT COMPANY INFORMATION

5.1 Name of Parent Company
I I HA U.S. DEPARTMENT OF DEFENSE

5.2 Parent Company's Dun & Bradstreet Number
[X] NA (9 Digits) NA

EPA

ted States
environmental
Protection
Agency

EPA FORM R

PART II. CHEMICAL-SPECIFIC INFORMATION

TRI FACILITY ID NUMBER
76544SDPTFBLDG4

Chem., cat., or Gen. Name
METHANOL

**SECTION 1. TOXIC CHEMICAL IDENTITY (Important: DO NOT complete this section if you complete Section 2 below.1**

1.1 CAS Number (Important: Enter only one number exactly as it appears on the Section 313 list-

000067-56-1

1.21 Toxic Chemical or Chemical. Category Name (Important: Enter only one name exactly as it appears on the Section 313 list.)

METHANOL

1.31 Generic Chemical Name (Important: Complete only if Part I, Section 2.1 is checked "yes."

HA

SECTION 2. MIXTURE COMPONENT IDENTITY (Important: DO NOT complete this section if you complete Section 1 above.)

2. 1 Generic Chemical Name Provided by Supplier (Important: Max. of 70 chars.., including numbers, letters, spaces, and punct.)

NA

**TION 3. ACTIVITIES AND USES OF THE CHEMICAL AT THE FACILITY** (Important: Check all that apply.)

| | | | |
|---|---|---|---|
| 3.1 | Manufacture the toxic chemical: | a. [ I Produce<br>b. [ I Import | If produce or import:<br>c. [ ] For on-site use/processing<br>d. [ ] For sale/distribution<br>e. [ ] As a byproduct'<br>f. [ ] As an impurity |
| 3.2 | Process the toxic chemical | a. [ I As a reactant<br>b. I I As a formulation component | c. [ I As an article component<br>d. [ I Repackaging |
| 3.3 | Otherwise use the'toxic chemical: | a. [ I As a chemical processing aid<br>b. [ I As a manufacturing aid | c. [X] Ancillary or other use |

**Section 4. MAXIMUM AMOUNT OF THE TOXIC CHEMICAL ON-SITE AT ANY TIME DURING THE CALENDAR YEAR**

4.1 104 (Enter two-digit code from instruction package.)

| United States Environmental Protection Agency | EPA FORM R<br>PART II. CHEMICAL-SPECIFIC INFORMATION (CONTINUED) | TRI FACILITY ID NUMBER<br>76544SDPTFBLDG4<br>Chem., Cat., or Cen. Name<br>METHANOL |
|---|---|---|

SECTION 5. RELEASES OF THE TOXIC CHEMICAL TO THE ENVIRONMENT ON-SITE

| | | A. Total Release (pounds/year) (enter range code from instructions or estimate) | B. Basis of Estimate (enter code) | C. % From Stormwater |
|---|---|---|---|---|
| 5.1 Fugitive or non-point air emissions | [ ]NA | 12000 | 0 | |
| 5.2 Stack or point air emissions | CXINA | NA | | |
| 5.3 Discharges to receiving streams or water bodies (enter one name per box) | | | | |
| 5.3.1 Stream or Water Body Name | | | | |
| W A | | | | |
| .2 Stream or Water Body Name | | | | |
| 15.3.3 Stream or Water Body Name | | | | |
| 5.4 Underground injections on-site | [X]NA | H A | | |
| 5.5 Releases to land on-site | | | | |
| 5.5.1 Landfill | [X]NA | N A | | |
| 5.5.2 Land treatment/ application farming | CXINA | WA | | |
| 5.5.3 Surface impoundment | [X]NA | NA | | |
| .5.4 Other disposal | CXIN | NA | | |

[ 1 Check here only if additional Section 5.3 information is provided on page 5 of this form.



Range Codes: A = 1-10 pounds; B = 11-499 pounds; c = 500 • 999 pounds.

| 'EPA. .d States Environmental Protection Agency | EPA FORM R<br>PART II. CHEMICAL-SPECIFIC INFORMATION (CONTINUED) | TRI FACILITY ID NUMBER<br>76544SDPTFBLDG4<br>Chem., Cat., or Gen. Name<br>METHANOL |
|---|---|---|

Section 5.3 ADDITIONAL INFORMATION ON RELEASES OF THE TOXIC CHEMICAL TO THE ENVIRONMENT ON-SITE

| 5.3 Discharges to receiving streams or water bodies (enter one name per box) | A. Total Release (pounds/year) (enter range code from instructions or estimate) | B. Basis of Estimate (enter code) | C. % From Stormwater |
|---|---|---|---|
| 5.3.4 Stream or Water Body Name | | | |
| 5.3.5 Stream or Water Body Name | | | |
| 5.3.6 Stream or Water Body Name | | | |

SECTION 6. TRANSFERS OF THE TOXIC CHEMICAL IN WASTES TO OFF-SITE LOCATIONS

6.1 DISCHARGES TO PUBLICLY OWNED TREATMENT WORKS (POTW)

6.1.A Total Quantity Transferred to POTWs and Basis of Estimate

| 6.1.A.1 Total Transfers (pounds/year) (enter range code or estimate) | 6.1.A.2 Basis of Estimate (enter code) |
|---|---|
| NA | |

6.1.B POTW Name and Location Information

| 6.1.B.1 POTW Name | | 6.1.B.2 POTW Name | |
|---|---|---|---|
| Street Address | | Street Address | |
| City | county | City | County |
| State | Zip Code | State | Zip Code |

If additional pages of Part II, Sections 5.3 and/or 6.1 are attached, indicate the total number of pages in this box [ I and indicate which Part II, Sections 5.3/6.1 page this is, here: [1 ]
(example: 1,2,3,etc.)



Range Codes: A = 1-10 pounds; B = 11-499 pounds; c = 500 • 999 pounds.

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PART II. CHEMICAL-SPECIFIC
INFORMATION (CONTINUED)

TRI FACILITY ID NUMBER: 76544SDPTFBLDG4

Chem., Cat., or Gen. Name: METHANOL

SECTION 6.2 TRANSFERS TO OTHER OFF-SITE LOCATIONS

6.2.1 Off-site EPA Identification Number (RCRA ID No.)
TX0046844700

Off-Site Location Name CHEMICAL RECLAMATION SERVICE

Street Address -405 POWELL STREET

City AVALON

County ELLIS

State TX | Zip Code 76623- | 1 Is location under control of reporting [ 1 YES [X] NO

| A. Total Transfers (pounds/year] (enter range code or estimate] | B. Basis of Estimate (enter code] | C. Type of Waste Treatment/Disposal/ Recycling/Energy Recovery (enter code) |
|---|---|---|
| 1. 2600 | 1. c | 1. M92 |
| 2. B | 2. C | 2. M10 |
| 3. NA | 3. | 3. |
| 4. | 4. | 4. |

SECTION 6.2 TRANSFERS TO OTHER OFF-SITE LOCATIONS

6.2.2 Off-site EPA Identification Number (RCRA ID No.]
TX0077603371

Off-Site Location Name SAFETY-KLEEN

Street Address 1722 COOPER CREEK ROAD

City DENTON

County DENTON

State TX | Zip Code 76208- | Is location under control of reporting [ I YES [X] NO

| A. Total Trans'fers (pounds/year) (enter range code or estimate) | B. Basis of Estimate (enter code) | C. Type of Waste Treatment/Disposal/ Recycling/Energy Recovery (enter code] |
|---|---|---|
| 1. 1500 | 1. C | 1. M92 |
| 2. NA | 2. | 2. |
| 3. | 3. | 3. |
| 4. | 4. | 4. |

If additional pages of Part II, Section 6.2 are attached, indicate the total number of pages in this box [2 ] end indicate which Part II, Sections 6.2 page this is, here. [1 ]
(example: 1,2,3,etc.)



Range Codes: A = 1-10 pounds; B = 11-499 pounds; c = 500 • 999 pounds.

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PART II. CHEMICAL-SPECIFIC
INFORMATION (CONTINUED)

TRI FACILITY ID NUMBER
76544SDPTFBLDG4

Chem., Cat., or Gen. Name
METHANOL

SECTION 6.2 TRANSFERS TO OTHER OFF-SITE LOCATIONS

.2.3 Off-site EPA Identification Number (RCRA ID No.)
MOD980962849

Off-Site Location Name ESSEX WASTE MANAGEMENT INC.

Street Address. 1483 S.W. HWY 58

City
KINGSVILLE

County
JOHNSON

State MO | Zip Code 64061- | Is location under control of reporting [ ] YES [X] NO

| A. Total Transfers (pounds/year) (enter range code or estimate) | B. Basis of Estimate (enter code) | C. Type of Waste Treatment/Disposal/ Recycling/Energy Recovery (enter code) |
|---|---|---|
| 1. B | 1. c | 1. M92 |
| 2. A | 2. c | 2. M10 |
| 3. NA | 3. | 3. |
| 4. | 4. | 4. |

SECTION 6.2 TRANSFERS TO OTHER OFF-SITE LOCATIONS

6.2.4 Off-site EPA Identification Number (RCRA ID No.)
NA

Off-Site Location Name

Street Address

City

county

State | Zip Code | Is location under control of reporting [ I YES [ ] NO

| IA. Total Transfers (pounds/year) (enter range code or estimate) | B. Basis of Estimate (enter code) | C. Type of Waste Treatment/Disposal/ Recycling/Energy Recovery (enter code) |
|---|---|---|
| 1. | 1. | 1. |
| 2. | 2. | 2. |
| 3. | 3. | 3. |
| 4. | 4. | 4. |

If additional pages of Part II, Section 6.2 are attached, indicate the total number of pages in this box [2 ] and indicate which Part II, Sections 6.2 page this is, here. [2 ]
(example: 1,2,3,etc.)



Range Codes: A = 1-10 pounds; B = 11-499 pounds; c = 500 - 999 pounds.

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PART II. CHEMICAL-SPECIFIC INFORMATION (CONTINUED)

TRI FACILITY ID NUMBER: 76544SDPTFBLDG4

Chem., Cat., or Cen. Name: METHANOL

[Section 7A. (N-SITE WASTE TREATMENT METHODS AND EFFICIENCY

[X] Not Applicable (NA) • Check here if no on-site treatment is applied to any waste stream containing the toxic chemical or chemical category.

| a. General Waste Stream (enter code) | b. Waste Treatment Method(s) Sequence [enter 3-character code(s)] | c. Range of Influent Concentration | d. Treatment Efficiency Estimate | e. Based on Operating Data? |
|---|---|---|---|---|
| 7A.1a | 7A.1b | 7A.1c | 7A.1d | 7A.1e |
| HA | 1 2 3 4 5 6 7 8 | | % | Yes [ 1 No [ 1 |
| 7A.2a | 7A.2b | 7A.2c | 7A.2d | 7A.2e |
| | 1 2 3 4 5 6 7 8 | | % | Yes [ 1 No [ 1 |
| 7A.3a | 7A.3b | 7A.3c | 7A.3d | 7A.3e |
| | 1 2 3 4 5 6 7 8 | | % | Yes [ 1 No [ 1 |
| 7A.4a | 7A.4b | 7A.4c | 7A.4d | 7A.4e |
| | 1 2 3 4 5 6 7 8 | | % | Yes [ 1 No [ 1 |
| 7A.5a | 7A.5b | 7A.5c | 7A.5d | 7A.5e |
| | 1 2 3 4 5 6 7 8 | | % | Yes [ 1 No [ 1 |

If additional pages are attached, indicate the total number of pages in this box [ ] and indicate which page this is, here [1].

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PART II. CHEMICAL-SPECIFIC
INFORMATION (CONTINUED)

TRI FACILITY ID NUMBER
76544SDPTFBLDG4
Chem., Cat., or Gen. Name
METHANOL

Section 7B. ON-SITE ENERGY RECOVERY PROCESSES

[X] Not Applicable (NA) - Check here if no on-site energy recovery is applied to any waste stream containing the toxic chemical or chemical category.

Energy Recovery Methods [enter 3-character code(s)]

| | | | |
|---|---|---|---|
| 1 NA | 2 | 3 | 4 |

Section 7C. ON-SITE RECYCLING PROCESSES

[X] Not Applicable (NA) - Check here if no on-site recycling is applied to any waste stream containing the toxic chemical or chemical category.

Recycling Hethods [enter 3-character code(s)]

| | | | | |
|---|---|---|---|---|
| 1 NA | 2 | 3 | 4 | 5 |
| 6 | 7 | 8 | 9 | 10 |

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PART II. CHEMICAL-SPECIFIC INFORMATION (CONTINUED)

TRI FACILITY ID NUMBER: 76544SDPTFBLDG4

Chem., cat., or Gen. Name: METHANOL

Section 8. SOURCE REDUCTION AND RECYCLING ACTIVITIES

| All estimates can be reported using up to two significant figures. | Colum A 1994 (pounds/year) | Colum B 1995 (pounds/year) | Column c 1996 (pounds/year) | Colum D 1997 (pounds/year) |
|---|---|---|---|---|
| 8.1 Quantity released | 12000 | 12000 | 9000 | 7200 |
| 8.2 Quantity used for energy recovery on-site | WA | HA | NA | WA |
| 8.3 Quantity used for energy recovery off-site | 4500 | 4500 | 3400 | 2700 |
| 8.4 Quantity recycled on-site | NA | NA | NA | NA |
| 8.5 Quantity recycled off-site | NA | NA | NA | NA |
| 8.6 Quantity treated on-site | NA | NA | NA | NA |
| 8.7 Quantity treated off-site | NA | HA | NA | HA |
| 8.8 Quantity released to the environment as a result of remedial actions, catastrophic events, or one-time events not associated with production processes (pounds/year) | | | | 0 |
| 18.9 Production Ratio or Activity Index | | | | 0001.00 |

8.10 Did your facility engage in any source reduction activities for this chemical during the reporting year? If not, enter "NA" In Section 8.10.1 and answer Section 8.11.

| | Source Reduction Activities Center code(s)] | Methods to Identify Activity (enter codes) | | |
|---|---|---|---|---|
| 8.10.1 | NA | a. | b. | c. |
| 8.10.2 | | a. | b. | c. |
| 8.10.3 | | a. | b. | c. |
| 8.10.4 | | a. | b. | c. |

8.11 Is additional optional information on source reduction, recycling, or pollution control activities included with this report? (Check one box) YES [ ] NO [X]

Report releases pursuant to EPRCA Section 329(8) including "any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment." DO not include any quantity treated on-site or off-site.

(IMPORTANT: Type or print; read instructions before completing form)

Form Approved OMB Number: 2070-0092
Approval Expires: 1 1/92



United States Environmental Protection Agency

FORM R

TOXIC CHEMICAL RELEASE INVENTORY REPORTING FORM

Section 313 of the Emergency Planning and Community Right-to-Know Act of 1986, also known as Title III of the Superfund Amendments and Reauthorization Act

TRI FACILITY ID NUMBER: 76544SDPTFBLDG4

Chem., Cat., or Cen. Name: XYLENE (MIXED ISOMERS)

WHERE TO SEND COMPLETED FORMS:

1. EPCRA Reporting Center
P.O. Box 3348
Merrifield, VA 22116-3348
ATTN: TOXIC CHEMICAL RELEASE INVENTORY

2. APPROPRIATE STATE OFFICE
(See instructions in Appendix F)

Enter "X" here if this is a revision: X

For EPA use only

IMPORTANT: See instructions to determine uhen "Not Applicable (NA)" boxes should be checked.

## PART I. FACILITY IDENTIFICATION INFORMATION

SECTION 1. REPORTING YEAR: '995

[Section 2. TRADE SECRET INFORMATION

2.1 Are you claiming the toxic chemical identified on page 3 trade secret?
[ ] Yes (Answer question 2.2; Attach substantiation forms)
[X] No (Do not answer 2.2; Co to Section 3)

2.21 If yes in 2.1, is this copy: [ ] Sanitized [ ] Unsanitized

## SECTION 3 . CERTIFICATION (Important: Read and sign after completing all form sections.)

I hearby certify that I have reviewed the attaclied documents and that, to the best of my knowledge and belief, the submitted information is true and complete and that the amounts and values in this report are accurate based on reasonable estimates using data available to the preparers of this report.

Name and official title of owner/operator or senior management official
WILLIAM BOOKIN, CHIEF ENVIRONMENTAL MANAGEMENT BRANCH

Signature: William C Bookin

Date Signed: 24 Sep

## SECTION 4.. FACILITY IDENTIFICATION

Facility or Establishment Name: U.S. DOD U.S. ARMY FORT HOOD

TRI Facility ID Number: 76544SDPTFBLDG4

Street' Address: BUILDING 4219, 77TH ST AT WAREHOUSE AVE

4.1 City: FORT HOOD

County: BELL

State: TX

Zip Code: 76544 -5057

Mailing Address (if different from street address)
ATTN: AFZF-DW-ENV

City: FORT HOOD

State: TX

Zip Code: 76544-5057

PUT LABEL HERE

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PART I. FACILITY IDENTIFICATION
INFORMATION (CONTINUED)

TRI FACILITY ID NUMBER
76544SDPTFBLDG4

Chem., Cat., or Gen. Name
XYLENE (MIXED ISOMERS)

SECTION 4. FACILITY IDENTIFICATION (Continued)

.2 This report contains information for: (Important: check only one) a. [X] An entire facility b. [ ] Part of a facility c. [X] Federal Facility

.3 Technical contact — Name: GARY TOOKE — Telephone Nunber (include area code): (817)288-5132

..4 Public. Contact — Name: PUBLIC AFFAIRS OFFICER — Telephone Number (include area Code): (817)287-3703

.5 SIC Code (4-digit): a. 9711 b. NA c. d. e. f.

.6 Latitude and Longitude

| | Latitude | | | Longitude | | |
|---|---|---|---|---|---|---|
| | Degrees | Minutes | Seconds | Degrees | Minutes | Seconds |
| Latitude | 031 | 08 | 14 | 097 | 47 | 26 |

4.7 Dun & Bradstreet Number(s) (9 digits)
a. NA
b.

4.8 EPA Identification Number(s) (RCRA I.D. No.) (12 characters)
a. TX8214020424
b. NA

4.9 Facility NPDES Permit Number(s) (9 characters)
a. TX0002233
b. TX0063886

4.10 Underground Injection Well Code (UIC) 1.0. Number(s) (12 digits)
a. NA
b.

SECTION 5. PARENT COMPANY INFORMATION

5.1 Name of Parent Company
[ ] NA U.S. DEPARTMENT OF DEFENSE

5.2 Parent Co&any's Dun & Bradstreet Number
[X] WA (9 Digits) WA

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PART II. CHEMICAL-SPECIFIC INFORMATION

TRI FACILITY ID NUMBER: 76544SDPTFBLDG4

Chem., Cat., or Cen. Name: XYLENE (MIXED ISOMERS)

SECTION 1. TOXIC CHEMICAL IDENTITY (Important: DO NOT complete this section if you complete Section 2 below.)

1.1 CAS Number (Important: Enter only one number exactly as it appears on the Section 313 List.

001330-20-7

1.21 Toxic Chemical or Chemical Category Name (Important: Enter only one name exactly as it appears on the Section 313 list.)

XYLENE (MIXED ISOMERS)

1.3 Generic Chemical Name (Important: Complete only if Part I, Section 2.1 is checked "yes."

HA

SECTION 2. MIXTURE COMPONENT IDENTITY (Important: DO NOT complete this section if you complete Section 1 above.)

2.1 Generic Chemical Name Provided by Supplier (Important: Hex. of 70 chars., including numbers, letters, spaces, and punct.)

NA

SF 3. ACTIVITIES AND USES OF THE CHEMICAL AT THE FACILITY (Important: Check all that apply.)

| | | | |
|---|---|---|---|
| 3.1 | Manufacture the toxic chemical: | a. [ ] Produce<br>b. [ 1 Import | If produce or import:<br>c. [ ] For on-site use/processing<br>d. [ ] For sale/distribution<br>e. [ ] As a byproduct<br>f. [ 1 As an impurity |
| 3.2 | Process the toxic chemical: | a. [ ] As a reactant<br>b. [ I As a formulation component | c. [ I As an article component<br>d. [ I Repackaging |
| 3.3 | Otherwise use the toxic chemical!: | a. [ 1 As a chemical processing aid<br>b. [ 1 As a manufacturing aid | c. [Xl Ancillary or other use |

Section 4. MAXIMUM AMOUNT OF THE TOXIC CHEMICAL ON-SITE AT ANY TIME DURING THE CALENDAR YEAR

4.1 03 (Enter two-digit code from instruction package.)

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PART II. CHEMICAL-SPECIFIC
INFORMATION (CONTINUED)

TRI FACILITY ID NUMBER: 76544SDPTFBLDG4

Chem., cat., or Gen. Name: XYLENE (MIXED ISOMERS)

**SECTION 5.** RELEASES OF THE **TOXIC CHEMICAL** TO THE ENVIRONMENT OR-SITE

| | | | A. Total Release (pounds/year) (enter range code from instructions or estimate) | B. Basis of Estimate (enter code) | C. % From Stormuater |
|---|---|---|---|---|---|
| 5.1 | Fugitive or non-point air emissions | [ ]NA | 2100 | 0 | |
| 5.2 | Stack or point air emissions | [ ]NA | 19000 | 0 | |
| 5.3 | Discharges to receiving streams or water bodies (enter one name per box) | | | | |
| (5.3.1 Stream or Water Body Name | | | | | |
| WA | | | | | |
| 5.3 Stream or Water Body Name | | | | | |
| 5.3.3 Stream or Water Body Name | | | | | |
| 5.4 | Underground injections on-site | CXINA | NA | | |
| 5.5 | Releases to land on-site | | | | |
| 5.5.1 | Landfill | CXINA | NA | | |
| 5.5.2 | Land treatment/ application farming | [X]NA | W A | | |
| 5.5.3 | Surface impoundment | CXINA | NA | | |
| 5.5.4 | Other disposal | CXINA | NA | | |

[ ] Check here only if additional Section 5.3 information is provided on page 5 of this form.



Range Codes: A = 1-10 pounds; B = 11-499 pounds; C = 500 - 999 pounds.

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PART II. CHEMICAL-SPECIFIC
INFORMATION (CONTINUED)

TRI FACILITY ID NUMBER: 76544SDPTFBLDG4

Chem., Cat., or Cen. Name: XYLENE (MIXED ISOMERS)

Section 5.3 ADDITIONAL INFORMATION ON RELEASES OF THE TOXIC CHEMICAL TO THE ENVIRONMENT ON-SITE

| 5.3 Discharges to receiving streams or water bodies (enter one name per box) | A. Total Release (pounds/year) (enter range code from instructions or estimate) | B. Basis of Estimate (enter code) | C. Y. From Stormwater |
|---|---|---|---|
| 5.3.4 Stream or Water Body Name | | | |
| 5.3.5 Stream or Water Body Name | | | |
| 5.3.6 Stream or Water Body Name | | | |

SECTION 6. TRANSFERS OF THE TOXIC CHEMICAL IN WASTES TO OFF-SITE LOCATIONS

6.1 DISCHARGES TO PUBLICLY OWNED TREATMENT WORKS (POTW)

6. cal 'buantity Transferred to POTWs and Basis of Estimate

| 6.1.A.1 Total Transfers (pounds/year) (enter range code or estimate) | 6.1.A.2 Basis of Estimate (enter code) |
|---|---|
| NA | |

6.1.B POTW Name and Location Information

| 6.1.B.1 POTW Name | | 6.1.B.2 POTW Name | |
|---|---|---|---|
| Street Address | | Street Address | |
| city | County | City | County |
| State | Zip Code | State | iip code |

If additional pages of Part II, Sections 5.3 and/or 6.1 are attached, indicate the total number of pages in this box [ I and indicate which Part II, Sections 5.3/6.1 page this is, here. Cl I (example: 1,2,3,etc.)



Range Codes: A = I-10 pounds; 8 = 11-499 pounds; c = 500 • 999 pounds.

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PART II. CHEMICAL-SPECIFIC INFORMATION (CONTINUED)

TRI FACILITY ID NUMBER: 76544SDPTFBLDG4

Chem., Cat., or Gen. Name: XYLENE (MIXED ISOMERS)

CTION 6.2 TRANSFERS 10 OTHER OFF-SITE LOCATIONS

2.1 Off-site EPA Identification Number (RCRA TO No.)
TXD046844700

Off-Site Location Name CHEMICAL RECLAMATION SERVICE

Street Address 405 POWELL STREET

City: AVALON
County: ELLIS

State T X | Zip Code 76623- | 1 Is Location under control of reporting [ 1 YES [X] NO

| . Total Transfers (pounds/year) (enter range code or estimate) | B. Basis of Estimate (enter code) | C. Type of Waste Treatment/Disposal/ Recycling/Energy Recovery (enter code) |
|---|---|---|
| . B | 1. C | 1. M92 |
| A | 2. c | 2. M10 |
| . NA | 3. | 3. |
| | 4. | 4. |

ECTION 6.2 TRANSFERS TO OTHER OFF-SITE LOCATIONS

.2.2 Off-sit; EPA Identification Number (RCRA ID No.)
TXD077603371

Off-Site Location Name SAFETY-KLEEN

Street Address 1722 COOPER CREEK ROAD

city: DENTON
county: DENTON

State TX | Zip Code 76208- | Is location under control of reporting [ I YES [X] NO

| A. Total Transfers (pounds/year) (enter range code or estimate) | B. Basis of Estimate (enter code) | C. Type of Waste Treatment/Disposal/ Recycling/Energy Recovery (enter code) |
|---|---|---|
| 1. C | 1. C | 1. M92 |
| 2. NA | 2. | 2. |
| 3. | 3. | 3. |
| 4. | 4. | 4. |

If additional pages of Part II, Section 6.2 are attached, indicate the total number of pages in this box [ ] and indicate which Part IT, Sections 6.2 page this is, here. [1 ]
(example: 1,2,3,etc.)



Range Codes: A = I-10 pounds; B = 11-499 pounds; c = 500 • 999 pounds.

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PART II. CHEMICAL-SPECIFIC INFORMATION (CONTINUED)

TRI FACILITY IO NUMBER: 76544SDPTFBLDG4

Chem., Cat., or Cen. Name: XYLENE (MIXED ISOMERS)

Section 7A. ON-SITE WASTE TREATMENT METHODS AND EFFICIENCY

[X] Not Applicable (NA) • Check here if no on-site treatment is applied to any waste stream containing the toxic chemical or chemical category.

| a. General Waste Stream (enter code) | b. Waste Treatment Method(s) Sequence [enter 3-character code(s)] | c. Range of Influent Concentration | d. Treatment Efficiency Estimate | e. Based on Operating Data? |
|---|---|---|---|---|
| 7A.1a | 7A.1b | 7A.1c | 7A.1d | 7A.1e |
| WA | 1 2 3 4 5 6 7 8 | | % | Yes [ 1 No [ I |
| 7A.2a | 7A.2b | 7A.2c | 7A.2d | 7A.2e |
| | 1 2 3 4 5 6 7 8 | | % | Yes [ 1 No [ 1 |
| 7A.3a | 7A.3b | 7A.3c | 7A.3d | 7A.3e |
| | 1 2 3 4 5 6 7 8 | | % | Yes [ 1 No I 1 |
| 7A.4a | 7A.4b | 7A.4c | 7A.4d | 7A.4e |
| | 1 2 3 4 5 6 7 8 | | % | Yes [ 1 No I 1 |
| 7A.5a | 7A.5b | 7A.5c | 7A.5d | 7A.5e |
| | 1 2 3 4 5 6 7 8 | | % | Yes [ 1 No [ 1 |

If additional pages are attached, indicate the total number of pages in this box [ ] and indicate which page this is, here [1].

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PART II. CHEMICAL-SPECIFIC
INFORMATION (CONTINUED)

| TRI FACILITY ID NUMBER |
|---|
| 76544SDPTFBLDG4 |
| Chem., Cat.; or Gen. Name |
| XYLENE (MIXED ISOMERS) |

ction 7B. ON-SITE ENERGY RECOVERY PROCESSES

XI Not Applicable (HA) - Check here if no on-site energy recovery is applied to any waste stream containing the toxic chemical or chemical category.

nergy Recovery Methods [enter 3-character code(s)]

| 1 | 2 | 3 | 4 |
|---|---|---|---|
| NA | | | |

ction 7C. ON-SITE RECYCLING PROCESSES

X] Not Applicable (NA) - Check here if no on-site recycling is applied to any waste stream containing the toxic chemical or chemical category.

ecycling Methods [enter 3-character code(s)]

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| NA | | | | |

| 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|
| | | | | |

| EPA | EPA FORM R | (TRI FACILITY ID NUMBER |
|---|---|---|
| U' States Environmental Protection Agency | PART II. CHEMICAL-SPECIFIC INFORMATION (CONTINUED) | 76544SDPTFBLDG4 |
| | | Chem., Cat., or Gen. Name |
| | | XYLENE (MIXED ISOMERS) |

Section 8. SOURCE REDUCTION AND RECYCLING ACTIVITIES

| All estimates can be reported using up to two significant figures. | Colum A 1994 (pounds/year) | Column B 1995 (pounds/year) | Column c 1996 (pounds/year) | Colum D 1997 (pounds/year) |
|---|---|---|---|---|
| 8.1 Quantity released * | 4100 | 21000 | 16000 | 13000 |
| 8.2 Puantity used for energy recovery on-site | NA | HA | NA | NA |
| 8.3 Quantity used for energy recovery off-site | 180 | 530 | 510 | 380 |
| 8.4 Quantity recycled on-site | NA | NA | HA | NA |
| 8.5 ouantity recycled off-site | NA | NA | NA | NA |
| 8.6 Quantity treated on-site | NA | NA | NA | NA |
| 8.7 ouantity treated off-site | NA | NA | NA | NA |

| | |
|---|---|
| 8.8 Quantity released to the environment as a result of remedial actions, catastrophic events, or one-time events not associated with production processes (pounds/year) | 0 |
| 8.9 Production Ratio or Activity Index | 0005.12 |

8.10 Did your facility engage in any source reduction activities for this chemical during the reporting year? If not, entter "NA" In Section 8.10.1 and answer Section 8.11.

| | Source Reduction Activities [enter code(s)] | Methods to Identify Activity (enter codes) | | |
|---|---|---|---|---|
| 8.10.1 | NA | a- | b | c. |
| 8.10.2 | | a. | b. | c. |
| 8.10.3 | | a. | b. | c. |
| 8.10.4 | | a. | b. | c. |

| | YES | NO |
|---|---|---|
| 8.11 Is additional optional information on source reduction, recycling, or pollution control activities included with this report? (Check one box) | [ ] | [X] |

Report releases pursuant to EPRCA Section 329(8) including "any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment." Do not include any quantity treated on-site or off-site.

(IMPORTANT: Type or print; read instructions before completing form)

Form Approved OMB Number: 2070-0092
Approval Expires: 11/92



United States Environmental Protection Agency

FORM R

TOXIC CHEMICAL RELEASE INVENTORY REPORTING FORM

Section 313 of the Emergency Planning and Community Right-to-Know Act of 1986, also known as Title III of the Superfund Amendments and Reauthorization Act

TRI FACILITY ID NUMBER: 76544SDPTFBLDG4

Chem., Cat., or Cen. Name: METHYL ETHYL KETONE

WHERE TO SEND COMPLETED FORMS:

1. EPCRA Reporting Center
P.O. Box 3348
Merrifield, VA 22116-3348
ATTN: TOXIC CHEMICAL RELEASE INVENTORY

2. APPROPRIATE STATE OFFICE
(See instructions in Appendix F)

Enter "X" here if this is a revision: X

For EPA use only

IMPORTANT: See instructions to determine when "Not Applicable (NA)" boxes should be checked.

## PART I. FACILITY IDENTIFICATION INFORMATION

SECTION 1. REPORTING YEAR: 1995

Section 2. TRADE SECRET INFORMATION

2.1 Are you claiming the toxic chemical identified on page 3 trade secret?
[ ] Yes (Answer question 2.2; Attach substantiation forms)
[X] No (Do not answer 2.2; Go to Section 3)

2.21 If yes in 2.1, is this copy: [ ] Sanitized [ ] Unsanitized

## SECTION 3. CERTIFICATION (Important: Read and sign after completing all form sections.)

I hearby certify that I have reviewed the attached documents and that, to the best of my knowledge and belief, the submitted information is true and complete and that the amounts and values in this report are accurate based on reasonable estimates using data available to the preparers of this report.

Name and official title of owner/operator or senior management official
WILLIAM BOOKIN, CHIEF ENVIRONMENTAL MANAGEMENT BRANCH

Signature: William C Bookin

Date Signed: 24 Sep 96

## SECTION 4. FACILITY IDENTIFICATION

4.1

Facility or Establishment Name: U.S. DOD U.S. ARMY FORT HOOD

TRI Facility ID Number: 76544SDPTFBLDG4

Street Address: BUILDING 4219, 77TH ST AT WAREHOUSE AVE

City: FORT HOOD

County: BELL

State: TX

Zip Code: 76544-5057

Mailing Address (if different from street address): ATTN: AFZF-DW-ENV

City: FORT HOOD

State: TX

Zip Code: 76544-5057

PUT LABEL HERE

| EPA United States Environmental Protection Agency | EPA FORM R<br>PART I. FACILITY IDENTIFICATION INFORMATION (CONTINUED) | TRI FACILITY ID NUMBER<br>76544SDPTFBLDG4<br>Chem., Cat., or Cen. Name<br>METHYL ETHYL KETONE |
|---|---|---|

**SECTION 4. FACILITY IDENTIFICATION (Continued).**

4.2 This report contains information for: (Important: check only one) a. [X] An entire facility b. [ ] Part of a facility c. [X] Federal Facility

| | | |
|---|---|---|
| 4.3 | Technical Contact Name: GARY TOOKE | Telephone Number (include area code): (817)288-5132 |
| 4.4 | Public Contact Name: PUBLIC AFFAIRS OFFICER | Telephone Number (include area code): (817)287-3703 |

| 4.5 | SIC Code (4-digit) | a. 9711 | b. NA | c. | d. | e. | f. |
|---|---|---|---|---|---|---|---|

| 4.6 | Latitude and Longitude | Latitude Degrees | Latitude Minutes | Latitude Seconds | Longitude Degrees | Longitude Minutes | Longitude Seconds |
|---|---|---|---|---|---|---|---|
| | | 031 | 08 | 14 | 097 | 47 | 26 |

| | | | |
|---|---|---|---|
| 4.7 | Dun & Bradstreet Number(s) (9 digits) | a. | NA |
| | | b. | |
| 4.8 | EPA Identification N&r(s) (RCRA I.D. No.) (12 characters) | a. | TX8214020424 |
| | | b. | WA |
| 4.9 | Facility NPDES Permit Number(s) (9 characters) | a. | TX0002233 |
| | | b. | TX0063886 |
| 4.10 | Underground Injection Well Code (UIC) I.D. Number(s) (12 digits) | a. | NA |
| | | b. | |

**SECTION 5. PARENT COMPANY INFORMATION**

| | | |
|---|---|---|
| 5.1 | Name of Pdrent Company | |
| | [ ] NA | U.S. DEPARTMENT OF DEFENSE |
| 5.2 | Parent Company's Dun & Bradstreet Number | |
| | [X] NA | (9 Digits) NA |

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PART II. CHEMICAL-SPECIFIC
INFORMATION

TRI FACILITY I D NUMBER
76544SDPTFBLDG4
Chem., Cat., or Gen. Name
METHYL ETHYL KETONE

CTION 1. TOXIC CHEMICAL IDENTITY (Important: DO NOT complete this section if you complete Section 2 below.)

1 CAS Number (Important: Enter only one number exactly as it appears on the Section 313 list.

000078-93-3

2 Toxic Chemical or Chemical Category Name (Important: Enter only one name exactly as it appears on the Section 313 list.)

METHYL ETHYL KETONE

.3 Generic Chemical Name (Important: Complete only if Part I, Section 2.1 is checked "yes."

NA

ECTION 2. MIXTURE COMPONENT IDENTITY (Important: DO NOT complete this section if you complete Section 1 above.)

.1 Generic Chemical Name Provided by Supplier (Important: Max. of 70 chars., including nunbers, letters, spaces, and punct.)

NA

ECT ACTIVITIES AND USES OF THE CHEMICAL AT THE FACILITY (Important: Check all that apply.1

| | | | |
|---|---|---|---|
| .1 | Manufacture the toxic chemical: | a. [ ] Produce<br>b. [ ] Import | If produce or import:<br>c. [ 1 For'on-site Use/processing<br>d. [ 1 For sale/distribution<br>e. I ] As a byproduct<br>f. II As an impurity |
| 3.2 | Process the toxic' chemical | a. [ I As a reactant<br>b. [ I As a formulation component | c. I 1 As an article component<br>d . [ ] Repackaging |
| 3. | Otherwise use the toxic chemical: | a. [ ] As a chemical processing aid<br>b. [ ] As a manufacturing aid | c. [X] Ancillary or other use |

Section 4. MAXIMUM AMOUNT OF THE TOXIC CHEMICAL ON-SITE AT ANY TIME DURING THE CALENDAR YEAR

4.1 .04 . . (Enter two-digit code from instruction package.)

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PART, II. CHEMICAL-SPECIFIC
INFORMATION (CONTINUED)

TRI FACILITY ID NUMBER
76544SDPTFBLDG4
Chem., Cat., or Cen. Name
METHYL ETHYL KETONE

SECTION 5. RELEASES OF THE TOXIC CHEMICAL TO THE ENVIRONMENT ON-SITE

| | | | A. Total Release (pounds/year) (enter range code from instructions or estimate) | B. Basis of Estimate (enter code) | C. % From Stormwater |
|---|---|---|---|---|---|
| .1 | Fugitive or non-point air emissions | [ ]NA | 492 | 0 | |
| .2 | Stack or point air emissions | [ ]NA | 4920 | 0 | |
| -me- | | | | | |
| .3 | Discharges to receiving streams or uater bodies (enter one name per box) | | | | |
| -3.1 | Stream or Water Body Name | | | | |
| 4 | | | | | |
| .3.2 | eam or Water Body Name | | | | |
| .3.3 | Stream or Water Body Name | | | | |
| 5.4 | Underground injections on-site | [X]NA | H A | | |
| 5.5 | Releases to land on-site | | | | |
| 5.5.1 | Landfiil | [X]NA | W A | | |
| 5.5.2 | Land treatment/ application farming | [X]NA | N A | | |
| 5.5.3 | Surface impoundment | [X]NA | NA | | |
| 5.5.4 | Other disposal | [X]NA | H A | | |

[ 1 Check here only if additional Section 5.3 information is provided on page 5 of this form.



Range Codes: A = 1-10 pounds; B = 11-499 pounds; c = 500 - 999 pounds.

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PART II. CHEMICAL-SPECIFIC INFORMATION (CONTINUED)

| TRI FACILITY ID NUMBER |
|---|
| 76544SDPTFBLDG4 |
| Chem., Cat., or Cen. Name |
| METHYL ETHYL KETONE |

ction 5.3 ADDITIONAL INFORMATION ON RELEASES OF THE TOXIC CHEMICAL TO THE ENVIRONMENT ON-SITE

| 3 Discharges to receiving streams or water bodies (enter one name per box) | A. Total Release (pounds/year) (enter range code from instructions or estimate) | B. Basis of Estimate (enter code) | C. % From Stormwater |
|---|---|---|---|
| 3.4 Stream or. Water Body Name | | | |
| 3.5 Stream or Water Body Name | | | |
| .3.6 Stream or Water Body Name | | | |

CTION 6. TRANSFERS OF THE TOXIC CHEMICAL IN WASTES TO OFF-SITE LOCATIONS

.1 DISCHARGES TO PUBLICLY OWNED TREATMENT WORKS (POTW)

.. otal Quantity Transferred to POTWs and Basis of Estimate

| .1.A.1 Total Transfers (pounds/year) (enter range code or estimate) | 6.1.A.2 Basis of Estimate (enter code) |
|---|---|
| WA | |

.1.B POTU Name and Location Information

| .1.B.1 POTW Name | 6.1.B.2 POTU Name |
|---|---|
| Street Address | Street Address |
| City / County | City / county |
| State / Zip Code | State / Zip Code |

If additional pages of Part II, Sections 5.3 and/or 6.1 are attached, indicate the total number of pages in this box [ ] and indicate which Part II, Sections 5.3/6.1 page this is, here. [1 1 (example: 1,2,3,etc.)



Range Codes: A = 1-10 pounds; B = 11-499 pounds; c = 500 • 999 pounds.

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PART, II. CHEMICAL-SPECIFIC
INFORMATION (CONTINUED)

TRI FACILITY ID NUMBER
76544SDPTFBLDG4

Chem., Cat., or Cen. Name
METHYL ETHYL KETONE

CTION 6.2 TRANSFERS TO OTHER OFF-SITE LOCATIONS

2.1 Off-site EPA Identification Number (RCRA ID No.)
TXD046844700

ff-Site Location Name CHEMICAL RECLAMATION SERVICE

reet Address 405 POWELL STREET

ty
'ALON

county
ELLIS

tate TX | Zip Code 76623- | 1 Is location under control of reporting [ I YES [X] NO

| Total Transfers (pour&year) (enter range code or estimate) | B. Basis of Estimate (enter code) | c. Type of Waste Treatment/Disposal/ Recycling/Energy Recovery (enter code) |
|---|---|---|
| B | 1. c | 1. M92 |
| B | 2. c | 2. M10 |
| WA | 3. | 3. |
| | 4. | 4. |

CTION 6.2 TRANSFERS TO OTHER OFF-SITE LOCATIONS

.2-2 Off-site EPA Identification Number (RCRA ID No.)
TXD077603371

Dff-Site Location Name SAFETY-KLEEN

Street Address 1722 COOPER CREEK ROAD

city
DENTON

county
DENTON

State TX | [Zip Code 76208- | Is location under control of reporting [ I YES [X] NO

| . Total Transfers (pounds/year) (enter range code or estimate) | B. Basis of Estimate (enter code) | C. Type of Waste Treatment/Disposal/ Recycling/Energy Recovery (enter code) |
|---|---|---|
| 6000 | 1. c | 1. H92 |
| B | 2. c | 2. M26 |
| WA | 3. | 3. |
| | 4. | 4. |

It ditional pages of Part II, Section 6.2 are attached, indicate the total number of pages in this box [3 ] and indicate which Part II, Sections 6.2 page this is, here. [1 ]
(example: 1,2,3,etc.)

EPA Form 9250-I (Rev. 12/4/94) · Previous editions are obsolete. Range Codes: A = 1-10 pounds; B = 11-499 pounds; c = 500 - 999 pounds.

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PART II. CHEMICAL-SPECIFIC
INFORMATION (CONTINUED)

TRI FACILITY ID NUMBER: 76544SDPTFBLDG4

Chem., Cat., or Gen. Name: METHYL ETHYL KETONE

**SECTION 6.2 TRANSFERS TO OTHER OFF-SITE LOCATIONS**

6.2.3 Off-site EPA Identification Number (RCRA ID No.)
MC0980962849

Off-Site Location Name ESSEX WASTE MANAGEMENT INC.

Street Address 1483 S.W. HWY 58

city: KINGSVILLE

county: JOHNSON

State MO | Zip Code 64061- | Is location under control of reporting [ 1 YES [X] NO

| A. Total Transfers (pounds/year) (enter range code or estimate) | B. Basis of Estimate (enter code) | C. Type of Waste Treatment/Disposal/ Recycling/Energy Recovery (enter code) |
|---|---|---|
| 1. B | 1. c | 1. M92 |
| 2. NA | 2. | 2. |
| 3. | 3. | 3. |
| | 4. | 4. |

**SECTION 6.2 TRANSFERS TO OTHER OFF-SITE LOCATIONS**

6.2.4 Off-site EPA Identification Number (RCRA ID No.)
TXD055135388

Off-Site'Location Name TREATMENT ONE

Street Address 5743 CHESWOOD

City: HOUSTON

county: HARRIS

State TX | Zip Code 77087- | Is location under control of reporting [ 1 YES [X] NO

| A. Total Transfer? (pounds/year) (enter range code or estimate) | B. Basis of Estimate (enter code) | C. Type of Waste Treatment/Disposal/ Recycling/Energy Recovery (enter code) |
|---|---|---|
| 1. A' | 1. c | 1. M10 |
| 2. WA | 2. | 2: |
| 3. | 3. | 3. |
| 4. | 4. | 4. |

If additional pages of Part II, Section 6.2 are attached, indicate the total number of pages in this box [3 I and indicate which Part II, Sections 6.2 page this is, here. [2 ]
(example: 1,2,3,etc.)



Range Codes: A = 1-10 pounds; B = 11-499 pounds; c = 500 · 999 pounds.

| EPA | EPA FORM R | TRI FACILITY ID NUMBER |
|---|---|---|
| Un' States .mental ..cection Agency | PART II. CHEMICAL-SPECIFIC 'INFORMATION (CONTINUED) | 76544SDPTFBLDG4 |
| | | Chem., Cat., or Gen. Name |
| | | METHYL ETHYL KETONE |

**SECTION 6.2 TRANSFERS TO OTHER OFF-SITE LOCATIONS**

6.2.5 Off-site EPA Identification Number (RCRA ID No.) TXD980624035

Off-Site Location Name H.E.A.T. INC.

Street Address 4460 SINGLETON ROAD

City DALLAS | coulty DALLAS

State TX | Zip Code 75212- | Is location under control of reporting [ I YES [X] NO

| A. Total Transfers (pour&/year) (enter range code or estimate) | B. Basis of Estimate (enter code) | C. Type of Waste Treatment/Disposal/ Recycling/Energy Recovery (enter code) |
|---|---|---|
| 1. B | 1. C | 1 . M92 |
| 2. NA | 2. | 2. |
| 3. | 3. | 3. |
| | 4. | 4. |

**SECTION 6.2 TRANSFERS TO OTHER OFF-SITE LOCATIONS**

6.2.6 Off-site EPA Identification Number (RCRA ID No.) TXD000719518

Off-Site Location Name DISPOSAL SYSTEMS, INC.

Street Address 2525 BATTLEGROUND RD.

City DEER PARK | County HARRIS

State TX | Zip Code 77536- | Is location under control of reporting [ ] YES [X] NO

| A. Total Transfers (pounds/year) (enter range code or estimate) | B. Basis of Estimate (enter code) | C. Type of Waste Treatment/Disposal/ Recycling/Energy Recovery (enter code) |
|---|---|---|
| 1. A | 1. C | 1. M92 |
| 2. HA | 2. | 2. |
| 3. | 3. | 3. |
| 4. | 4. | 4. |

..ditional pages of Part II, Section 6.2 are attached, indicate the total number of pages in this box [3 1 and indicate which Part II, Sections 6.2 page this is, here. [3 ] (example: 1,2,3,etc.)

 Range Codes: A = 1-10 pounds; B = 11-499 pounds; c = 500 - 999 pounds.

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PART II. CHEMICAL-SPECIFIC
INFORMATION (CONTINUED)

TRI FACILITY ID NUMBER
76544SDPTFBLDG4

Chem., Cat., or Gen- Name
METHYL ETHYL KETONE

Section 7A. ON-SITE WASTE TREATMENT METHODS AND EFFICIENCY

[X] Not Applicable (NA) - Check here if no on-site treatment is applied to any waste stream containing the toxic chemical or chemical category.

| a. General Waste Stream (enter code ) | b. Waste Treatment Method(s) Sequence [enter 3-character code(s)] | c. Range of Influent Concentration | d. Treatment Efficiency Estimate | e. Based on Operating Data7 |
|---|---|---|---|---|
| 7A.1a | 7A.1b | 7A.1c | 7A.1d | 7A.1e |
| WA | 1 2 3 4 5 6 7 8 | | % | Yes [ 1 No [ 1 |
| 7A.2a | 7A.2b | 7A.2c | 7A.2d | 7A.2e |
| | 1 2 3 4 5 6 7 8 | | % | Yes [ 1 No c 1 |
| 7A.3a | 7A.3b | 7A.3c | 7A.3d | 7A.3e |
| | 1 2 3 4 5 6 7 8 | | % | Yes [ 1 No [ 1 |
| 7A.4a | 7A.4b | 7A.4c | 7A.4d | 7A.4e |
| | 1 2 3 4 5 6 7 8 | | % | Yes [ 1 No c 1 |
| 7A.5a | 7A.5b | 7A.5c | 7A.5d | 7A.5e |
| | 1 2 3 4 5 6 7 8 | | % | Yes c 1 No c ] |

If additional pages are attached, indicate the total number of pages in this box [ 1 and indicate which page this is, here [1].

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Agency

EPA FORM R
PART II. CHEMICAL-SPECIFIC
INFORMATION (CONTINUED)

TRI FACILITY ID NUMBER
76544SDPTFBLDG4

Chem., cat., or Cen. Name
#ETHYL ETHYL KETONE

**Section 7B.** ON-SITE ENERGY RECOVERY PROCESSES

[X] Not Applicable (NA) • Check here if no on-site energy recovery is applied to any waste stream containing the toxic chemical or chemical category.

Energy Recovery Methods [enter 3-character code(s)]

| 1 | 2 | 3 | 4 |
|---|---|---|---|
| NA | | | |

**Section 7C.** ON-SITE RECYCLING PROCESSES

[X] Not Applicable (NA) • Check here if no on-site recycling is applied to any waste stream containing the toxic chemical or chemical category.

Recycling Methods Center 3-character code(s)]

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| NA | | | | |

| 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|
| | | | | |

EPA FORM R

PART II. CHEMICAL-SPECIFIC INFORMATION (CONTINUED)

TRI FACILITY ID NUMBER: 76544SDPTFBLDG4

Chem., Cat., or Cen. Name: METHYL ETHYL KETONE

## Section 8. SOURCE REDUCTION AND RECYCLING ACTIVITIES

| estimates can be reported using up to two significant figures. | Column A 1994 (pounds/year) | Column B 1995 (pounds/year) | Column c 1996 (pounds/year) | Column 0 1997 (pounds/year) |
|---|---|---|---|---|
| 1 Quantity released * | 11000 | 5400 | 3700 | 3000 |
| 2 Quantity used for energy recovery on-site | NA | NA | HA | NA |
| 3 Quantity used for energy recovery off-site | 1100 | 6400 | 4800 | 3800 |
| 4 Quantity recycled on-site | NA | NA | HA | NA |
| 5 Quantity recycled off-site | 25 | 110 | 80 | 70 |
| 6 Quantity treated on-site | NA | NA | WA | NA |
| 7 Quantity treated off-site | 130 | NA | MA | NA |

8.8 Quantity released to the environment as a result of remedial actions, catastrophic events, or one-time events not associated with production processes (pounds/year): 0

8.9 Production Ratio or Activity Index: 0000.45

8.10 Did your facility engage in any source reduction activities for this chemical during the reporting year? If not, enter "NA" In Section 8.10.1 and answer Section 8.11.

| | Source Reduction Activities [enter code(s)] | Methods to Identify Activity (enter codes) | | |
|---|---|---|---|---|
| 8.10.1 | NA | a. | b. | c. |
| 8.10.2 | | a. | b. | c. |
| 8.10.3 | | a. | b. | c. |
| 8.10.4 | | a. | b. | c. |

8.11 Is additional optional information on source reduction, recycling, or pollution control activities included with this report? (Check one box) YES [ ] NO [X]

* Report releases pursuant to EPRCA Section 329(8) including "any spilling, Leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, Leaching, dumping, or disposing into the environment." Do not include any quantity treated on-site or off-site.

WESTON
MANAGERS DESIGNERS/CONSULTANTS
Roy F. Weston, Inc.
Suite 700
5599 San Felipe
Houston. Texas 77056-2721
713-621-1620 • Fax 713-621-6959

27 February 1996

Ms. Beverly Brannan
CESWF-ED-MR
U.S. Army Corps of Engineers
Fort Worth District
819 Taylor Street
Fort Worth, TX 76102-0300

**RE:** Fort Hood 1995 Texas Tier II Report
U.S. Army Corps of Engineers Contract No. DACA56-93-D-0008
Delivery Order No. 11, Modification No. 2
WESTON Work Order No. 03886-l 16-003-0010

Dear Ms. Brannan:

Attached, please find the completed Texas Tier II report for the reporting year 1995 for Ft. Hood. This report was prepared by Roy F. Weston, Inc. (WESTON®) under U.S. Army Corps of Engineers (USACE) Contract No. DACA56-93-D-0008, Delivery Order No. 11, Modification No. 2.

As defined in the Scope of Work (SOW) dated 12 February 1995, the Tier II forms for 1995 were prepared based on existing unit material inventory data provided to WESTON by Ft. Hood. Because the inventory data for the post was not complete for the reporting year, it was assumed that the monthly average unit material inventory reported was representative of those months for which no inventory data was received. Total material quantities were annualized to provide the quantities reported on the 1995 Tier II report.

The Texas Tier II report must be received by the State Emergency Response Commission at the Texas Department of Health no later that 1 March 1995. An envelope with the address has been provided for your use. A check in the amount of $50.00 must accompany the form. Please note that the check number and the date must be TYPED onto Page 1 of the Texas Tier II report form. In addition, an original signature must be provided on the bottom of Page 1 of the form. A copy of the completed report must also be supplied to the Emergency Response Unit on post and the Local Emergency Planning Committee (LEPC) for Bell County. An envelope with the LEPC address is also attached for your use.

WESTON appreciates' the bpportunity to assist USACE and Ft. Hood in the preparation of the 1995 Texas Tier II report. If you have any questions regarding the information contained in the report or this letter, please contact me at (713) 621-1620.

Very truly yours,

ROY F. WESTON, INC.

Kristy Stewart

Kristy Stewart
Associate Engineer

Attachments

cc: Mr. Dave Wrbas, Ft. Hood DPW
Mr. Thomas Hoskings, WESTON



PRINTED ON RECYCLED PAPER

# TEXAS TIER TWO COVER SHEET

Budget 7C790
Fund 180

Revised 9/95

Office Use Only
N ☐
P ☐
M ☐
EPL ☐

- Please complete these forms with a typewriter or a printer.
- File this report between January 1 and March 1, 1996.
- Do NOT send Material Safety Data Sheets (MSDSs) with the Tier Two Report.

Mail the original and filing fee to:

STATE EMERGENCY RESPONSE COMMISSION
c/o TEXAS DEPARTMENT OF HEALTH
HAZARD COMMUNICATION BRANCH
1100 WEST 49TH STREET
AUSTIN, TX 78756

This cover sheet must be used to submit hazardous chemical inventories under TCRAs and EPCRA Sections 311 and 312

1. Reporting period from January 1 to December 31, 1995 ..... Page 1 of 10
2. Check if information below is identical to information submitted last year. ..... YES ☐
3. FIRST TIME filing? YES ☐ * UPDATE? YES • I ANNUAL filing? YES ☒*

   *If Yes, a filing fee is required

4. Total number of Chemical Description Blocks completed in attached report? .... 18

   Confidential information included in this report? ..... YES ☐
5. Fee Attached: $ 50.00 Check Number: _____ Check Date: / /

FACILITY IDENTIFICATION IN TEXAS (Physical site of chemicals)

6. Name of Texas Facility III CORPS AND FT. HOOD
7. Street Address/Location Description Bldg. 4219
8. City Ft. Hood TX Zip Code 76544
9. County (If more than one, list primary county only) Bell
10. SIC Code (4 digit number) 9711 Dun & Bradstreet Number N/A

OWNER OR OPERATOR (Name of Corporation, Company, Agency, or Individual Owner or Operator)

11. Name III CORPS AND FT. HOOD Telephone (817) 287-8713
12. Mailing Address Attn: AFZF-PW-ENV
13. City Ft. Hood State TX Zip Code 76544

EMERGENCY CONTACT

14. Name William C. Bodkin Title Chief-Env. Mgmt. Branch
15. Telephone (817) 287-8711 24 Hour Telephone (817) 287-3908
16. Name Gary Tooke Title Env. Prot. Specialist
17. Telephone (817) 288-5132 24 Hour Telephone (817) 287-3908

18. Optional attachments -- I have attached a site plan ..... YES ☐
19. I have attached a list of site coordinate abbreviations ..... YES ☐
20. I have attached a description of dikes and other safeguard measures ..... YES ☐

Certification (Read and sign after completing all sections of the Tier Two Report): I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents. and that based on my inquiry of those individuals responsible for obtaining the information. I believe that the submitted information is true. accurate. and complete.

21. Name and Official Title of Authorized Representative -- Please type.

    Name _____ Title _____

22. Signature -- Required _____ Date Signed _____

# TEXAS TIER TWO CHEMICAL DESCRIPTION SHEET

Revised 9/95

Reporting period from January 1 to December 31, 1995 . . . . . Page 1 2 of 0

FACILITY IDENTIFICATION IN TEXAS

2. Name of Texas Facility III Corps & Fort Hood
3. Street Address/Location Description Bldg. 4219
4. City Ft. Hood TX Zip Code 76544

CHEMICAL DESCRIPTIONS

5. Chemical Description: CAS Number 68649-I 2-7 Trade Secret? YES Cl
6. Chemical Name(s) Polvalphaolephins
7. Common (Label) Name: Polvalphaolephins Optional? YES ✍
8. Check all that apply: Pure ☐ Mix ✍ Solid ☐ Liquid ✍ Gas Cl EHS ☐
9. Hazards: Fire ☒ Pressure ☐ Reactivity ☐ Acute • J Chronic ☒
10. Range Value: Max. Daily Amt. 04 Avg. Daily Amt. 04 #Days on Site 365
11. EHS Name:
12. Storage Codes: Location or work areas in Facility:

| | | | |
|---|---|---|---|
| D | 1 | 4 | See Appendices A, B, C |
| F | 1 | 4 | See Appendices A, B, C |
| N | 1 | 4 | See Appendices A, B, C |
| | | | |
| | | | |

13. Peak Storage Quantity: Gallons Cubic Feet Pounds 93,800
14. NFPA Hazard Rating (Enter Number): Health Flammability Reactivity

CHEMICAL DESCRIPTIONS

5. Chemical Description: CAS Number 64742-54-7 Trade Secret? YES ✍
6. Chemical Name(s) Mineral Oil, Petroleum Distillates, Hydrotreated Heavy Paraffinic
7. Common (Label) Name: Hydrotreated Heavy Paraffinic Distillates Optional? YES • I
8. Check all that apply: Pure ☐ Mix ☒ Solid ☐ Liquid ☒ Gas ☐ EHS Cl
9. Hazards: Fire ☒ Pressure ☐ Reactivity • I Acute ☒ Chronic • fJ
10. Range Value: Max. Daily Amt. 05 Avg. Daily Amt. 05 #Days on Site 365
11. EHS Name:
12. Storage Codes: Location or work areas in Facility:

| | | | |
|---|---|---|---|
| D | 1 | 4 | See Appendices A, B, C |
| F | 1 | 4 | See Appendices A, B, C |
| N | 1 | 4 | See Appendices A, B, C |
| | | | |
| | | | |

13. Peak Storage Quantity: Gallons Cubic Feet Pounds 1.285.000
14. NFPA Hazard Rating (Enter Number): Health Flammability Reactivity

# TEXAS TIER TWO CHEMICAL DESCRIPTION SHEET

Revised 9/95

Reporting period from January 1 to December 31, 1995 . . . . . Page 103 of _____

**FACILITY IDENTIFICATION IN TEXAS**

2. Name of Texas Facility III Corps & Fort Hood
3. Street Address/Location Description Bldg 4219
4. City Ft. Hood TX Zip Code 76544

**CHEMICAL DESCRIPTIONS**

5. Chemical Description: CAS Number 64742-46-7 Trade Secret? **YES** ☐
6. Chemical Name(s) Hvdrotreated Middle Petroleum Distillates
7. Common (Label) Name: Hvdrotreated Middle Petroleum Distillates Optional? **YES** ☐
8. Check all that apply: Pure ☐ Mix ☒ Solid ✍ Liquid ☒ Gas ☐ EHS ☐
9. Hazards: Fire ✍ Pressure ☐ Reactivity ☐ Acute ✍ Chronic ✍
10. Range Value: Max. Daily Amt. 04 Avg. Daily Amt. 04 #Days on Site 365
11. EHS Name: _____

12. Storage Codes: Location or work areas in Facility:

| | | | |
|---|---|---|---|
| D | 1 | 4 | See Appendices A, B, C |
| F | 1 | 4 | See Appendices A, B, C |
| I | 1 | 4 | See Appendices A, B, C |
| | | | |
| | | | |

13. Peak Storage Quantity: Gallons _____ Cubic Feet _____ Pounds 5 1,400
14. NFPA Hazard Rating (Enter Number): Health Flammability Reactivity

**CHEMICAL DESCRIPTIONS**

5. Chemical Description: CAS Number 64742-57-O Trade Secret? **YES • I**
6. Chemical Name(s) Residual Oils
7. Common (Label) Name: Residual Oils Optional? **YES** ✍
8. Check all that apply: Pure ☐ Mix ✍ Solid ☐ Liquid ✍ Gas ☐ EHS ☐
9. Hazards: Fire ✍ Pressure ☐ Reactivity ☐ Acute • I Chronic ✍
10. Range Value: Max. Daily Amt. 04 Avg. Daily Amt. 04 #Days on Site 365
11. EHS Name: _____

12. Storage Codes: Location or work areas in Facility:

| | | | |
|---|---|---|---|
| D | 1 | 4 | See Appendices A, B, C |
| F | 1 | 4 | See Appendices A, B, C |
| N | 1 | 4 | See Appendices A, B, C |
| | | | |
| | | | |

13. Peak Storage Quantity: Gallons _____ Cubic Feet _____ Pounds 122,249
14. **NFPA Hazard Rating (Enter Number): Health ___ Flammability ___ Reactivity ___**

# TEXAS TIER TWO CHEMICAL DESCRIPTION SHEET

Revised 9/95

1. Reporting period from January 1 to December 31, 1995 . . . . . Page 1 4 of 0

## FACILITY IDENTIFICATION IN TEXAS

2. Name of Texas Facility III Corps & Fort Hood
3. Street Address/Location Description Bldg 4219
4. City Fort Hood TX Zip Code 76544

## CHEMICAL DESCRIPTIONS

5. Chemical Description: CAS Number 64742-94-5 Trade Secret? YES ✍
6. Chemical Name(s)- Naphtha
7. Common (Label) Name: Dry Cleaning Solvent Optional? YES Cl
8. Check all that apply: Pure • I Mix ✍ Solid ☐ Liquid • P Gas ☐ EHS ✍
9. Hazards: Fire ✍ Pressure ✍ Reactivity Cl Acute ✍ Chronic • I
10. Range Value: Max. Daily Amt. 04 Avg. Daily Amt. 04 #Days on Site 365
11. EHS Name:

12. Storage Codes: Location or work areas in Facility:

| | | | |
|---|---|---|---|
| D | 1 | 4 | See Appendix B |
| F | 1 | 4 | See Appendix B |
| M | 1 | 4 | See Appendix B |
| | | | |
| | | | |

13. Peak Storage Quantity: Gallons Cubic Feet Pounds 32,000
14. NFPA Hazard Rating (Enter Number): Health Flammability Reactivity

## CHEMICAL DESCRIPTIONS

5. Chemical Description: CAS Number 75-71-8 Trade Secret? YES ☐
6. Chemical Name(s) Dichlorodifluoromethane
7. Common (Label) Name: Freon 12 Optional? YES ☐
8. Check all that apply: Pure ✍ Mix ☐ Solid ✍ Liquid ☐ Gas ☒ EHS • I
9. Hazards: Fire ☐ Pressure ✍ Reactivity • I Acute ☒ Chronic ✍
10. Range Value: Max. Daily Amt. 04 Avg. Daily Amt. 04 #Days on Site 365
11. EHS Name:

12. Storage Codes: Location or work areas in Facility:

| | | | |
|---|---|---|---|
| L | 2 | 4 | See Appendix C |
| | | | |
| | | | |
| | | | |
| | | | |

13. Peak Storage Quantity: Gallons Cubic Feet Pounds 36,500
14: NFPA Hazard Rating (Enter Number): Health Flammability Reactivity

# TEXAS TIER TWO CHEMICAL DESCRIPTION SHEET

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1. Reporting period from January 1 to December 31, 1995 . . . . . Page 1 5 of 0

## FACILITY IDENTIFICATION IN TEXAS

2. Name of Texas Facility III Corps & Fort Hood
3. Street Address/Location Description Bldg. 4219
4. City Ft. Hood **TX** Zip Code 76544

## CHEMICAL DESCRIPTIONS

5. Chemical Description: CAS Number 8012-95-l Trade Secret? **YES** ☐
6. Chemical Name(s) Mineral Oil
7. Common (Label) Name: Mineral Oil Optional? **YES** ☐
8. Check all that apply: Pure ☑ Mix ☑ Solid ☐ Liquid ☒ Gas ☐ EHS • I
9. Hazards: Fire ☒ Pressure Cl Reactivity Cl Acute ☑ Chronic ☑
10. Range Value: Max. Daily Amt. 05 Avg. Daily Amt. 05 #Days on Site 365
11. EHS Name:
12. Storage Codes: Location or work areas in Facility:

| | | | |
|---|---|---|---|
| D | 1 | 4 | See Appendices A, B, C |
| F | 1 | 4 | See Appendices A, B, C |
| N | 1 | 4 | See Appendices A, B, C |
| | | | |
| | | | |

13. Peak Storage Quantity: Gallons Cubic Feet Pounds 168,480
14. NFPA Hazard Rating (Enter Number): Health Flammability Reactivity

## CHEMICAL DESCRIPTIONS

5. Chemical Description: CAS Number 64-l 7-5 Trade Secret? **YES Cl**
6. Chemical Name(s) Ethanol
7. Common (Label) Name: Ethyl Alcohol Optional? **YES** ☐
8. Check all that apply: Pure ☒ Mix ☒ Solid ☐ Liquid ☒ Gas ☐ EHS ☐
9. Hazards: Fire ☒ Pressure ☐ Reactivity ☐ Acute • P Chronic ☒
10. Range Value: Max. Daily Amt. 04 Avg. Daily Amt. 04 #Days on Site 365
11. EHS Name:
12. Storage Codes: Location or work areas in Facility:

| | | | |
|---|---|---|---|
| F | 1 | 4 | See Appendices A, B, C |
| D | 1 | 4 | See Appendices A, B, C |
| M | 1 | 4 | See Appendices A, B, C |
| | | | |
| | | | |

13. Peak Storage Quantitytity: Gallons Cubic Feet Pounds 7 1.094
14. NFPA Hazard Rating (Enter Number): Health Flammability Reactivity

# . TEXAS TIER TWO CHEMICAL DESCRIPTION SHEET

Revised 9/95

Reporting period from January 1 to December 31, 1995 . . . . . Page 6 of 1 0

FACILITY IDENTIFICATION IN TEXAS

2. Name of Texas Facility III Corps & Fort Hood
3. Street Address/Location Description Bldg. 4219
4. City Ft. Hood TX Zip Code 76544

CHEMICAL DESCRIPTIONS

5. Chemical Description: CAS Number 8006-61-g Trade Secret? YES ☐
6. Chemical Name(s) Gasoline
7. Common (Label) Name: Regular Unleaded Gasoline Optional? YES ✍
8. Check all that apply: Pure ☒ Mix Cl Solid ✍ Liquid ☒ Gas • l EHS ☐
9. Hazards: Fire ✍ Pressure ✍ Reactivity ✍ Acute ☒ Chronic ☒
10. Range Value: Max. Daily Amt. 05 Avg. Daily Amt. 05 #Days on Site 365
11. EHS Name:
12. Storage Codes: Location or work areas in Facility:

| | | | |
|---|---|---|---|
| A | 1 | 4 | See Appendix D |
| B | 1 | 4 | See Appendix D |
| P | 1 | 4 | See Appendices C, D |
| | 1 | 4 | See Appendices A, B, C |
| | | | |

13. 'peak Storage Quantity: Gallons 125,408 Cubic Feet Pounds
14. NFPA Hazard Rating (Enter Number): Health Flammability Reactivity

CHEMICAL DESCRIPTIONS

5. Chemical Description: CAS Number 68476-34-6 Trade Secret? YES ☐
6. Chemical Name(s) Diesel Fuel
7. Common (Label) Name: DF2, Diesel Fuel Optional? YES ☐
8. Check all that apply: Pure ☒ Mix ☐ Solid ☐ Liquid ☒ Gas ☐ EHS El
9. Hazards: Fire ✍ Pressure Cl Reactivity ☐ Acute ✍ Chronic ✍
10. Range Value: Max. Daily Amt. 05 Avg. Daily Amt. 05 #Days on Site 365
11. EHS Name:
12. Storaae Codes: Location or work areas in Facility:

| | | | |
|---|---|---|---|
| A | 1 | 4 | See Appendix D |
| B | 1 | 4 | See Appendix D |
| P | 1 | 4 | See Appendices C, D |
| | | | |
| | | | |

13. 'Peak Storage Quantity: Gallons 31,868 Cubic Feet Pounds
14. NFPA Hazard Rating (Enter Number): Health Flammability Reactivi t y

# 1 TEXAS TIER TWO CHEMICAL DESCRIPTION SHEET

Revised 9/95

Reporting period from January 1 to December 31, 1995 . . . . . Page 7 of 1 0

## FACILITY IDENTIFICATION IN TEXAS

2. Name of Texas Facility III Corps & Fort Hood
3. Street Address/Location Description Bldg. 4219
4. City Ft. Hood TX Zip Code 76544

## CHEMICAL DESCRIPTIONS

5. Chemical Description: CAS Number 8006-20-6 Trade Secret? **YES** ☑
6. Chemical Name(s) JP8
7. Common (Label) Name: JP8, Jet Fuel Optional? **YES** ☐
8. Check all that apply: Pure ☑ Mix • l Solid • l Liquid ☒ Gas ☑ EHS ☐
9. Hazards: Fire ☒ Pressure ☐ Reactivity ☐ Acute ☑ Chronic ☒
10. 'Range Value: Max. Daily Amt. 07 Avg. Daily Amt. 07 #Days on Site 365
11. EHS Name:
12. Storage Codes: Location or work areas in Facility:

| | | | |
|---|---|---|---|
| A | 1 | 4 | See Appendix D |
| B | 1 | 4 | See Appendix D |
| P | 1 | 4 | See Appendices C, D |
| F | 1 | 4 | See Appendices A, B, C |
| | | | |

13. Peak Storage Quantity: Gallons 3,802,799 Cubic Feet _____ Pounds _____
14. NFPA Hazard Rating (Enter Number): Health Flammability Reactivity

## CHEMICAL DESCRIPTIONS

5. Chemical Description: CAS Number 8002-09-3 Trade Secret? **YES** ☐
6. Chemical Name(s) Terpene Alcohols
7. Common (Label) Name: Pine Oil Optional? **YES** ☐
8. Check all that apply: Pure ☑ Mix • f Solid ☐ Liquid ☑ Gas ☐ EHS ☐
9. Hazards: Fire ☑ Pressure ☐ Reactivity ☐ Acute ☑ Chronic ☑
10. Range Value: Max. Daily Amt. 04 Avg. Daily Amt. 03 #Days on Site 365
11. EHS Name:
12. Storaae Codes: Location or work areas in Facility:

| | | | |
|---|---|---|---|
| M | 1 | 4 | See Appendices A, B, C |
| N | 1 | 4 | See Appendices A, B, C |
| | | | |
| | | | |
| | | | |

13. 'Peak Storage Quantity: Gallons _____ Cubic Feet _____ Pounds 28,439
14. NFPA Hazard Rating (Enter Number): Health Flammability Reactivity _____

# TEXAS TIER TWO CHEMICAL DESCRIPTION SHEET.

Revised 9/95

Reporting period from January 1 to December 31 , 1995



## FACILITY IDENTIFICATION IN TEXAS

2. Name of Texas Facility III Corps & Fort Hood
3. Street Address/Location Description Bldg. 4219
4. City Ft. Hood TX Zip Code 76544

## CHEMICAL DESCRIPTIONS

5. Chemical Description: CAS Number 123-31-g Trade Secret? YES ☐
6. Chemical Name(s) Hvdroauinone
7. Common (Label) Name: Hvdroauinone Optional? **YES** ☐
8. Check all that apply: Pure ☐ Mix ✍ Solid ☐ Liquid ✍ Gas ☐ EHS ✍
9. Hazards: Fire ✍ Pressure ✍ Reactivity ☐ Acute ✍ Chronic ☒
10. Range Value: Max. Daily Amt. 02 Avg. Daily Amt. 02 #Days on Site 3 6 5
11. EHS Name: Hvdroauinone
12. Storage Codes: Location or work areas in Facility:

| | | | |
|---|---|---|---|
| F | 1 | 4 | Building 9 10 12 |
| | | | |
| | | | |
| | | | |
| | | | |

13. "Peak Storage Quantity: Gallons ____ Cubic Feet ____ Pounds 1,048
14. NFPA Hazard Rating (Enter Number): Health Flammability Reactivity

## CHEMICAL DESCRIPTIONS

5. Chemical Description: CAS Number Not Established Trade Secret? **YES** ☐
6. Chemical Name(s) Chlorinated Lime
7. Common (Label) Name: Chlorinated Lime Optional? **YES** ☐
8. 'Check all that apply: Pure ☐ Mix ☒ Solid • I Liquid ✍ Gas ☐ EHS • I
9. Hazards: Fire ✍ Pressure ☐ Reactivity ✍ Acute ✍ Chronic ✍
10. Range Value: Max. Daily Amt. 04 Avg. Daily Amt. 04 #Days on Site 365
11. EHS Name: ____
12. Storage Codes: Location or work areas in Facility:

| | | | |
|---|---|---|---|
| E | 1 | 4 | See Appendix A |
| N | 1 | 4 | See Appendix A |
| | | | |
| | | | |
| | | | |

13. Peak Storage Quantity: Gallons ____ Cubic Feet ____ Pounds 23,023
14. NFPA Hazard Rating (Enter Number): Health Flammability Reactivity

# TEXAS TIER TWO CHEMICAL DESCRIPTION SHEET

Revised 9/95

1. Reporting period from January 1 to December 31, 1995 . . . . . Page 19 of 0

**FACILITY IDENTIFICATION IN TEXAS**

2. Name of Texas Facility III Corps & Fort Hood
3. Street Address/Location Description Bldg. 4219
4. City Ft. Hood **TX** Zip Code 76544

**CHEMICAL DESCRIPTIONS**

5. Chemical Description: CAS Number 78-93-3 Trade Secret? YES Cl
6. Chemical Name(s) 2-Butanone
7. Common (Label) Name: Methyl Ethyl Ketone, MEK Optional? **YES** ☐
8. Check all that apply: Pure • I Mix • I Solid ☐ Liquid ✍ Gas ☐ EHS ☐
9. Hazards: Fire • J Pressure ✍ Reactivity ☐ Acute ✍ Chronic ✍
10. Range Value: Max. Daily Amt. 04 Avg. Daily Amt. 03 #Days on Site 365
11. EHS Name:
12. Storage Codes: Location or work areas in Facility:

| | | | |
|---|---|---|---|
| F | 2 | 4 | See Appendices A, B |
| F | 1 | 4 | See Appendices A, B |
| M | 1 | 4 | See Appendices A, B |
| N | 1 | 4 | See Appendices A, B |
| | | | |

13. Peak Storage Quantity: Gallons Cubic Feet Pounds 18,683
14. NFPA Hazard Rating (Enter Number): Health Flammability Reactivity

**CHEMICAL DESCRIPTIONS**

5. Chemical Description: CAS Number 107-21-l Trade Secret? YES ☐
6. Chemical Name(s) Ethylene Glvcol
7. Common (Label) Name: Ethvlene Glycol, Antifreeze Optional? **YES** ☐
8. Check all that apply: Pure ✍ Mix ✍ Solid ☐ Liquid ☒ Gas ☐ EHS • I
9. Hazards: Fire ☐ Pressure Cl Reactivity ☐ Acute ✍ Chronic ✍
10. Range Value: Max. Daily Amt. 05 Avg. Daily Amt. 05 #Days on Site 365
11. EHS Name:
12. Storaqe Codes: Location or work areas in Facility:

| | | | |
|---|---|---|---|
| D | 1 | 4 | See Appendix B |
| F | 1 | 4 | See Appendix B |
| M | 1 | 4 | See Appendix B |
| | | | |
| | | | |

13. Peak Storage Quantity: Gallons Cubic Feet Pounds 5 13,539
14. NFPA Hazard Rating (Enter Number): Health Flammability Reactivity

# TEXAS TIER TWO CHEMICAL DESCRIPTION SHEET

Revised 9/95

. Reporting period from January 1 to December 31, 1995 . . . . . Page 10 of 10

**FACILITY IDENTIFICATION IN TEXAS**

2. Name of Texas Facility III Corps & Fort Hood
3. Street Address/Location Description Bldg. 4219
4. City Ft. Hood **TX** Zip Code 76544

**CHEMICAL DESCRIPTIONS**

5. Chemical Description: CAS Number 67-56-l Trade Secret? **YES El**
6. Chemical Name(s) Methyl Alcohol
7. Common (Label) Name: Methanol Optional? **YES** ☐
8. Check all that apply: Pure ✍ Mix ☒ Solid ✍ Liquid ☒ Gas ☐ EHS ✍
9. Hazards: Fire ✍ Pressure ☐ Reactivity ☐ Acute ✍ Chronic ✍
10. Range Value: Max. Daily Amt. 04 Avg. Daily Amt. 03 #Days on Site 365
11. EHS Name:
12. Storage Codes: Location or work areas in Facility:

| | | | |
|---|---|---|---|
| F | 1 | 4 | See Appendices A, B, C |
| M | 1 | 4 | See Appendices A, B, C |
| | | | |
| | | | |
| | | | |

13. Peak Storage Quantity: Gallons _____ Cubic Feet _____ Pounds 17,115
14. NFPA Hazard Rating (Enter Number): Health Flammability Reactivity

**CHEMICAL DESCRIPTIONS**

5. Chemical Description: CAS Number 7664-93-9 Trade Secret? **YES** ☐
6. Chemical Name(s) Sulfuric Acid
7. Common (Label) Name: Sulfuric Acid Optional? **YES** ☐
8. Check all that apply: Pure • I Mix ✍ Solid ✍ Liquid • ?J Gas ☐ EHS ☐
9. Hazards: Fire ☐ Pressure ☐ Reactivity ✍ Acute ☒ Chronic ☐
10. Range Value: Max. Daily Amt. 04 Avg. Daily Amt. 04 #Days on Site 365
11. EHS Name: Sulfuric Acid
12. Storage Codes: Location or work areas in Facility:

| | | | |
|---|---|---|---|
| D | 1 | 4 | See Appendix B |
| F | 1 | 4 | See Appendix B |
| | | | |
| | | | |
| | | | |

13. Peak Storage Quantity: Gallons _____ Cubic Feet _____ Pounds 72,292
14. NFPA Hazard Rating (Enter Number): Health Flammability Reactivity

# APPENDIX A
## SUPPLY ROOMS
## BUILDING NUMBERS

| | | |
|---|---|---|
| 38003 | 13052 | 32011 |
| 37006 | 14022 | 17021 |
| 37010 | 9413 | 27006 |
| 720 | 12010 | 27008 |
| 890 19 | (10006 | 17009 |
| 87004 | 10007 | 13029 |
| 12020 | 12010 | 27002 |
| 11024 | 10009 | 1905 |
| 9576 | 11050 | 1906 |
| 9580 | 11044 | 21010 |
| 10004 | 10001 | 21006 |
| 10003 | 10002 | 21003 |
| 10005 | 9010 | 19019 |
| 12009 | 34001 | 21008 |
| 10008 | 2845 | 21009 |
| 10011 | 34010 | 2624 |
| 10010 | 38023 | 2610 |
| 90003 | 32028 | 2613 |
| 90210 | 34006 | 2626 |
| 6940 | 90098 | 2625 |
| 9122 | 32005 | 90094 |
| 16010 | 32006 | 29016 |
| 14020 | 32015 | 26027 |
| 14019 | 32012 | 92210 |
| 1402 | 32007 | 4616 |
| 12004 | 32023 | 4617 |
| 12002 | 32010 | 3948 |
| 87016 | 39004 | 4475 |
| 7007 | 39021 | 39021 |
| 9569 | 39022 | 87019 |
| 35008 | 39044 | 6940 |

**APPENDIX A**
**SUPPLY ROOMS**
**BUILDING NUMBERS**
**(continued)**

| | | |
|---|---|---|
| 90098 | 16001 | 91039 |
| 90094 | 31009 | 91040 |
| 29007 | 41008 | 39050 |
| 30017 | 41009 | 2038 |
| 1950 | 3400 1 | 39054 |
| 39020 | 38053 | 39051 |
| 39021 | 32009 | 701 |
| 4359 | 32006 | 705 |
| 4615 | 32001 | 707 |
| 7012 | 7012PM | 7013 |
| 7022 | 38059 | 88038 |
| 88030 | 92156 | 92159 |
| 35022 | 4000 1 | 40007 |
| 26014 | 26041 | 6970 |
| 17043 | 9008 | 3830 |
| 91003 | 3605 | |

# APPENDIX B
## POL SHEDS
## BUILDING NUMBERS

| | | |
|---|---|---|
| 38017 | 17007 | 7053 |
| 9572 | 13029 | 90033 |
| 10008 | 1907 | 91038 |
| 90003 | 19018 | 4214 |
| 9133 | 26014 | 13009 |
| 6940 | 21008 | 9576 |
| 9105 | 90094 | 91003 |
| 15000 | 38063 | 90008 |
| 9125 | 26050 | 2036 |
| 9122 | 92209 | 3533 |
| 14020 | 4281 | 3852 |
| 15010 | 9563 | 38013 |
| 15011 | 7022 | 38059 |
| 9117 | 7021 | 38032 |
| 13011 | 35030 | 38033 |
| 9512 | 32023 | MATES |
| 9559 | 30016 | |
| 9008 | 2506 | |
| 6975 | 2518 | |
| 38028 | 17043 | |
| 32032 | 4353 | |
| 32023 | 4000 1 | |
| 90098 | 4625 | |
| 32010 | 39044 | |
| 32005 | 40006 | |
| 32016 | 3604 | |
| 17030 | 4353 | |
| 17023 | 7027 | |
| 26043 | | |

# APPENDIX C
# MOTOR POOLS
# BUILDING NUMBERS

| | |
|---|---|
| 1912 | 13474 |
| 1138014 | 2532 |
| 2610 | 3608 |
| 17030 | 2531 |
| 29017 | 3850 |
| 38063 | 17030 |
| 38064 | 17021 |
| 11052 | 9576 |
| 11050 | 4615 |
| 19012 | 4616 |
| 30015 | 3850 |
| 38053 | 3734 |
| 2511 | 15028 |
| 2604 1 | 36003 |
| 32002 | 3747 |
| 32016 | 44012 |
| 26027 | 38033 |
| 38003 | 91037 |
| 35023 | 91003 |
| 13029 | 1 9 1 0 7 1 |
| 38023 | 6975 |
| 32023 | 4493 |
| 2035 | 9543 |
| 30009 | 90076 |
| 3606 | 1129 |
| 9553 | 10008 |
| 7002 | MATES |
| 2529 | |

## APPENDIX D
## BULK FUEL STORAGE

| |
|---|
| West Fort Hood Tank Farm Bldg. #90084 |
| Robert Gray Airfield (Alert) Bldg. #90052 |
| Robert Gray Airfield (Rapid) Bldg. #900 |
| Hood Army Airfield Bldg. #7074 |
| MATES - National Guard |
| DOL Bldg. #89010 |
| Bldg. #1001 |
| Bldg. #36000 |
| Bldg. #23020 |
| Bldg. #28000 |
| Bldg. #224 |
| Bldg. #50006 |
| Bldg. #50007 |
| Bldg. #70003 |
| Bldg. #2475 |

# CODE TABLES FOR THE TEXAS TIER TWO CHEMICAL DESCRIPTION SHEET

| TABLE I. REPORTING RANGE VALUES | | |
|---|---|---|
| Range Value | Weight in Pounds From ..... | To |
| 01 | 0 | 99 |
| 02 | 100 | 999 |
| 03 | 1,000 | 9,999 |
| 04 | 10,000 | 99,999 |
| 05 | 100,000 | 999,999 |
| 06 | 1,000,000 | 9,999,999 |
| 07 | 10,000.000 | 49,999,999 |
| 08 | 50,000.000 | 99,999,999 |
| 09 | 100.000.000 | 499.999.999 |
| 10 | 500.000.000 | 999.999,999 |
| 11 | 1 billion | > 1 billion |

| TABLE II. STORAGE TYPES | |
|---|---|
| Codes | Types of Storage |
| A | ABOVE GROUND TANK |
| B | BELOW GROUND TANK |
| C | TANK INSIDE BUILDING |
| D | STEEL DRUM |
| E | PLASTIC OR NON-METALLIC DRUM |
| F | CAN |
| G | CARBOY |
| H | SILO |
| I | FIBER DRUM |
| J | BAG |
| K | BOX |
| L | CYLINDER |
| M | GLASS BOTTLES OR JUGS |
| N | PLASTIC BOTTLES OR JUGS |
| O | TOTE BIN |
| P | TANK WAGON |
| Q | RAIL CAR |
| R | OTHER |

| TABLE III. PRESSURE CONDITIONS | |
|---|---|
| Codes | Storage Conditions |
| 1 | AMBIENT (NORMAL) PRESSURE |
| 2 | GREATER THAN AMBIENT PRESSURE |
| 3 | LESS THAN AMBIENT PRESSURE |

| TABLE IV. TEMPERATURE CONDITIONS | |
|---|---|
| Codes | Storage Conditions |
| 4 | AMBIENT (OUTSIDE) TEMPERATURE |
| 5 | GREATER THAN AMBIENT TEMPERATURE |
| 6 | LESS THAN AMBIENT TEMPERATURE |
| 7 | CRYOGENIC CONDITIONS (LESS THAN -200" C) |

## RANGE VALUE CODES FOR GASOLINE AND DIESEL*

**Table IV. GASOLINE RANGE VALUES**

| Range Value | Number of Gallons From | To |
|---|---|---|
| 04 | 1585 | 15,853 |
| 05 | IS.854 | 158,529 |
| 06 | 158,530 | I ,585,288 |
| 07 | 1,585,289 | 7,926,442 |
| 08 | 7,926,443 | 15,852,885 |
| 09 | 15,852,886 | 79,264,426 |
| 10 | 79.264.427 | 158,528,852 |
| I I | 158,528,853 | >1 58,528,853 |

**Table V. DIESEL RANGE VALUES**

| Range Value | Number of Gallons From | To |
|---|---|---|
| 04 | 1400 | 14,009 |
| 05 | 14,010 | 140,100 |
| 06 | 140,101 | 1,400,952 |
| 07 | 1,400,953 | 7,004,763 |
| 08 | 7,004,764 | 14,009,526 |
| 09 | 14,009,527 | 70,047,632 |
| 10 | 70,047,633 | 140,095,264 |
| 11 | 140.095.265 | >140,095,265 |

Note: These reporting ranges are specific for **gasoline- and diesel only.** The ranges were calculated by using the formula located in the Chemical Description Sheet Line-By-Line instructions for Line 10, "To Convert Liquid to Pounds", on page 21. Each liquid has a unique specific gravity, which may be found on the Material Safety Data Sheet (MSDS) and must be used to convert gallons to pounds.

# Appendix C

# Photochemical Use/Recovery Records

# Appendix C

## Photochemical Use/Recovery Records

The documents contained in Appendix C were obtained in order to characterize the use and disposal practices of the many labs on Fort Hood which used silver containing chemicals. The documents contain testing information which document the percent recovery of the equipment used to reclaim the silver. The documents are test results for the photo/x-ray solution prior to and subsequent to the recovery units. They indicate that the recovery of metals is adequate and the systems protect the sanitary sewer system. The documents were obtained from the Directorate of Public Works, Environmental Division, Environmental Management Office. The documents also contain communications of Fort Hood personnel about the proper disposal practices of solutions which may have been considered hazardous. The materials to be disposed of were reviewed in the document and recommendations made in the documents which indicate that sanitary sewer disposal of those chemicals listed would not cause contamination of the sanitary sewer system.

**SILVER RECOVERY PLAN**
**FORT HOOD, TEXAS**

| BUILDING # | TYPE ACTIVITY | TYPE SYSTEM | STATUS |
|---|---|---|---|
| 232 | TASC PHOTO LAB | ELECTROLYTIC COMPLIANCE STATION HAULAWAY | ACTIVE |
| 3945 | MAP REPRODUCTION | COMPLIANCE STATION | ACTIVE |
| 91012 | TEXCOM PHOTO PROCESSING | HAULAWAY | ACTIVE |
| 7022 | AIRCRAFT X-RAY | HAULAWAY | ACTIVE |
| 36000 | DARNELLARMY HOSPITAL (X-RAY) | ELECTROLYTIC COMPLIANCE STATION HAULAWAY | ACTIVE |
| 36014 | DENTAL CLINIC (X-RAY) | ELECTROLYTIC COMPLIANCE STATION HAULAWAY | ACTIVE |
| 49020 | VET CLINIC (X-RAY) | HAULAWAY | ACTIVE |
| 28000 | 1 CD PUBLIC AFFAIRS | HAULAWAY | INACTIVE SINCE SPRING 96 |
| 439 (ADJACENT LOCATION) | 2 AD PUBLIC AFFAIRS | HAULAWAY | INACTIVE SINCE SPRING 96 |
| 39000 | 13 COSCOM PUBLIC AFFAIRS | HAULAWAY | INACTIVE SINCE SPRING 96 |
| 1001 | III CORPS PUBLIC AFFAIRS (SENTINAL) | HAULAWAY | INACTIVE SINCE SPRING 96 |

DEPARTMENT OF THE ARMY
HEADQUARTERS III CORPS AND FORT HOOD
FORT HOOD, TEXAS 76544

REPLY TO
ATTENTION OF

June 1, 1994

Director-ale of Engineering and I-lousing

Mr. Mike Frew
Enforcement Section
Industrial and Hazardous Waste Division
Texas Natural Resource Conservation Commission
P.O. Box 13087
Austin, Texas 7871 l-3087

Dear Mr. Frew:

As you requested in our May 10, 1994, meeting, I have enclosed the Material Safety Data Sheets (MSDS) on photographic chemicals used at Fort Hood. Also per your request, the following is further explanation of the handling and disposal of these chemicals.

Units turned in unused and unopened photochemicals during late 1993. During this time, Fort Hood made inquiries to determine if the material could be reused, transferred, donated, or sold. Fort Hood was unsuccessful in reusing the material; and on March 15, 1994, the photochemicals were classified as waste. The photochemicals were classified as either nonhazardous or hazardous waste based upon their MSDS. Fort Hood consulted with Safety-Kleen regarding the disposition of these chemicals as part of a fluid recovery contract. Safety-Kleen advised Fort Hood to neutralize the nonhazardous photochemicals by mixing compatible chemicals according to the manufacturer's specification. Once completed, the resultant mixture would be a non-RCRA waste suitable for disposal into the sanitary sewer. During the period March 15 through April 15, 1994, these photochemicals were neutralized and disposed of in the Fort Hood sanitary sewer. Chemicals found to. contain listed hazardous constituents were deemed unsuitable for elementary neutralization and labeled as hazardous waste, and DRMO is handling the disposal.

I hope this explanation answers your questions. Additionally, I have enclosed pictures of the thermometers we were discussing. As explained in our meeting, these thermometers were subject to bidding at the time of the multimedia inspection. After the bidding period had ended with the receipt of no bids, the thermometers were packed in drums and labeled hazardous waste. These drums remain at the permitted hazardous waste storage site at West Fort Hood.

Please feel free to contact me if you have any further questions. I hope we are able to avoid further escalation of this matter. Fort Hood is committed to environmental awareness and looks forward to working closely with your office to ensure future compliance issues are addressed before they become problems.

Sincerely,

Albert G. Bungard
Colonel, U.S. Army
Director of Erigineering and Housing

AFZF-DE-Et10 Disposal of' TASC Chemicals

TASC DEH NOV0 5 1985
ATTN: Mr. Sandage (Graphics) Mrs. Cope/ks/8711

1. The three T173 processing solutions used In Building 2219 on the 3M "840 Full Color Transparency Maker" have been evaluated by the Directorate of Engineering and Housing, Environmental Managernent Office. Disposal guidance is provided for the spent 'products.

2. T173 bleach needs to be neutralized using baking soda. Ms. Manear and Mr. Reynolds at the Cannlbtlization Point, 287-6345, have been contacted about disposal of this solution. They have agreed to do the neutralization provided the bleach is turned in with a DA Form 2407 Fork Request. The enclosed Material Safety Data Sheet should be Included as well with the Initial request;

3. T173 developer can be poured down the drain with dilution. Since drain facilities at Building 2219 are inadequate, recommend the solution be turned into the Cannibalization Point with the T173 bleach.

4. T173 fixer should be processed through the silver recovery system at the Defense Reutilization and Marketing Office (DRMO), Mrs. Jackson, 287-3037, Building 4291, of DRMO should be contacted, to obtain the 5 gallon containers required for turn-in and for further Information. A copy of the enclosed 3M Product Environmental Data Sheet for the fixer may be required.

5. Additional environmental inquiries may be made at 287-8754.

ORIGINAL SIGNED
ROBERT K. JAYNE
Colonel, Engineer
Facilities Engineer

2 Encls

-5057

AFZF-DE-EPO

MAR 2 2 1985

SUBJECT: Approval to Dump Chemicals

Commander
15th Military Intelligence Battalion (-)(AE)
ATTN: AFVQ-AE-AC (IA Section)
Fort Hood, Texas 76544-5056

1. The following chemicals can be disposed of In the sanitary sewer:

a. D-76 Developer, NSN 6780-00-153-8911

b. Hypo-cleaning agent, NSN 6750-00-920-7859

c. Photo-flo washing solution, NSN 6750-00-965-4643

d. Dektol,developer, NSN 6750-00-782-3851

Disposal should be followed by dilution with tap water. Five minutes of good flushing should insure adequate dilution in the quantities specified.

2. The hypo-cleaning agent is compatible with mineral acids. Generation of sulfur dioxide gas could result by mixing.

FOR THE COMMAND&R:

ORIGINAL SIGNED

ROBERT K. JAYNE
Colonel, Engineer
Facilities Engineer

EPO FILE

1512-01 (Photo Shop - Product Business)

FROM Ft. HOOD TO KILLEEN

**CHEMSOLVE**
*environmental analytical services*
*11629 Manckaca Road Austin, Texas 78748 (512) 280-7680*

To: Alex Kachura
HQ, III Corps. & Ft. Hood
Attn: AFZF-DE-ENV Bkdg. 4468 72nd Street
Fort Hood, TX 76544-5057 817-287-3591

Report #: 14997

## Report of Laboratory Analysis

Project: DAKFH48-95-M-0706
Sample: FH5-152-2 Matrix: water
Date/Time Taken: 6/1/95 10:40 Date/Time Rec'd: 6/16/95 10:15

| Parameter | Result | Units | Limit | PQL | Method | Date/Time | Run | By |
|---|---|---|---|---|---|---|---|---|
| TC Arsenic | 0.061 | mg/L | 5 | 0.05 | 7061 | 6/20/95 | 4:45 | JLM |
| TC Barium | 0.076 | mg/L | 100 | 0.01 | 7080 | 6/20/95 | 4:45 | JLM |
| TC Cadmium | 0.023 | mg/L | 1 | 0.005 | 7130 | 6/20/95 | 4:45 | JLM |
| TC Chromium | 0.11 | mg/L | 5 | 0.01 | 7190 | 6/20/95 | 4:45 | JLM |
| TC Lead | 0.063 | mg/L | 5 | 0.02 | 7420 | 6/20/95 | 4:45 | JLM |
| TC Mercury | <0.0002 | mg/L | 0.2 | 0.0002 | 7470 | 6/23/95 | 15:58 | LBK |
| TC Selenium | <0.05 | mg/L | 1 | 0.05 | 7741 | 6/20/95 | 4:45 | JLM |
| TC Silver | 0.018 | mg/L | 5 | 0.01 | 7760 | 6/22/95 | 14:58 | JLM |

Respectfully submitted,

Mark C. Krause, FAIC

Copyright © 1995, Chemsolve, Austin, Texas. All rights reserved.
PQL - Practical quantification limit. M.S. - Matrix spike. M.S.D. - Matrix spike duplicate

CHEMSOLVE
environmental analytidal services
'1629 Manchaca Road Austin, Texas 78748 (512) 280-7680

**Project:** DAKFH48-95-M-0706 **Report #: 14997**
**Sample:** FH5-152-2

# Report of Laboratory Quality Assurance

| Parameter | Blank | Precision | Limit | M.S. | M.S.D. | Limits |
|---|---|---|---|---|---|---|
| TC Arsenic | <0.05 | 0.06 | 20 | 118.8 | 118.7 | 80 - 125 |
| TC Barium | <0.01 | 0.01 | 20 | 119.0 | 119 | 80 - 125 |
| TC Cadmium | <0.005 | 2.35 | 20 | 87.0 | 83.9 | 80 - 125 |
| TC Chromium | <0.01 | 0.62 | 20 | 106.0 | 107.3 | 80 - 125 |
| TC Lead | <0.02 | 0.09 | 20 | 114.9 | 115.1 | 80 - 125 |
| TC Mercury | <0.0002 | 6.25 | 14.74 | 89.4 | 82.8 | 74.2 - 129.5 |
| TC Selenium | <0.05 | 0.47 | 20 | 118.0 | 119.1 | 80 - 125 |
| TC Silver | <0.01 | 0.69 | 13.6 | 100.6 | 99.9 | 60.9 - 118.1 |

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PQL - Practical quantification limit. MS. - Matrix spike. M.S.D. - Matrix spike duplicate

**CHEMSOLVE**
*environmental analytical services*
*11629 Manchaca Road Austin, Texas 78748 (512) 280-7680*

To: Alex Kachura
HQ, III Corps. & Ft. Hood
Attn: AFZF-DE-ENV Bkdg. 4468 72nd Street
Fort Hood, TX 76544-5057 817-287-3591

Report #: 14996

# Report of Laboratory Analysis

Project: DAKFH48-95-M-0706
Sample: FH5-152-1 Matrix: water
Date/Time Taken: 6/1/95 14:30 Date/Time Rec'd: 6/16/95 10:15

| Parameter | Result | Units | Limit | PQL | Method | Date/Time | Run | By |
|---|---|---|---|---|---|---|---|---|
| TC Arsenic | 0.15 | mg/L | 5 | 0.05 | 7061 | 6/20/95 | 4:45 | JLM |
| TC Barium | 0.065 | mg/L | 100 | 0.01 | 7080 | 6/20/95 | 4:45 | JLM |
| TC Cadmium | 0.024 | mg/L | 1 | 0.005 | 7130 | 6/20/95 | 4:45 | JLM |
| TC Chromium | 0.12 | mg/L | 5 | 0.01 | 7190 | 6/20/95 | 4:45 | JLM |
| TC Lead | 0.042 | mg/L | 5 | 0.02 | 7420 | 6/20/95 | 4:45 | JLM |
| TC Mercury | 0.00030 | mg/L | 0.2 | 0.0002 | 7470 | 6/23/95 | 15:58 | LBK |
| TC ('Selenium | CO.05 | mg/L | 1 | 0.05 | 7741 | 6/20/95 | 4:45 | JLM |
| TC Silver | <0.01 | mg/L | 5 | 0.01 | 7760 | 6/22/95 | 14:58 | JLM |

Respectfully submitted,

Mark C. Krause, FAIC

Copyright © 1995, Chemsolve, Austin, Texas. All rights reserved.
PQL - Practical quantification limit. M.S. - Matrix spike. M.S.D. - Matrix spike duplicate

CHEMSOLVE
environmental analytical services
71629 Manchaca Road Austin, Texas 78748 (512) 280-7680

Project: DAKFH48-95-M-0706 Report #: 14996
Sample: FH5-152-1

# Report of Laboratory Quality Assurance

| Parameter | Blank | Precision | Limit | M.S. | M.S.D. | Limits |
|---|---|---|---|---|---|---|
| TC Arsenic | <0.05 | 0.06 | 20 | 118.8 | 118.7 | 80 - 125 |
| TC Barium | <0.01 | 0.01 | 20 | 119.0 | 119 | 80 - 125 |
| TC Cadmium | co.005 | 2.35 | 20 | 87.0 | 83.9 | 80 - 125 |
| TC Chromium | <0.01 | 0.62 | 20 | 106.0 | 107.3 | 80 - 125 |
| TC Lead | <0.02 | 0.09 | 20 | 114.9 | 115.1 | 80 - 125 |
| TC Mercury | <0.0002 | 6.25 | 14.74 | 89.4 | 82.8 | 74.2 - 129.5 |
| TC Selenium | <0.05 | 0.47 | 20 | 118.0 | 119.1 | 80 - 125 |
| TC Silver | <0.01 | 0.69 | 13.6 | 100.6 | 99.9 | 60.9 - 118.1 |

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PQL - Practical quantification limit. M.S. - Matrix spike. M.S.D. - Matrix spike duplicate

Photo Process Evaluation & Waste Characterization

SK SURVEY NO. IS024704

# IMAGING ANALYTICAL SURVEY

Generator Name Ft Hood Photo LAB

SK Customer No. 6 049 03 14 53

Facility Street Address (No P.O. Boxes)
Ft Hood Photo LAB

City Ft Hood State TX Zip

**Customer Codes:** (Circle Only One)

11 Dentists 1 8 Motion Picture/Television
12 Hospitals/Clinics 19 Government Systems
13 Prof. Diagnostic Imaging 20 Office Imaging
14 MiniLabs/MicroLab 21 Police/Gov't Offices/Schools
15 Lg. Photofinishers 22 Industrial X-Ray
16 Professional Imaging 23 Other
17 Printing & Publishing

| SK CONTROL NO. | | SK CONTROL NO. | | SK CONTROL NO. | | SK CONTROL NO. | |
|---|---|---|---|---|---|---|---|
| LAB NO. | | LAB NO. | | LAB NO. | | LAB NO. | |

| SAMPLE 1 DESCRIPTION | SAMPLE 2 DESCRIPTION | SAMPLE 3 DESCRIPTION | SAMPLE 4 DESCRIPTION |
|---|---|---|---|
| Developer | Developer -- | Developer | Developer |
| Bleach Fixer | Bleach Fixer | Bleach Fixer | Bleach Fixer |
| Fixer X | Fixer X | Fixer X | Fixer |
| Stabilizers | Stabilizers | Stabilizers | Stabilizers |
| Washwater | Washwater | Washwater -- | Washwater |
| Other: | Other: | Other: | Other: |
| **Sample Point** | **Sample Point** | **Sample Point** | **Sample Point** |
| After Processor | After Processor | After Processor X | After Processor |
| After Electrolytic | After Electrolytic | After Electrolytic | After Electrolytic -- |
| After Canister X | After Canister X | After Canister | After Canister |
| No Treatment | No Treatment | No Treatment | No Treatment |
| Other | Other | Other | Other |

**Date of Sample** 5-1-95

**Equipment Manufacturer** KREONITE

**Type of Equipment** FUJI

**Process: Black/White or Color (Circle One)**

Generator **Certification** (Not a waste handling agreement):

On behalf of the Generator, I hereby warrant, represent, and certify that: all information submitted in this document is true, accurate, and complete; all known or suspected hazards have been disclosed; and, I am a duty authorized employee of the Generator.

Generator agrees to indemnify and hold Safety-Kleen Corp. and its subsidiaries harmless for any claims, liabilities, damages, and costs including, but not limited to, attorney's fees, arising out of or in any way related to breach of the above warranty by the Generator.

Name James McMurray Title Mgr

Signature X James McMurray Date 5-1-95 Phone (817) 283-7625

Comments #1 & #2 Pulled to determine correct service interval

Sales Representative Name Phil Nickey Number 2441 Branch No. 6-049-03

GENERATOR PART NO. 91678

**Report Date:** 5/12/95
Report: **Imaging Services**

**Generator :**
**Ft Hood** Photo Lab

Survey: IS024704

Ft Hood Photo Lab
Ft Hood, TX

**Safety-Kleen Service Representative/ Branch** Number :
2444 Phil Rickey / 604903
Attention:

**Dear Customer:**

The following **are** the results of the Silver (Ag) and pH analysis completed by Safety-Kleen Corp. on your sample.

Please contact your local Safety-Kleen representative or branch facility listed above if you have any questions.

| Sample Number | Description | Sample Point | MDL* | Ag Result | Units | pH |
|---|---|---|---|---|---|---|
| 9509076 | Fixer | After Canister | 0.25 | <<0.02 | ppm | 6.9 |
| 9509077 | Fixer | After Canister | 0.25 | <<0.02 | ppm | 7.8 |
| 9509078 | Fixer | After Processor | 0.25 | 469.61 | ppm | 4.6 |

* Method Detection Limit

Sample Date: 5/1/95
Processor:

Equipment Manufacture: Kreonite
Type of Equipment: FUJI

John Schmitz
Corporate Lab Manager

Allan Maateuffel Technical Center

P.O.' Box 92050
Elk Grove Village, IL 60009-2050
Fax: 312/825-7853

12555 W. dld Higgins Rd.
Elk Grove Village, IL 60007
Telephone: 312/825-7338

SK SURVEY NO.
IS024707

# IMAGING ANALYTICAL SURVEY

Generator Name Ft Hood Photo Lab Bldg 232 SK Customer No. 6 0 4 9 0 3 1 4 5 3

Facility Street Address (No P.O. Boxes)
Ft Hood Photo Lab Bldg 232

City Ft Hood State TX Zip

**Customer Codes: (Circle Only One)**

| | |
|---|---|
| 11 Dentists | 18 Motion Picture/Television |
| 12 Hospitals/Clinics | 19 Government Systems |
| 13 Prof. Diagnostic Imaging | 20 Office Imaging |
| 14 MiniLabs/MicroLab | 21 Police/Gov't Offices/Schools |
| 15 Lg. Photofinishers | 22 industrial X-Ray |
| 16 Professional Imaging | 23 Other |
| 17 Printing & Publishing | |

| SK CONTROL NO. | | SK CONTROL NO. | | SK CONTROL NO. | | SK CONTROL NO. | |
|---|---|---|---|---|---|---|---|
| LAB NO. | | LAB NO. | | LAB NO. | | LAB NO. | |

| SAMPLE 1 DESCRIPTION | SAMPLE 2 DESCRIPTION | SAMPLE 3 DESCRIPTION | SAMPLE 4 DESCRIPTION |
|---|---|---|---|
| Developer X | Developer — | Developer — | Developer — |
| Bleach -Fixer — | Bleach Fixer -- | Bleach Fixer — | Bleach Fixer — |
| Fixer — | Fixer — | Fixer — | Fixer |
| Stabilizers — | Stabilizers — | Stabilizers -- | Stabilizers — |
| Washwater — | Washwater X | Washwater — | Washwater -- |
| Other: | Other: | Other: | Other: |

| Sample Point | Sample Point | Sample Point | Sample Point |
|---|---|---|---|
| After Processor X | After Processor X | After Processor — | After Processor — |
| After Electrolytic — | After Electrolytic -- | After Electrolytic — | After Electrolytic — |
| After Canister — | After Canister — | After Canister — | After Canister — |
| No Treatment — | No Treatment — | No Treatment — | No Treatment — |
| Other | Other | Other | Other |

**Date of Sample** 4-6-95 **Equipment Manufacturer** COLEXTA

**Type of Equipment** RTP 30 H (RAH) **Process: Black/White or Color (Circle One)**

Generator **Certification** (Not a waste handling agreement):

On behalf of the Generator, I hereby warrant, represent, and **certify** that: all Information **submitted in this** document **is** true, accurate, and complete; all known or suspected hazards have been **disclosed;** and, I am a duly **authorized** employee of the Generator.

Generator agrees to Indemnify and hold Safety-Kleen Corp. and Its **subsidiaries** harmless for any **claims, liabilities,** damages, and costs **including, but not limited to, attorney's fees, arising out of or in any way related to breach of the above warranty by the Generator.**

Name KATHY ETHERIDGE Title ASSISTANT LEAD PHOTOGRAPHER

Signature X Kathy Etheridge Date 11-6-95 Phone 817 287-8711

Comments Please rush per Tom Graff

Sales Representative Name Tom GRAFF Number 2269 Branch No. 601903

GENERATOR PART NO. 91678

Report Date: 4/21/95
Report: Imaging Services

Generator:
Ft Hood photo Lab Bldg 232

Survey: IS024707

Bldg 232
Ft Hood, TX

Safety-Kleen Service Representative / Branch Number:
2209 Tom Graff / 604903
Attention:

Dear Customer:

The following are the results of the Silver (Ag) and pH analysis completed by Safety-Kleen Corp. on your sample.

Please contact your local Safety-Kleen representative or branch facility listed above if you have any questions.

| Sample Number | Description | Sample Point | MDL* | Ag Result | Units | pH |
|---|---|---|---|---|---|---|
| 9507299 | Developer | After Processor | 0.25 | <0.02 | ppm | 10.0 |
| 9507300 | Washwater | After Processor | 0.25 | <0.25 | ppm | 65 |

* Method Detection Limit

Sample Date: 4/6/95
Processor: Color

Equipment Manufacture: Colexea
Type of Equipment: RTD30H

John Schmitz
Corporate Lab Manager

Allan Manteuffel Technical Center

P.O. Box 92050
Elk Grove Village, XL 60009-2050
Fax: 312/825-7853

12555 W. Old Higgins Rd.
Elk Grove Village, IL 60007
Telephone: 312/825-7338

SK SURVEY NO.
151024708

# IMAGING ANALYTICAL SURVEY

Generator Name: Ft Hood Photo Lab Bldg 237 SK Customer No. 6-049-07-1453

Facility Street Address (No P.O. Boxes): Ft Hood Photo Lab Bldg 237

City: Ft Hood State: Tx Zip:

**Customer Codes: (Circle Only One)**

- 11 Dentists
- 12 Hospitals/Clinics
- 13 Prof. Diagnostic imaging
- 14 MiniLabs/MicroLab
- 15 Lg. Photofinishers
- 16 Professional imaging
- 17 Printing, & Publishing
- 18 Motion Picture/Television
- 19 Government Systems
- 20 Office imaging
- 21 Police/Gov't Offices/Schools
- 22 industrial X-Ray
- 23 Other

SK USE ONLY

| SK CONTROL NO. | | SK CONTROL NO. | | SK CONTROL NO. | | SK CONTROL NO. | |
|---|---|---|---|---|---|---|---|
| LAB NO. | | LAB NO. | | LAB NO. | | LAB NO. | |

| SAMPLE 1 DESCRIPTION | SAMPLE 2 DESCRIPTION | SAMPLE 3 DESCRIPTION | SAMPLE 4 DESCRIPTION |
|---|---|---|---|
| Developer X | Developer | Developer | Developer |
| Bleach Fixer | Bleach Fixer | Bleach Fixer | Bleach Fixer |
| Fixer | Fixer | Fixer | Fixer |
| Stabilizers | Stabilizers | Stabilizers | Stabilizers |
| Washwater | Washwater X | Washwater | Washwater |
| Other: | Other: | Other: | Other: |
| **Sample Point** | **Sample Point** | **Sample Point** | **Sample Point** |
| After Processor X | After Processor | After Processor | After Processor |
| After Electrolytic -- | After Electrolytic -- | After Electrolytic | After Electrolytic |
| After Canister | After Canister | After Canister | After Canister |
| No Treatment | No Treatment -- | No Treatment | No Treatment |
| Other | Other | Other | Other |

**Date of Sample** 4-6-95 **Equipment Manufacturer** ILFORD

**Type of Equipment** 2240RC **Process: Black/White or Color (Circle One)**

Generator **Certification** (Not a waste handling agreement):

On behalf of the Generator, I hereby warrant, represent, and certify that: all information submitted In this document Is true, accurate, and complete; all known or suspected hazards have been disclosed; and, I am a duty authorized employee of the Generator.

Generator agrees to indemnify and hold Safety-Kleen Corp. and its subsldiaries harmless for any claims, liabilities, damages, and costs including, but not limited to, attorney's fees, arising out of or In any way related to breach of the above warranty by the Generator.

Name: James McMurray Title: Photo Supervisor

Signature: X James McMurray Date: 4-6-95 Phone: (817) 2878717

Comment: Please Rush per Tom Huff

Sales Representative Name: Tom Graft Number: 2207 Branch No. 604903

GENERATOR PART NO 91678

Report Date: 4/21/95
Report: Imaging Services

Generator:
Ft Hood Photo Lab Bldg 232

Survey: IS024708

Bldg 232
Ft Hood, TX

Safety-Kleen Service Representative / Branch Number :
2209 Tom Graff / 604903
Attention:

Dear Customer:

The following are the results of the Silver (Ag) and pH analysis completed by Safety-Kleen Corp. on your sample.

Please contact your local Safety-Kleen representative or branch facility listed above if you have any questions.

| Sample Number | Description | Sample Point | MDL' | Ag Result | units | pH |
|---|---|---|---|---|---|---|
| 9507295 | Developer | After Processor | 0.25 | 0.96 | ppm | 10.8 |
| -- 9507296 | Washwater | After Processor | 0.25 | <0.02 | ppm | 8.2 |

' Method Detection Limit

Sample Date: 4/6/95
Processor:

Equipment Manufacture: ILFORD
Type of Equipment: 2240RC

John Schmitz
Corporate Lab Manager

Allan Manteuffel Technical Center

P.O. Box 92050
Elk Grove Village, IL 60009-2050
Fax: 312/825-7853

12555 W. Old Higgins Rd.
Elk Grove Village, IL 60007
Telephone: 312/825-7338

SK SURVEY NO.
IS024710

# IMAGING ANALYTICAL SURVEY

Generator Name Ft Hood Photo Lab Bldg 237 SK Customer 6049 031453

Facility Street Address (No P.O. Boxes)
Ft Hood Photo Lab Bldg 3.3-L.

City Ft Hood State TX Zip

**Customer Codes:** (Circle Only One)

11 Dentists
12 Hospitals/Clinics
13 Prof. Diagnostic imaging
14 MiniLabs/MicroLab
15 Lg. Photofinishers
16 Professional imaging
17 Printing & Publishing
18 Motion Picture/Television
19 Goveminent Systems
20 Office imaging
21 Police/Gov't Offices/Schools
22 Industrial X-Ray
23 Other

| SK CONTROL NO. | | SK CONTROL NO. | | SK CONTROL NO. | | SK CONTROL NO. | |
|---|---|---|---|---|---|---|---|
| LAB NO. | | LAB NO. | | LAB NO. | | LAB NO. | |

| SAMPLE 1 DESCRIPTION | SAMPLE 2 DESCRIPTION | SAMPLE 3 DESCRIPTION | SAMPLE 4 DESCRIPTION |
|---|---|---|---|
| Developer X | Developer | Developer | Developer |
| Bleach Fixer | Bleach Fixer | Bleach Fixer | Bleach Fixer |
| Fixer | Fixer | Fixer | Fixer |
| Stabilizers | Stabilizers | Stabilizers | Stabilizers |
| Washwater | Washwater -- | Washwater | Washwater |
| Other: | Other: | Other: | Other: |
| **Sample Point,** | **Sample Point** | **Sample Point** | **Sample Point** |
| After Processor X | After Processor | After Processor | After Processor |
| After Electrolytic | After Electrolytic | After Electrolytic -- | After Electrolytic |
| After Canister | After Canister -- | After Canister | After Canister |
| No Treatment | No Treatment | No Treatment | No Treatment -- |
| Other | Other | Other | Other |

**Date of Sample** 4-6-95 **Equipment Manufacturer** KERONITE

**Type of Equipment** RTF · 20 **Process: Black/White or Color (Circle One)**

Generator Certification (Not a waste handling agreement):
On behalf of the Generator, I hereby warrant, represent, and certify that: all information submitted in this document is true, accurate, and complete; all known or suspected hazards have been disclosed; and, I am a duly authorized employee of the Generator.
Generator agrees to Indemnify and hold Safety-Kleen Corp. and Its subsidiaries harmless for any claims, liabilities, damages, and costs including, but not limited to, attorney's fees, arising out of or In any way related to breach of the above warranty by the Generator.

Name [illegible] Title [illegible]

Signature X [illegible] Date 4-6-95 Phone ( )

Comments Please rush per Tom Graff

Sales Representative Name Tom GRAFF Number 2209 Branch No. 604903

GENERATOR PART NO. 91678

Report Date: 4/21/95
Report: Imaging Services

**Generator:**
Ft Hood Photo Lab Bldg #232

**Survey:** IS024710

Ft Hood Photo Lab Bldg 232
Ft Hood, TX 76544

**Safety-Kleen Service Representative /** Branch Number :
2209 Tom Graff / 604903
**Attention:**

**Dear** Customer:

The following are the results of the Silver (Ag) and pH analysis completed by Safety-Kleen Corp. on your sample.

Please contact your local Safety-Kleen representative or branch facility listed above if you have any questions.

| Sample Number | Description | Sample Point | MDL* | Ag Result | Units | pH |
|---|---|---|---|---|---|---|
| 9507262 | Developer | After Processor | 0.25 | <0.25 | ppm | 9.7 |

"Method Detection Limit

Sample Date: 4/6/95
Processor:

Equipment Manufacture: Keronite
Type of Equipment: RTF20

John Schmitz
Corporate Lab Manager

Allan Manteuffel Technical Center

P.O. Box 92050
Elk Grove Village, IL 60009-2050
Fax: 312/825-7853

12.555 W. Old Higgins Rd.
Elk Grove Village, IL 60007
Telephone: 312/825-7338

SK SURVEY NO.
IS024714

# IMAGING ANALYTICAL SURVEY

Generator Name: Ft Hood Photo Lab Bldg #232 SK Customer No. 6-049-03-1453

Facility Street Address (No P.O. Boxes): Ft Hood Photo Lab Bldg #232

City: Ft Hood State: Tx Zip: 76544

**Customer Codes: (Circle Only One)**

11 Dentists
12 Hospitals/Clinks
13 Prof. Diagnostic Imaging
14 MiniLabs/MicroLab
15 Lg. Photofinishers
16 Professional Imaging
17 Printing & Publishing
18 Motion Picture/Television
19 Government Systems
20 Office Imaging
21 Police/Gov't Offices/Schools
22 Industrial X-Ray
23 Other

| SK CONTROL NO. | SK CONTROL NO. | SK CONTROL NO. | SK CONTROL NO. |
|---|---|---|---|
| LAB NO. | LAB NO. | LAB NO. | LAB NO. |

SK USE ONLY

| SAMPLE 1 DESCRIPTION | SAMPLE 2 DESCRIPTION | SAMPLE 3 DESCRIPTION | SAMPLE 4 DESCRIPTION |
|---|---|---|---|
| Developer X | Developer | Developer | Developer |
| Bleach Fixer | Bleach Fixer | Bleach Fixer | Bleach Fixer |
| Fixer | Fixer | Fixer | Fixer |
| Stabilizers | Stabilizers | Stabilizers X | Stabilizers |
| Washwater | Washwater X | Washwater | Washwater |
| Other: | Other: | Other: | Other: |
| **Sample Point** | **Sample Point** | **Sample Point** | **Sample Point** |
| After Processor X | After Processor X | After Processor X | After Processor |
| After Electrolytic | After Electrolytic | After Electrolytic | After Electrolytic |
| After Canister | After Canister | After Canister | After Canister |
| No Treatment | No Treatment | No Treatment | No Treatment |
| Other | Other | Other | Other |

**Date of Sample** 4-6-95 **Equipment Manufacturer** FUJI

**Type of Equipment** FUJI (FP550B) **Process: Black/White or Color (Circle One)**

Generator Certification (Not a waste handling agreement):

On behalf of the Generator, I hereby warrant, represent, and certify that: all information submitted In this document Is true, accurate, and complete; all known or suspected hazards have been disclosed; and, I am a duly authorized employee of the Generator. Generator agrees to Indemnify and hold Safety-Kleen Corp. and Its subsidiaries harmless for any claims, liabilities, damages, and costs Including, but not limited to, attorney's fees, arising out of or In any way related to breach of the above warranty by the Generator.

Name: Kathy Etheridge Title: Assistant Lead Photographer

Signature: X Kathy Etheridge Date: 4/6/95 Phone: ( ) 2887625

Comments: Please switch per Tom Graff

Sales Representative Name: Tom Graff Number: 2209 Branch No: 604903

GENERATOR PART NO 91678

Report Date: 4/21/95
Report: Imaging Services

Generator:
Ft Hood Photo Lab Bldg #232

Survey: IS024714

Ft Hood photo Lab Bldg #232
Ft Hood, TX 76544

Safety-Kleen Service Representative/ Branch Number :
2209 Tom Graff / 604903
Attention:

Dear Customer:

The following are the results of the Silver (Ag) and pH analysis completed by Safety-Kleen Corp. on your sample.

Please contact your local Safety-Kleen representative or branch facility listed above if you have any questions.

| Sample Number | Description | Sample Point | MDL* | Ag Result | Unite | pH |
|---|---|---|---|---|---|---|
| 9507259 | Developer | After Processor | 0.25 | 0.35 | ppm | 10.1 |
| 9507260 | Washwater | After Processor | 0.25 | 103.40 | ppm | 7.7 |
| 9507261 | Stabilizers | After Processor | 0.25 | 1.92 | ppm | 6.7 |

✍✍ MethodDelxctionL.imit

Sample Date: 4/6/95
Processor: Color

Equipment Manufacture: FUJI
Type of Equipment: FUJIFP550B

John Schmitz
Corporate Lab Manager

Allan Manteuffel Technical Center

P.O. Box 92050
Elk Grove Village, IL 60009-2050
Fax: 312/825-7853

12555 W. Old Higgins Rd.
Elk Grove Village, IL 60007
Telephone: 312/825-7338

safety-kleen

# IMAGING ANALYTICAL SURVEY

SK SURVEY NW.
IS024713

Generator Name Ft Hood Photo Lab Bldg 232 SK Customer No. 6.04.9.03.1453

Facility Street Address (No P.O. Boxes)
Ft Hood Photo Lab Bldg 232

City Ft Hood State TX Zip

**Customer Codes: (Circle Only Ond)**

11 Dentists
12 Hospitals/Clinics
13 Prof. Diagnostic Imaging
14 MiniLabs/MicroLab
15 Lg. Photofinishers
16 Professional Imaging
17 Printing & Publishing
18 Motion Picture/Television
19 Government Systems
20 Office Imaging
21 Police/Gov't Off ices/Schools
22 Industrial X-Ray
23 Other

SK USE ONLY

| SK CONTROL NO. | SK CONTROL NO. | SK CONTROL NO. | SK CONTROL NO. |
|---|---|---|---|
| LAB NO. | LAB NO. | LAB NO. | LAB NO. |

| SAMPLE 1 DESCRIPTION | SAMPLE 2 DESCRIPTION | SAMPLE 3 DESCRIPTION | SAMPLE 4 DESCRIPTION |
|---|---|---|---|
| Developer X | Developer — | Developer — | Developer — |
| Bleach Fixer — | Bleach Fixer — | Bleach Fixer — | Bleach Fixer — |
| Fixer — | Fixer — | Fixer — | Fixer |
| Stabilizers -- | Stabilizers — | Stabilizers — | Stabilizers — |
| Washwater — | Washwater X | Washwater X | Washwater — |
| Other: | Other: | Other: | Other: |
| **Sample Point** | **Sample Point** | **Sample Point** | **Sample Point** |
| After Processor X | After Processor X | After Processor X | After Processor — |
| After Electrolytic — | After Electrolytic -- | After Electrolytic — | After Electrolytic — |
| After Canister — | After Canister — | After Canister — | After Canister — |
| No Treatment -- | No Treatment — | No Treatment | No Treatment — |
| Other | Other | Other | Other |

**Date of Sample** 4-6-95 **Equipment Manufacturer** FUJI

**Type of Equipment** FA 720 **Process: Black/White or Color (Circle One)**

Generator Certification (Not a waste handling agreement):

On behalf of the Generator, I hereby warrant, represent, and certify that: all information submitted In this document is true, accurate, and complete; all known or suspected hazards have been disclosed; and, I am a duly authorized employee of the Generator.

Generator agrees to Indemnify and hold Safety-Kleen Corp. and Its subsidiaries harmless for any claims, liabilities, damages, and costs including, but not limited to, attorney's fees, arising out of or In any way related to breach of the above warranty by the Generator.

Name Kathy Ettenice Title Assistant Lead Photographer

Signature X Kathy Ettenice Date 4-6-95 Phone ( )

Comments Please mail - per Tom Graff

Sales Representative Name Tom Graff Number 2209 Branch No. 604903

GENERATOR PART NO. 91678

Report Date: 4/21/95
Report: Imaging Service8

**Generator:**
Ft Hood Photo Lab Bldg 232

Survey: IS024713

Bldg 232
Ft Hood, TX

Safety-Kleen Service Representative / Branch Number :
2209 Tom Graff / 604903
Attention:

**Dear Customer:**

The following are the results of the Silver (Ag) and pH analysis completed by Safety-Kleen Corp. on your sample

Please contact your local Safety-Kleen representative or branch facility listed above if you have any questions.

| Sample Number | Description | Sample Point | MDL* | Ag Result | Units | pH |
|---|---|---|---|---|---|---|
| 9507292 | Developer | After Processor | 0.25 | <0.25 | ppm | 10.1 |
| 9507293 | Washwater | After Processor | 0.25 | 123.04 | ppm | 6.8 |
| 9507294 | Washwater | After Processor | 0.25 | 1.16 | ppm | 7.2 |

* Method Detection Limit

Sample Date: 4/6/95
Processor: Color

Equipment Manufacture: Fuji
Type of Equipment: FA720

John Schmitz
Corporate Lab Manager

Allan Manteuffel Technical Center

P.O. Box 92050
Elk Grove Village, IL 60009-2050
Fax 312/825-7853

12555 W. Old Hi&ins Rd.
Elk Grove Village, IL 60007
Telephone: 312/825-7338

SK SURVEY NO.
IS024711

# IMAGING ANALYTICAL SURVEY

Generator Name Ft Hos S K C u s t o m e r No. 6 0 4 9 0 7 1 5 3

Facility Street Address (No P.O. Boxes).
Ft Hood Pkt 3 LAB BLDG 2 3 2

City FT Hood State TX Zip

**Customer Codes:** (Circle Only Ond)

| | |
|---|---|
| 11 Dentists | 18 Motion Picture/Television |
| 12 Hospitals/Clinics | 19 Governmenf Systems |
| 13 Prof. Diagnostic Imaging | 20 Office imaging |
| 14 MiniLabs/MicroLab | 21 Police/Gov't Offices/Schools |
| 15 Lg. Photofinishers | 22 Industrial X-Ray |
| 16 Professional Imaging | 23 Other |
| 17 Printing & Publishing | |

SK CONTROL NO. | LAB NO.

SK USE ONLY

| SAMPLE 1 DESCRIPTION | SAMPLE 2 DESCRIPTION | SAMPLE 3 DESCRIPTION | SAMPLE 4 DESCRIPTION |
|---|---|---|---|
| Developer X | Developer | Developer | Developer |
| Bleach Fixer | ~~Bleach Fixer~~ X | Bleach Fixer | Bleach Fixer |
| Fixer | Fixer | Fixer | Fixer |
| Stabilizers | Stabilizers | Stabilizers | Stabilizers |
| Washwater | Washwater | Washwater X | Washwater |
| Other: | Other: BLEACH | Other | Other: |
| **Sample Point** | **Sample Point** | **Sample Point** | **Sample Point** |
| After Processor X | After Processor X | After Processor X | After Processor |
| After Electrolytic | After Electrolytic | After Electrolytic | After Electrolytic |
| After Canister | After Canister | After Canister | After Canister |
| No Treatment | No Treatment | No Treatment | No Treatment |
| Other | Other | Other | Other |

**Date of Sample** 11-6-95

**Equipment Manufacturer** COLENTA

**Type of Equipment** E-6 SLIDE PROCESSOR 20-10

**Process: Black/White or Color (Circle One)**

Generator **Certification** (Not a waste handling agreement):

On behalf of the Generator, I hereby warrant, represent, and certify that: all Information **submitted** In **this** document Is true, accurate, and complete; all known or suspected hazards have been disclosed; and, I **am** a duly **authorized** employee of the Generator.

Generator agrees to Indemnify and hold Safety-Kleen Corp. **and its subsidiaries** harmless for any **claims, liabilities,** damages, and costs Including, but not **limited** to, attorney's fees, arising out of or **in any way** related to breach of the above warranty by the Generator.

Name KATHY ETHERIDGE Title ASSISTANT LEAD [illegible]

Signature X Kathy Etheridge Date 11-6-95 Phone (817)2878711

Comments Please Rush per Tom Graff

Sales Representative Name Tom GRAFF Number 2209 Branch No. 604903

GENERATOR PART NO. 91678

Report Date: 4/21/95
Report: Imaging Services

Generator:
Ft Hood Photo Lab Bldg 232

Survey: IS024711

Bldg 232
Ft Hood, TX

Safety-Kleen Service Representative / Branch Number
2209 Tom Graff / 604903
Attention:

Dear Customer:

The following are the results of the Silver (Ag) and pH analysis completed by Safety-Kleen Corp. on your sample.

Please contact your local Safety-Kleen representative or branch facility listed above, if you have any questions.

| Sample Number | Description | Sample Point | MDL* | Ag Result | Units | |
|---|---|---|---|---|---|---|
| 9507301 | Developer | After Processor | 0.25 | <0.20 | ppm | 9.7 |
| 9507302 | Bleach | After Processor | 0.25 | 508.69 | ppm | 5.9 |

* Method Detection Limit

Sample Date: 4/6/95
Processor: Color

Equipment Manufacture: Colenta
Type of Equipment: SlideProce

John Schmitz
Corporate Lab Manager

Allan Manteuffel Technical Center

P.O. Box 92050
Elk Grove Village, IL 60009-2050
Fax: 312/825-7853

12555 W. Old Higgins Rd.
Elk Grove Village, IL 60007
Telephone: 312/825-7338

Safety-Kleen

# IMAGING ANALYTICAL SURVEY

SK SURVEY NO.
IS024712

Generator Name Ft Hood Photo Lab Bldg 232 SK Customer No. 6 0 4 9 0 3 1 4 5 3

Facility Street Address (No P.O. Boxes)
Ft Hood Photo Lab Bldg 232

City Ft Hood State TX Zip

**Customer Types: (Circle Only One)**

11 Dentists
12 Hospitals/Clinics
13 Prof. Diagnostic Imaging
14 MiniLabs/MicroLab
15 Lg. Photofinishers
16 Professional Imaging
17 Printing & Publishing
18 Ms:
19 G 1 Motion Picture/Television
1 overnment Systems
20 Office imaging
21 Police/Gov't Offices/Schools
22 Industrial X-Ray
23 Other

SK USE ONLY

| SK CONTROL NO. | | SK CONTROL NO. | | SK CONTROL NO. | | SK CONTROL NO. | |
|---|---|---|---|---|---|---|---|
| LAB NO. | | LAB NO. | | LAB NO. | | LAB NO. | |

| SAMPLE 1 DESCRIPTION | SAMPLE 2 DESCRIPTION | SAMPLE 3 DESCRIPTION | SAMPLE 4 DESCRIPTION |
|---|---|---|---|
| Developer X | Developer — | Developer — | Developer -- |
| Bleach Fixer -- | Bleach Fixer — | Bleach Fixer — | Bleach Fixer — |
| Fixer — | Fixer — | Fixer | Fixer — |
| Stabilizers -- | Stabilizers — | Stabilizers -- | Stabilizers -- |
| Washwater — | Washwater X | Washwater — | Washwater — |
| Other: | Other: | Other: | Other: |
| **Sample Point** | **Sample Point** | **Sample Point** | **Sample Point** |
| After Processor X | After Processor X | After Processor X | After Processor — |
| After Electrolytic — | After Electrolytic — | After Electrolytic — | After Electrolytic — |
| After Canister — | After Canister — | After Canister -- | After Canister — |
| No Treatment -- | No Treatment — | No Treatment — | No Treatment — |
| Other | Other | Other | Other |

**Date of Sample** 11-6-98 **Equipment Manufacturer** FUJI

**Type of Equipment** AP5500 **Process: Black/White or Color (Circle One)**

Generator Certification (Not a waste handling agreement):

On behalf of the Generator, I hereby warrant, represent, and certify that: all Information submitted in this document is true, accurate, and complete; all known or suspected hazards have been disclosed; and, I am a duty authorized employee of the Generator.

Generator agrees to Indemnify and hold Safety-Kleen Corp. and Its subsidiaries harmless for any claims, liabilities, damages, and costs Including, but not limited to, attorney's fees, arising out of or In any way related to breach of the above warranty by the Generator.

Name Kathy Ethridge Title Assistant Lead Photographer

Signature X Kathy Ethridge Date 7/6/95 Phone 817 287 8711

Comments Please rush for Tom Graff

Sales Representative Name Tom Graff Number 2209 Branch No. 604903

GENERATOR PART NO. 91678

Report Date: 4/21/95
Report: Imaging Services

Generator:
Ft Hood Photo Lab Bldg 232

Survey: IS024712

Bldg232
Ft Hood, TX

Safety-Kleen Service Representative / Branch Number :
2209 Tom Graff / 604903
Attention:

Dear Customer:

The following are the results of the Silver (Ag) and pH analysis completed by Safety-Kleen Corp. on your sample.

Please contact your local Safety-Kleen representative or branch facility listed above if you have any questions.

| Sample Number | Descripti | o | n | MDL*e | PoirAg Result | Units | pH |
|---|---|---|---|---|---|---|---|
| 9507297 | Developer | After | Processor | 0.25 | <0.20 | ppm | 10.2 |
| 9507298 | Washwater | After | Processor | 0.25 | 488.84 | ppm | 7.2 |

* Method Detection Limit

Sample Date: 4/6/95
Processor: Color

Equipment Manufacture: Fuji
Type of Equipment: AP5500

Allan Manteuffel Technical Center

P.O. Box 92050
Elk Grove Village, IL 60009-2050
Fax: 312/825-7853

12555 W. Old Higgins Rd.
Elk Grove Village, IL 60007
Telephone: 312/825-7338

Report Date: 5/9/95
Report: Imaging Services

Generator :
Ft Hood Photo Lab Bldg 232

Survey: IS024711

Bldg 232
Ft Hood, TX

Safety-Kleen Service Representative/ Branch Number :
2209 Tom Graff / 604903
Attention:

Dear Customer:

The following are the results of the Silver (Ag) and pH analysis completed by Safety-Kleen Corp. on your sample.

please contact your local Safety-Kleen representative or branch facility listed above if you have any questions.

| Sample Number | Description | Sample Point | MDL* | Ag Result | Units | pH |
|---|---|---|---|---|---|---|
| 9507303 | Washwater | After Processor | 0.25 | 0.38 | ppm | 7.2 |

* Method Detection Limit

Sample Date: 4/6/95
Processor: Color

Equipment Manufacture: Colenta
Type of Equipment: SlideProce

John Schmitz
Corporate Lab Manager

Allan Manteuffel Technical Center

P.O. Box 92050
Elk Grove Village, IL 60009-2050
Fax: 312/825-7853

12555 W. Old Higgins Rd.
Elk Grove Village, IL 60007
Telephone: 312/825-7338

Safety-Kleen

# IMAGING ANALYTICAL SURVEY

IS024711

Generator Name: Ft Hood PhotoLab Bldg 272 SK Customer No. 6-049-07-1453

Facility Street Address (No P.O. Boxes): Ft Hood Photo Lab Bldg 272

City: Ft Hood State: TX Zip:

**Customer Codes: (Circle Only One)**

11 Dentists
12 Hospitals/Clinics
13 Prof. Diagnostic Imaging
14 MiniLabs/MicroLab
15 Lg. Photofinishers
16 Professional Imaging
17 Printing & Publishing
18 Motion Picture/Television
19 Government Systems
20 Office Imaging
21 Police/Gov't Offices/Schools
22 Industrial X-Ray
23 Other

SK USE ONLY

| SK CONTROL NO. | SK CONTROL NO. | SK CONTROL NO. | SK CONTROL NO. |
|---|---|---|---|
| LAB NO. | LAB NO. | LAB NO. M | LAB NO. |

| SAMPLE 1 DESCRIPTION | SAMPLE 2 DESCRIPTION | SAMPLE 3 DESCRIPTION | SAMPLE 4 DESCRIPTION |
|---|---|---|---|
| Developer X | Developer X | Developer | Developer |
| Bleach Fixer | ~~Bleach Fixer~~ | Bleach Fixer | Bleach Fixer |
| Fixer | Fixer | Fixer | Fixer |
| Stabilizers | Stabilizers | Stabilizers | Stabilizers |
| Washwater | Washwater | Washwater X | Washwater |
| Other: | Other: BLEACH | Other: | Other: |
| **Sample Point** | **Sample Point** | **Sample Point** | **Sample Point** |
| After Processor X | After Processor X | After-Processor X | After Processor |
| After Electrolytic | After Electrolytic | After Electrolytic | After Electrolytic |
| After Canister | After Canister | After Canister | After Canister |
| No Treatment | No Treatment | No Treatment | No Treatment |
| Other | Other | Other-d | Other |

Date of Sample: 11-6-95.

Equipment Manufacturer: COLENTA

Type of Equipment: E-6 SLIDE PROCESSOR 20-10

Process: Black/White or Color (Circle One)

Generator Certification (Not a waste handling agreement):
On behalf of the Generator, I hereby warrant, represent, and certify that: all information submitted in this document is true, accurate, and complete; all known or suspected hazards have been disclosed; and, I am a duly authorized employee of the Generator.
Generator agrees to indemnify and hold Safety-Kleen Corp. and its subsidiaries harmless for any claims, liabilities, damages, and costs including, but not limited to, attorney's fees, arising out of or in any way related to breach of the above warranty by the Generator.

Name: KATHY ETTERIDGE Title: ASSISTANT/FAD PHOTOGRAPHER

Signature: X Kathy Etteridge Date: 11-6-95 Phone: (817) 287-8916

Comments: Please Rush per Tom Graff

Sales Representative Name: Tom GRAFF Number: 2209 Branch No. 604903

SALES REPRESENTATIVE

PART NO. 91678

# Appendix D

# Tank Purging Correspondence

# Appendix D

## Tank Purging Correspondence

The correspondence regarding the tank purging practices on Fort Hood were obtained from the Directorate of Public Works. The practice and related documentation was reviewed due to the possibility of contamination of the sanitary sewer system with improper tank purging. The correspondence included here was all that was available for review on this subject. This correspondence indicates that, if procedures are followed, the disposal of purging water from the tanks to the sanitary sewer system would not compromise the system.

DEPARTMENT OF THE ARMY.
HEADQUARTERS 13TH CORPS SUPPORT COMMAND
FORT HOOD. TEXAS 76544-5070

REPLY TO
ATTENTION OF

AFVG-G4-ENG

30 AUG 19%

MEMORANDUM FOR Colonel Bungard, Director of Engineering and Housing (DEH), Fort Hood, Texas 76544

SUBJECT: Disposal of Purging Solution

**1.** Proper disposal of hazardous materials and waste are of great concern to all of our units. We are in urgent need of written guidance concerning designated locations to dump the purging solution from our fuel tankers. Your environmental office provided verbal guidance on current dumping locations for the purging solution, however, this does not alleviate valid concerns from commanders that formal written guidance does not currently exist.'

**2.** Your urgent assistance is sincerely appreciated. My point of contact is MAJ Prettyman at 287-8869.

WILLIAM S. JONES, JR.
COL, GS
Chief of Staff

AFZF-DE-ENV (AFVG-TR-418/23 Aug 94) (200-1a) 1st End
Mr. Bill Bodkin/skj/7-8713
SUBJECT: Dumping Purging Solution

DEH, Environmental Management Office 25 AUG 1994

FOR Commander, 418th Transportation Company

1. Reference paragraph 5-l l(d)(6), Fort Hood Regulation 420-2, 1 May 1993.

2. Your request for disposing of the purging solution into the sanitary sewer manhole located next to the west gate of your motor pool on Terminal Avenue is approved.

3. Point of contact is Mr. Bill Bodkin, Chief, Environmental Management Branch, 287-8713.

CHARLES T. McGINNIS, III
Deputy Director
Engineering and Housing

ENV

DEPARTMENT OF THE ARMY
418th Transportation Company (MED POL)
Fort Hood, Texas 76544.

AFVG-TR-418 23 AUGUST 1994

MEMORANDUM THRU

Commander, 180th Transportation Battalion, ATTN: S-3, Fort Hood, Texas 76544

Commander, 64th Corps Support Group, ATTN: S-3, Fort Hood, Texas 76544

Commander, 13th COSCOM, ATTN: G-3, Fort Hood, Texas 76544

FOR Commander, III Corps, ATTN: Director of Engineering and Housing, Fort Hood, Texas 76544

SUBJECT: Dumping purging solution

1. We are currently involved in purging our fuel tankers. After the tanker is purged, the purging solution has to be dumped. We need to receive written authorization stating where the tankers can dump the purging solution in order to avoid any repercussions from the EPA.

2. POC the undersigned, 287-1313.

LYNDON C. JOHNSON
CPT, TC
Commanding

# Appendix E

## Sanitary Sewer System Release Related Correspondence with Bell County Water Control & Improvement District #1

## Appendix E

### Sanitary Sewer System Release Related Correspondence with Bell County Water Control & Improvement District #1

The correspondence contained in Appendix E was obtained from the Directorate of Public Works. It was reviewed as it pertains to any possible release of hazardous constituents to the receiving wastewater treatment plant through the sanitary sewer system. The correspondence indicates that the releases discussed were not hazardous to the plant and were dilute through the sanitary sewer system.

The 12 September 1994 document, indicating that the plant will receive the landfill leachate from the Fort Hood Landfill, refers to Fort Hood's active sanitary landfill.

The document dated 13 February 1991 indicates a possible fuel release in the sanitary sewer system. It is unclear exactly where the source manhole is located other than at "second manhole north of North Avenue on the west side of 53rd Street." That manhole is designated as a purge disposal point. The concentration of the fuel was not tested and the odor dissipated rapidly. No subsequent complaint from the wastewater treatment plant could be found indicating that the fuel was in large quantities. The memo indicates that the incident was a one time incident, and no repair information for 1991 exists indicating that the line was broken at the same time which would have allowed the fuel to exit the sewer system which would be cause for concern under this SWMU.

# BELL COUNTY WATER CONTROL & IMPROVEMENT DISTRICT No. 1

P.O. Box 43
201 S. 38TH ST.
KILLEEN, TX 76540-0043
(817) 526-6343

September 12, 1994

Headquarters III Corps'and Fort Hood
Directorate of Engineering and Housing
AFZF-DE-EPS
Fort Hood, Texas 76544

Attn: Col. Albert Bungard

Dear Sir;

It is our understanding that Fort Hood proposes to dispose of leachate from the Fort Hood Landfill into the sanitary sewer system, which outfalls to the Bell County Water Control and Improvement District No. 1 Wastewater Treatment Plant, for treatment.

This is acceptable as long as the constituents of the leachate do not exceed the operating parameters of the plant and regulatory requirements of the Environmental Protection Agency and the Texas Natural Resource Conservation Commission.

If we can be of further assistance, please do not hesitate to contact me.

Sincerely,

BELL COUNTY WATER CONTROL &
IMPROVEMENT DISTRICT NO. 1

Carl G. White, General Manager

AFZF-DE (420) 15 February 1991

MEMORANDUM THRU

GC

COFS

FOR DCG

SUBJECT: Suspected Fuel in Sewer Main-- INFORMATION MEMORANDUM

1. Purpose. To furnish information regarding the suspected fuel in sewer main.

2. Information.

a. Reference is made to the suspected- fuel in sewer main reported to us by the Killeen Fire Department, 1900, Sunday, 10 Feb 91.

b. On Sunday evening, I had our firemen check it out - to ensure there was no fire hazard and/or to determine the scope of the problem. Due to hours of darkness and the fact the odor was minimal at our manholes, lift stations, etc.; they were unable to locate any problem - but did rule out a safety hazard.

c. On Monday, 11 Feb 91, I had our Sanitary Engineer, Plumbing Shop Foreman, and Environmental Division personnel make a deliberate search to determine if there had been a "dumping" and the extent of the problem. Mr. Stanuszek's report is enclosed. (Enclosure 1)

d. He also contacted the Killeen Wastewater Treatment Plant Supervisor to determine if there was any problem at the plant. He was advised there had been none - and that there was no evidence of gasoline in the sewage being treated. Apparently, the amount introduced into the sewer was relatively small and had been totally dissipated/neutralized within the sewage stream.

e. We are unlikely to ever determine who was responsible - but will keep our eye on that manhole. We have asked that the enclosed announcement be published in the CALTROP (encl 2), and will follow-up with the Corps G4 to reinforce the need to

PUBLIC RECORD

properly dispose of wash water when "purging" fuel tanks. We teach the Unit Environmental Coordinators how to do it properly In our Environmental Management Course.

f. Our conclusion is that this incident did not Introduce enough fuel into the sewer to create an environmental problem or require any spill report to the EPA, Texas Water Commission, or Texas Department of Health.

g. We will continue to stress environmental control at every opportunity - and hope to preclude Incidents of this nature, In the future.

Encls

ROBERT F. HARRIS
Colonel, CE
Director of Engineering
and Housing

Noted _____

See Me _____

AFZF-DE-ENV (420) 15 February 1991

MEMORANDUM FOR DOIM, ATTN: DOIM-IM-A

SUBJECT: CALTROP Submission

1. Request the following item be published in the CALTROP Bulletin:

"Fuel Tank Purging: The disposal of fuels, oils, paints, solvents, or any other hazardous material by flushing into drains or sewers is strictly prohibited. The disposal of gasoline into sanitary sewers is particularly dangerous. Explosive fumes may accumulate and may cause explosions at unpredictable locations. Organizations having a requirement for tank purging must follow the instructions in Environmental Guidance 2. Before attempting to purge tanks, coordinate with the DEH, Environmental Management Branch, Building 4468, 72nd and Warehouse, 287-8755/8714. Ensure proper disposal practices are implemented. Failure to do so may cause severe environmental problems and/or cause an intolerable safety hazard."

2. Point of contract is Mr. A. J. Rivera, Environmental Management Branch, 287-8755.

ROBERT F. HARRIS
Colonel, CE
Director of Engineering
and Housing

AFZF-DE-EPS (420-10c) 13 Feb 1991

MEMORANDUM FOR RECORD

SUBJECT: Gasoline (Mogas) in Sanitary Sewer System

1. At approximately 0830 on 11 Feb 91, Joseph Stanuszek, Civil Engineer and William Bodkin, Environmental Engineer, inspected the Fort Hood 30' diameter outfall sewer for further evidence of gasoline as had been discovered on 10 Feb 91. Manholes were opened at the intersection of Business 190 and Highway 195 and along G Avenue at 2nd Street and 10th Street. No evidence of gasoline was detected.

2. At 1315 hours, a faint gasoline odor was detected by Joseph Stanuszek and Kirk Marek, Civil Engineer, from a manhole on the 30' sewer line located southwest of Building 6898. Inspection then proceeded in an upstream direction to determine the source.

3. The inspection method consisted of progressively opening manholes in an upstream direction. If the gasoline odor was present, inspection continued upstream. If not, inspection proceeded at the nearest downstream tributary manhole. By this method, the odor trail led a distance of approximately 19,700 feet to the second manhole north of North Avenue on the west side of 53rd Street. This manhole has been designated and is used as a disposal point for wash water from fuel truck purging operations.

4. It is apparent that either Improper purging operations were employed or mogas fuel was improperly disposed of at this manhole. This incident appears to be a one time dump since the gasoline odor became fainter as inspection proceeded upstream to the source manhole.

Joseph S. Stanuszek

JOSEPH S. STANUSZEK
Civil Engineer, Engineering Plans
and Services Division

# Appendix F

# Noncompliance Notifications

# Appendix F

## Noncompliance Notifications

Appendix F includes the Noncompliance Notifications sent to Texas Natural Resource Conservation Commission when raw wastewater was released from the sanitary sewer system due to a line breakage, pump station overflow or other malfunction of the system. These notifications were obtained from the Directorate of Public Works and were included because they pertain directly to the possibility of hazardous constituents possibly released to the environment through the sanitary sewer system.

**TEXAS** NATURAL **RESOURCE** CONSERVATION **COMMISSION**

# UNAUTHORIZED DISCHARGE OF WASTEWATER NONCOMPLIANCE NOTIFICATION

Name of Permittee: The Corps of Fort Hood ☐ Permittee ☒ Subscriber *Permit No.: WCID#1, TX10351-002

County: Coryell / Bell TNRCC Region: Waco Region 9

Source and Location of Unauthorized Discharge (WWTP, lift station, collection line, other): Lift Station 51400

Cause of Unauthorized Discharge: Contractor broke 2" forced St side of sewer line

Discharge Route: Unnamed Tributary of Clear Creek Estimated Volume: unknown

Duration: When Begun Nov 20, 96 (Date) 0900 AM (Time) When Ended Nov 20, 96 (Date) 1100 AM (Time)

or When Expected to be Corrected _____ (Date)

Actions Taken to Mitigate Adverse Effects (disinfection, containment, cleanup, other): Pumped wet wells and transported to gravity side of sewer line, flushed with water & added hypochlorite to water and ground.

Monitoring Data:

☐ Yes ☒ No Field Measurements
☐ Yes ☒ No Laboratory Samples
☐ Yes ☒ No Fish Kill If yes, estimate number killed. _____

**Note: Data should be attached or submitted to TNRCC when available.**

Actions Taken to Correct the Problem and Prevent Recurrence: Repaired break. New force main line will be completed and in operation shortly

Other Comments: _____

Information Reported By: William C. Bodkin (Name) Supervisor (Title)

Date Reported: 21 Nov 96 Telephone (817) 28 7- 8713

Signed: William C. Bodkin (Name) C. Env Mgt Br, DPW (Title)

* If the unauthorized discharge is from a collection system, use the permit number of the treatment plant to which the collection system is tied.

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

# UNAUTHORIZED DISCHARGE OF WASTEWATER NONCOMPLIANCE NOTIFICATION

Name of Permittee: III Corps + Ft Hood ☐ Permittee ☒ Subscriber

*Permit No.: WCID #1 TX 10351-002

County: Coryell / Bell

TNRCC Region: Waco Region 9

Source and Location of Unauthorized Discharge (WWTP, lift station, collection line, other): Lift Station 51400

Cause of Unauthorized Discharge: 'ontractor broke 12" forced side of sewer line

Discharge Route: Clear Creek

Estimated Volume: Inknown

Duration: When Begun Oct 31, 96 (Date) 09:30am (Time). When Ended Oct 31, 96 (Date) 1:00 P.m. (Time)

or When Expected to be Corrected _____ (Date)

Actions Takeh to Mitigate Adverse Effects (disinfection, containment, cleanup, other): Wet wells were pumped out + fluid taken to gravity side of sewer line. Hypochlorite added to area.

nitoring Data:

☐ Yes ☒ No Field Measurements
☐ Yes ☒ No Laboratory Samples
☐ Yes ☒ No Fish Kill If yes, estimate number killed. _____

Note: Data should be attached or submitted lo TNRCC when available.

Actions Taken to Correct the Problem and Prevent Recurrence: Break was repaired. Area was cleaned.

Other Comments: _____

Information Reported By: Nancy Niemann (Name), General Engineer (Title)

Date Reported: 31 Oct 96

Telephone (287) - 9718

Signed: William C Bodkin (Name) G Env Mgt Br (Title)

* If the unauthorized discharge is from a collection system, use the permit number of the treatment plant to which the collection system is tied.

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Page 1 of 2

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

# UNAUTHORIZED DISCHARGE OF WASTEWATER
## NONCOMPLIANCE NOTIFICATION

Name of Permittee: The Corps of Fort Hood ☐ Permittee ☒ Subscriber Permit No.: WCID #1 TX 10357-002

County: Coryell / Bell TNRCC Region: WACO Region 9

Source and Location of Unauthorized Discharge (WWTP, lift station, collection line, other): LIFT STATION 52.380

Cause of Unauthorized Discharge: PUMPS CLOGGED WITH PAPER & OTHER PRODUCTS

Discharge Route: CLEAR CREEK Estimated Volume: UNKNOWN

Duration: When Begun SEP 14, 96 (Date) 0900 (Time) When Ended SEP 14, 96 (Date) 1015 (Time)

or When Expected to be Corrected _____ (Date)

Actions Taken to Mitigate Adverse Effects (disinfection, containment, cleanup, other): PUMPS CLEANED OUT, WATER ADDED TO STREAM

Monitoring Data:

☐ Yes ☒ No Field Measurements
☐ Yes ☒ No Laboratory Samples
☐ Yes ☒ No Fish Kill If yes, estimate number killed. _____

Note: Data should be attached or submitted to TNRCC when available.

Actions Taken to Correct the Problem and Prevent Recurrence: Pump cleaned out AREA WASH DOWN AND HYPOCLORITE ADDED.

Other Comments: _____

Information Reported By: WILLIAM C BODEIN (Name) C. ENV MGR (Title)

Date Reported: 16 Sep 96 Telephone (817) 287-8713

Signed: William C Bodein (Name) Chief Environmental Management Branch (Title)

* If the unauthorized discharge is from a collection system, use the permit number of the treatment plant to which the collection system is tied.

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

# UNAUTHORIZED DISCHARGE OF WASTEWATER NONCOMPLIANCE NOTIFICATION

Name of Permitlee: U. S. ARMY, FORT HOOD ☐ Permitlee ☒ Subscriber *Permit No.: WCID#1, TX10357-002

County: BELL/CORYELL TNRCC Region: WACO Region 9

Source and Location of Unauthorized Discharge (WWTP, lift station, collection line, other): LIFT STATION facility Number 54100

Cause of Unaulhorized Discharge: Pump Failure

Discharge Route: Un normal Stream to Bleas Creek Estimated Volume: 1256 PM

Duration: When Begun 13 MAR 96 (Dale) 10:00 AM (Time) When Ended 13 MAR 96 (Dale) 1:30 PM (Time)

or When Expected to be Corrected _____ (Dale)

Actions Taken to Mitigate Adverse Effects (disinfection, containment, cleanup, other): Disinfected with HTH and Flushed Stream with Water from fire Hydrant

Monitoring Data:

☐ Yes ☒ No Field Measurements
☐ Yes ☒ No Laboratory Samples
☐ Yes ☒ No Fish Kill If yes, estimate number killed. _____

Note: Data should be attached or submitted to TNRCC when available.

Actions Taken to Correct the Problem and Prevent Recurrence: Pumps were repaired and put back into service.

Other Comments: Telephonic Notication made 3:07 PM March 13, 1996.

Information Reported By: William C. Bodkin (Name) Chief, Env Hlth Br (Title)

Dale Reported: 13 Mar 96 Telephone (817) 287-8713

Signed: William C. Bodkin (Name) Chief Env Hlth Br (Title)

* If the unauthorized discharge is from a collection system, use the permit number of the treatment plant to which the collection system is tied.

**TEXAS** NATURAL RESOURCE CONSERVATION COMMISSION

# UNAUTHORIZED DISCHARGE OF WASTEWATER NONCOMPLIANCE NOTIFICATION

Name of Permittee: U.S. Army Fort Hood ☐ Permiltee ☒ Subscriber

'Permit No.: WCID# 1 TX 10351-002

County: BELL/CORYELL

TNRCC Region: 9- WACO

Source and Location of Unauthorized Discharge (WWTP, lift station, collection line, other): Break in Collection Line

Cause of Unauthorized Discharge: LINE BREAK.

Discharge Route: Contained in Ditch

Estimated Volume: UNKNOW

Duration: When Begun 11 DEC 95 (Dale) (Time) When Ended 11 DEC 95 (Dale) (Time)

or When Expected to be Corrected _____ (Dale)

Actions Taken to Mitigate Adverse Effects (disinfection, containment, cleanup, other): PIPE REPAIRED WATER TREATED WITH HYPOCHLORITE, WATER RETURNED TO MANHOLE

Monitoring Data:

☐ Yes ☒ No Field Measurements
☐ Yes ☒ No Laboratory Samples
☐ Yes ☒ No Fish Kill If yes, estimate number killed. _____

Note: Data should be attached or submitted to TNRCC when available.

Actions Taken to Correct the Problem and Prevent Recurrence: PIPE PATCHED. DESIGNED FOR REPLACEMENT OF LINES IS UNDERWAY. NEW LINES WILL BE RE-ROUTED.

Other Comments: LINE IS UNCOVERED FOR DITCH LINING PROJECT.

Information Reported By: William C Rodkin (Name) Chief Env Mgt Br (Title)

Date Reported: Phone 13 Dec 95 - 14 Dec 95 Telephone ( 817 ) 287-8713

Signed: William C Rodkin (Name) Chief Env Mgt Br (Title)

* If the unauthorized discharge is from a collection system, use the permit number of the treatment plant to which the collection system is tied.

TNRCC-0501 (Rev. 10-10 94)

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

# UNAUTHORIZED DISCHARGE OF WASTEWATER NONCOMPLIANCE NOTIFICATION

'Name of Permittee: U.S. ARMY, FORT HOOD ☐ Permittee ☒ Subscriber 'Permit No.: WCID#1 TX10351-002

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

UNAUTHORIZED DISCHARGE OF WASTEWATER NONCOMPLIANCE NOTIFICATION

Name of Permittee: U. S. ARMY, FORT HOOD ☐ Permittee ☒ Subscriber 'Permit No.: WCID#1 TX10351-002

County: BELL/CORYELL TNRCC Region: 9 - WACO

Source and Location of Unauthorized Discharge (WWTP, lift station, collection line, other): MANHOLE FORCE MAIN COLLECTION LINE

Cause of Unauthorized Discharge: ROCKS IN MANHOLE - FAILURE OF PRIOR REPAIR

Discharge Route: UNNAMED STREAM TO CLEAR CREEK Estimated Volume:

**Duration:** When Begun 21 NOV 95 (Date) (Time) When Ended 21 NOV 95 (Date) (Time)

or When Expected to be Corrected (Date)

Actions Taken to Mitigate Adverse Effects (disinfection, containment, cleanup, other): FLUSH STREAM & ADDED HTH down STREAM.

Monitoring Data:

☐ Yes ☒ No Field Measurement<
☐ Yes • J No Laboratory Samples
☒ Yes ☐ No Fish Kill If yes, estimate number killed. 12.

**Note: Dala should be attached or submitted to TNRCC when available.**

Actions Taken to Correct the Problem and Prevent Recurrence: WILL SECURE MANHOLE COVER TO PREVENT UNAUTHORIZED PERSONNEL FROM REMOVING COVER FORCE MAIN WAS REPAIRED.

Other Comments:

Information Reported By: WILLIAM C. BODKIN (Name) C, ENV NOT BR (Title)

Date Reported: 21 NOV 95 Telephone (817) 287-8713

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

# UNAUTHORIZED DISCHARGE OF WASTEWATER NONCOMPLIANCE NOTIFICATION

**Name of Permittee:** US ARMY FORT HOOD ☐ Permittee ☐ Subscriber **Permit No.:** TX 10351-002 WCID #1

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

UNAUTHORIZED DISCHARGE OF WASTEWATER NONCOMPLIANCE NOTIFICATION

**Name of Permittee:** US ARMY, Fort Hood ☐ Permittee ☒ Subscriber **Permit No.:** TX10351-002 WCID #1

County: BELL / CORYELL TNRCC Region: 9 - WACO

Source and Location of Unauthorized Discharge (WWTP, lift station, collection line, other): Lift Station BUILDING 8001,

Cause of Unauthorized Discharge: GREASE BUILD UP STOPPED FLOAT VALVE FROM BRING CLAMPS ON

Discharge Route: THRU GOLF COURSE INTO CITY, KILLEEN Estimated Volume: 10,000

Duration: When Begun 9 NOV 95 (Date) Est. 2 AM (Time) When Ended 9 NOV 95 (Date) 0845 (Time)

or When Expected to be Corrected _____ (Date)

Actions Taken to Mitigate Adverse Effects (disinfection, containment, cleanup, other): GREASE REMOVED & FLOATS FREED. PUMPS BACK ON LINE.

Monitoring Data:

☐ Yes ☒ No Field Measurements
☐ Yes ☒ No Laboratory Samples
☐ Yes ☒ No Fish Kill If yes, estimate number killed. _____

**Note: Data should be attached or submitted to TNRCC when available.**

Actions Taken to Correct the Problem and Prevent Recurrence: REMOVED GREASE FROM TOP OF WATER AND FREED FLOATS. MAINTENANCE PERSONNEL CHECK LIFTSTATION ROUNTINELY

Other Comments: City of Killeen advised.

Information Reported By: WILLIAM C. BODKIN (Name) CHIEF ENV MGT BR (Title)

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

# UNAUTHORIZED DISCHARGE OF WASTEWATER NONCOMPLIANCE NOTIFICATION

Name of Permittee: U.S. ARMY FORT HOOD ☐ Permittee ☐ Subscriber 'Permit No.: TX 10351-002

County: BELL / CORYELL TNRCC Region: 9 - WACO

Source and Location of Unauthorized Discharge (WWTP, lift station, collection line, other):

SEWER LIFT STATION BUILDING 41012

Cause of Unauthorized Discharge: PUMP FAILURE

Discharge Route: DITCH TO UNNAMED STREAM to CLEAR CREEK Estimated Volume: 33,000 GAL

Duration: When Begun Sep 23, 1995 ≈ 5:00 PM (Date) (Time) When Ended Sep 23 1995 ≈ 9:30 PM (Date) (Time)

or When Expected to be Corrected _____ (Date)

Actions Taken to Mitigate Adverse Effects (disinfection, containment, cleanup, other): OPEN FIRE HYDRANT TILL MIDNIGHT, ADDED CHLORINE

Monitoring Data:

☐ Yes ☒ No Field Measurements
☐ Yes ☒ No Laboratory Samples
☐ Yes ☒ No Fish Kill If yes, estimate number killed. _____

Note: Data should be attached or submitted to TNRCC when available.

Actions Taken to Correct the Problem and Prevent Recurrence: REPAIRED PUMP. LIFT STATION IS CHECK ON A REGULAR BASIS

Olher Comments: _____

Information Reported By: WILLIAM C. BODKIN (Name) CHIEF, ENV. MGT BR, DPW (Title)

Date Reported: 25 Sep 95 Telephone (817) 287-8713

Signed: William C. Bodkin (Name) C, Env Mgt Br DPW (Title)

[1] If the unauthorized discharge is from a collection system, use the permit number of the treatment plant to which the collection system is tied.

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

# UNAUTHORIZED DISCHARGE OF WASTEWATER NONCOMPLIANCE NOTIFICATION

Name of Permittee: U. S. Army, Fort Hood ☐ Permittee ☐ Subscriber  Permit No.:

County: Coryell  TNRCC Region: 9 - WACO

Source and Location of Unauthorized Discharge (WWTP, lift station, collection line, other): LIFT STATION BLD 41012

Cause of Unauthorized Discharge: CIRCUIT BREAKER TRIPPED on PUMPS

Discharge Route: Concrete ditch to UNNAMED DRAINAGE - CLEAR CK  Estimated Volume: 100,000

Duration: When Begun Jul 5, 1995 (Date) 6:15 PM (Time)  When Ended Jul 5, 1995 (Date) 7:20 PM (Time)

or When Expected to be Corrected _____ (Date)

Actions Taken to Mitigate Adverse Effects (disinfection, containment, cleanup, other): ADDED DISINFECT AND FLUSH WITH WATER FROM FIRE HYDRANT.

Monitoring Data:

☐ Yes ☒ No Field Measurements
☐ Yes ☒ No Laboratory Samples
☐ Yes ☒ No Fish Kill If yes, estimate number killed. _____

Note: Data should be attached or submitted to TNRCC when available.

Actions Taken to Correct the Problem and Prevent Recurrence: ELECTRICAL SHOP IS CHECKING SYSTEM TO CORRECT PROBLEM WITH CIRCUIT BREAKER

Other Comments: CHECK DOWN STREAM & FOUND NO PROBLEMS

Information Reported By: William C. Bodkin (Name) CHIEF, ENVIRONMENTAL MGT BR (Title)

Date Reported: July 6, 1995  Telephone (817) 287-8713 FAX 817 287-3591

Signed: William C. Bodkin (Name) Chief Envir Mgt Br (Title)

* If the unauthorized discharge is from a collection system, use the permit number of the treatment plant.

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

# UNAUTHORIZED DISCHARGE OF WASTEWATER NONCOMPLIANCE NOTIFICATION --

Name of Permittee: Family Housing Maintance ☐ Permittee ☐ Subscriber

Permit No.: TEC M 456150083 #CLASS I

County: Bell

TNRCC Region: Central Tex Region

Source and Location of Unauthorized Discharge (WWTP, lift station, collection line, other): Behind QTD 8502 - 1 Fort Hood Texas Walkervillige

Cause of Unauthorized Discharge: Killeen Sewer Main Hole Over Flowed

Discharge Route: ~~200 Gal Per~~ North

Estimated Volume: 200 Gal per Hr

Duration: When Begun Est. 5 (Date) 2:00 (Time) When Ended 2-14-95 (Date) 3:00 (Time)

or When Expected to be Corrected _____ (Date)

Actions Taken to Mitigate Adverse Effects (disinfection, containment, cleanup, other): Unstoped Sewer Line To Killeen Main Hole & Disinfected Sewer Spill

Monitoring Data:

☐ Yes ☒ No Field Measurement<
☐ Yes ☒ No Laboratory Samples
☐ Yes ☒ No Fish Kill If yes, estimate number killed. _____

Note: Data should be attached or submitted to TNRCC when available,

Actions Taken to Correct the Problem and Prevent Recurrence: Clean Sewer Main with Tagalong Jet Machine & Notified Killeen To Correct Their Problem

Other Comments: ~~None~~ Turned over To government Inspector Paul Hammel To get with city of Killeen reference there responsibility

Information Reported By: Bob by Anthony (Name) Supervisor (Title)

Date Reported: Bobby Anthony 2-14-95 Telephone (817) 532-5004

Filed: E. Kuhlmann (Name) QCZ (Title)

. If the unauthorized discharge is from a collection system, use the permit number of the treatment plant to which the collection system is tied.

TNRCC-0501 (Rev. 10-10-94)

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

# UNAUTHORIZED DISCHARGE OF WASTEWATER NONCOMPLIANCE NOTIFICATION

Name of Permittee: U.S. ARMY, FORT HOOD ☐ Permittee ☐ Subscriber

Permit No.: WICD#1

County: BELL / CORYELL

TNRCC Region: 9

Source and Location of Unauthorized Discharge (WWTP, lift station, collection line, other): LIFT STATION, 51400

Cause of Unauthorized Discharge: PUMP FAILED

Discharge Route: LIFT STATION TO UNNAMED STREAM

Estimated Volume: 8,000 GAL

Duration: When Begun JAN 16, 95 (Date) 11 AM (Time) When Ended JAN 16, 95 (Date) 7 P.M. (Time)

or When Expected to be Corrected _____ (Date)

Actions Taken to Mitigate Adverse Effects (disinfection, containment, cleanup, other): DISINFECTION ADDED TO WATER OVERFLOW

Monitoring Data:

☐ Yes ☒ No Field Measurements

☐ Yes ☒ No Laboratory Samples

☐ Yes ☒ No Fish Kill If yes, estimate number killed. _____

Note: Data should be attached or submitted to TNRCC when available.

Actions Taken to Correct the Problem and Prevent Recurrence: REPAIRED PUMPS ALARM SYSTEM IS WORKING

Other Comments: OVERFLOW ONLY OCCURRED WHEN LIFT STATION UP-STREAM CAME ON AND WASTED ABOUT 5-10 MIN EACH. ONE PUMP WAS WORKING.

Information Reported By: WILLIAM C. BODKIN (Name) CHIEF ENVIRONMENTAL MANAGEMENT BR. (Title)

Date Reported: JANUARY 17 1995

Telephone (817) 287-8713

Signed: William C. Bodkin (Name) Chief Environmental Management Br (Title)

* If the unauthorized discharge is from a collection system, use the permit number of the treatment plant to which the collection system is tied.

**TEXAS** NATURAL RESOURCE CONSERVATION COMMISSION

# **UNAUTHORIZED** DISCHARGE OF WASTEWATER NONCOMPLIANCE NOTIFICATION

Name of Permittee: U.S. Army Fort Hood Permit No.: 2233

County: Bell/Coryell TNRCC Region: 9-Waco

Source and Location of Unauthorized Discharge (WWTP, lift station, collection line, other): Lift Station (51400) on Clear Creek Golf Course

Cause of Unauthorized Discharge: Lift Station shut down

Discharge Route: Lift Station to unnamed stream to Clear Creek Estimated Volume: Unknown

Duration: When Begun Dec 5, 1994 (Date) 0730 (Time) When Ended Dec 5, 1994 (Date) 1200 (Time)

or When Expected to be Corrected _____ (Date)

Actions Taken to Mitigate Adverse Effects (disinfection, containment, cleanup, other): Flushed stream, small amounts of Calcium Hypochlorite.

Monitoring Data:

- ☐ Yes ☒ No Field Measurements
- ☒ Yes ☒ No Laboratory Samples
- ☒ Yes ☐ No Fish Kill If yes, estimate number killed. 20 Blue Gills

Note: Data should be attached or submitted to TNRCC when available.

Actions Taken to Correct the Problem and Prevent Recurrence: Repaired alarm system

Other Comments: Alarm system being repaired. Water was clear for most part - Minnows were not affected

Information Reported By: William C. Bodkin (Name) C. Env Mgt Bc (Title)

Date Reported: 6 Dec. 94 Telephone (817) 287-8713

Signed: William C. Bodkin (Name) C. Env Mgt Bc (Title)

# Appendix G

# Procedures Manual - "III Corps & FH Regulation 420-2" (1 May 1993)

# Appendix G

## Procedures Manual - "III Corps & FH Regulation 420-2" (1 May 1993)

The Procedures Manual was obtained from the Directorate of Public Works and was included in this document because it has specific procedures for handling of hazardous materials on Fort Hood. The handling of hazardous materials with relation to the sanitary sewer system is germaine to this project.

III CORPS & FH REG 420-2

FACILITIES ENGINEERING

# ENVIRONMENT AND NATURAL RESOURCES

SOLDIERS GIVE A HOOT!

MOBILE ARMORED CORPS
PHANTOM

HEADQUARTERS
III CORPS AND FORT HOOD

1 May 1993

DEPARTMENT OF THE ARMY
HEADQUARTERS III CORPS AND FORT HOOD
Fort Hood, Texas 76544-5057
1 MAY 1993

*III CORPS & FH REG 420-2

Facilities Engineering

# ENVIRONMENT AND NATURAL RESOURCES

**SUMMARY.** This regulation prescribes policies, assigns responsibilities, and establishes procedures for protection of the environment, preservation of natural resources, and hazardous material (HAZMAT)/hazardous waste (HAZWASTE) management.

**APPLICABILITY.** This regulation applies to units and activities assigned, attached, or conducting training, or residing on Fort Hood as tenants; contractor activities and leases located within the limits of the Fort Hood Military Reservation; persons residing, visiting, or working within the limits of the Fort Hood Military Reservation; and members of family housing. During mobilization, this regulation remains in effect.

**SUPPLEMENTATION.** Local supplementation of this regulation is prohibited without approval of Directorate of Engineering and Housing (DEH).

**INTERIM CHANGES.** Changes to this regulation are not official unless authenticated by the Directorate of Information Management (DOIM). Changes are issued when regulation or policy changes dictate. Users will destroy interim changes on their expiration dates unless sooner superseded or rescinded.

**SUGGESTED IMPROVEMENTS.** The proponent of this regulation is the Director of Engineering and Housing (DEH). Users are invited to send comments and suggested improvements to the Commander, III Corps and Fort Hood, ATTN: AFZF-DE.

**REQUIREMENTS IMPACTING ON UNIT COMMANDERS.** The requirements impacting on unit commanders are found in chapters 2, 9, and 10, paragraphs 1-4, 1-5, 1-6, 4-2, 4-3, 4-4, 5-2c, 5-5a(2), 5-5b, 5-6c, 5-8b, 6-3b, 6-4, 6-7, 6-8, 6-10, 6-11, 7-3c, 8-2a, tables 1-1 and 5-1, and appendix C.

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*This regulation supersedes FH Regulation 420-2, 31 October 1986.

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# CHAPTER 1
# GENERAL

**1-1. PURPOSE.** This regulation prescribes policies, assigns responsibilities, and establishes procedures for protection of the environment, preservation of natural resources, and HAZMAT/HAZWASTE management.

**1-2. REFERENCES.** References are listed in appendix A.

**1-3. ABBREVIATIONS AND TERMS.** Explanations of abbreviations and terms are in the glossary.

**1-4. RESPONSIBILITIES.**

a. Post commander or designated representative:

(1) Establishes an organizational structure to plan, execute, and monitor environmental programs.

(2) Plans and executes an environmental program, based on AR 200-1, AR 200-2, and this regulation to achieve the Army's environmental objectives.

(3) Cooperates with State and local authorities in the planning and execution of projects and activities required of Fort Hood for compliance with applicable Federal, State, and regional pollution control standards.

(4) Integrates environmental protection activities and programs to the fullest extent possible, into the planning and execution of the command basic mission.

(5) Reports, as required, to major commanders on the progress and effectiveness of environmental projects and activities to detect, quantify, and correct pollution sources according to public laws (see table 1-1 for a summary of laws).

b. DEH.

(1) DEH is the designated representative of the post commander in matters relating to the environment.

(2) DEH reviews administrative matters pertaining to this regulation.

c. Commander, Medical Department Activity (MEDDAC), funds and administers infectious waste disposal contracts.

d. Others are assigned responsibilities in several chapters of this regulation.

**1-5. STANDING OPERATING PROCEDURES (SOP).** SOPs required throughout this regulation may be combined to form a singular document under one title or may be incorporated to organization's SOP as an appendix.

**1-6. PUNITIVE PROVISIONS.** Paragraphs 4-3, 4-6, 4-7a, 5-2b, 5-2c, 5-5b, 5-15, 7-2a, and 10-1 of this regulation provide the basis for disciplinary action under Article 92, Uniform Code of Military Justice (UCMJ) (Violation of a Lawful General Regulation), for personnel subject to the UCMJ.

**1-7. EXCLUSIONS.** This regulation does not affect policies and procedures applicable to:

a. Nuclear accidents and incidents outlined in AR 360-5, chapter 10; AR 50-6, chapter 5; AR 40-13, chapter 3; or the III Corps and Fort Hood Nuclear Chemical Accident Incident Control Plan.

b. Chemical agent accidents and incidents as outlined in AR 385-40, chapter 7, or the III Corps and Fort Hood Nuclear Chemical Accident Incident Control Plan.

c. Radioactive accidents and incidents described in TM 3-261, chapter 10.

Table 1-1. Summary of laws

| NAME OF LAW | PL NUMBER | VIOLATION | PENALTY |
|---|---|---|---|
| Federal Water Pollution Control Act Amendments of 1972 (includes NPDES Permits) | 92-500 | Willful or negligent violations of sections 301 (Effluent Limitation), 302 (Water Quality Related Effluent Limitations), 306 (National Standards of Performance) and 307 (Toxic and Pretreatment Effluent Standards). | A fine of not less than $2,500 nor more than $25,000 per day of violations or by imprisonment for not more than 1 year or both for 1st offense and up to $50,000 per day of violation and 2 years in prison for subsequent violation. |
| Section 311 - Clean Water Act, Oil and Hazardous Substance Liability | 92-500 Sec 311 | Failure to notify of a discharge. | Up to $10,000, 1 year prison or both. |
| | | Discharge by willful negligence or willful misconduct. | Up to $250,000. |
| Resource Conservation and Recovery Act of 1976 (RCRA) | 94-580 | Hazardous Waste Subsection - Knowingly transport, treat, store, or dispose of hazardous waste, without permit. | Normal fine up to $25,000 per day of violation, imprisonment not to exceed 1 year, or both. |
| Clean Air Amendments of 1977 | 91-604 | Enforcement is normally through states and enforcement orders. | Up to $25,000 per day of violation, imprisonment for not more than 1 year, or both. |
| Safe Drinking Water Act | 93-523 | Willful violation of standards. | Up to $5,000 for each day of violation. |
| Federal Environmental, Pesticide Control Act of 1972 | 92-516 | Any provision of the Act. | Up to $25,000 fine, 1 year imprisonment. |
| Endangered Species Act | 93-205 | Any violation of the Act | Up to $10,000 fine. |
| Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) (Super Fund) | 96-510 | Failure to comply with notice. | Up to $10,000 for each day of violation, imprisonment for not more than 1 year, or both. |
| Texas Clean Air Act: Vernon's Texas Codes Annotated | Article 4477-5 | Emission of air contaminant. | $50 to $1,000 for each day of violation. |
| Texas Water Quality Act: Vernon's Texas Codes Annotated, Water Code | Section 26.001 | Unauthorized discharges. | Up to $10,000. |
| | | Discharge of oil. | $50 to $1,000. |
| Uniform Code of Military Justice | Article 92 | Violation of this regulation. | Maximum: 2 years confinement, reduction to Private, forfeiture of all pay and allowances, dishonorable discharge. |

NOTE: Complete copies of these laws and statutes are available for review at DEH, 287-8754.

# CHAPTER 2
# ENVIRONMENTAL DOCUMENTATION

**2-1. SUMMARY.** This chapter establishes responsibilities and local procedures for preparation, review, and approval of environmental impact statement (EIS), environmental assessment (EA) and record of environmental consideration (REC). Consult AR 200-2 for technical information and to understand applicability of:

a. National Environmental Policy Act (NEPA).

b. Requirements for environmental records and documents.

c. Categorical exclusions.

d. Actions and conditions that require environmental documentation.

e. Public involvement.

## 2-2. RESPONSIBILITIES.

a. The Post Commander is the approving authority for EISs.

b. The Chief of Staff is the approving authority for EAs of actions implemented off post.

c. The Garrison Commander is the approving authority for Eas of actions implemented on post.

d. Staff Judge Advocate (SJA) reviews proposed environmental documentation.

e. DEH:

(1) Executes RECs.

(2) Assists the proponent in the preparation of and reviews environmental documentation.

(3) Maintains record copies of environmental documentation.

f. The proponent (commander, principal staff leader, director, contractor, civilian supervisor, or leader of tenant organization):

(1) Prepares environmental documentation as required. Provides necessary information to develop environmentally compatible concepts of implementation and practicable alternatives to the proposed action.

(2) Considers early, during planning, each environmental value that can be positively or negatively affected through implementation of the proposed action.

## 2-3. PROCEDURES.

a. Prepare environmental documentation early enough so that it can contribute to the decision making process. See AR 200-2 for listings of actions that require environmental documentation. Do not use EA to rationalize decisions already made or actions already taken.

b. Proponent organizations planning actions requiring environmental documentation meet with DEH, Environmental Management Office, building 4468, as early as the planning process may permit, but not less than 3 months prior to the date of decision.

c. DEH will draft environmental documentation for the proponent using the proponent's input. The proponent wil sign the document before submittal to the approving authority, as shown in figure 2-1.

DEPARTMENT OF THE ARMY
HEADQUARTERS III CORPS AND FORT HOOD

ENVIRONMENTAL ASSESSMENT
FOR THE
(PROPOSED ACTION)
FORT HOOD, TEXAS
(DATE PREPARED)

PREPARED BY:

(Signature block)

TECHNICAL REVIEW BY:

(Signature block)

PROPONENT:

(Signature block)

LEGAL REVIEW BY:

(Signature block)

APPROVED BY:

(Signature block)

Figure 2-1. Format for the cover page of an EA

d. EAs are approved or disapproved at least 45 days prior to the date in which the final decision must be made. This period is intended to allow announcement and consideration of public comment.

# CHAPTER 3
# AIR QUALITY

**3-1. SUMMARY.** This chapter provides local restrictions and procedures necessary for control of air emissions. These procedures do not exempt individuals and organizations from compliance with fire, health, and safety regulations.

**3-2. OPEN BURNING.** Coordinate outdoor fires with DEH, using DA Form 4283 (Facilities Engineering Work Request), at least 30 days before proposed burns. Obtain concurrence, guidance, and required support from DEH before the burn. This requirement is not applicable to fires used for noncommercial food preparation.

a. Do not burn oils, asphaltic materials, natural or synthetic rubber, automotive tires, or other materials which may produce high concentrations and volumes of smoke. Excess propellant charges left over from artillery firing may be burned at the firing points.

b. Incinerate infectious waste at permitted incinerators. This requirement applies to hospital, clinics, aid stations, and temporary or field medical facilities. If permitted incinerators are not available, MEDDAC will contract disposal services.

c. Dispose of solid wastes according to chapters 6 and 7. Do not burn common wastes, such as trash, rubbish, lumber, vegetation clippings, leaves, and tree prunings. This prohibition does not apply to the sanitation contractor for operation of disposal facilities which are permitted or coordinated through State agencies.

d. Incinerate vinyl acetate and other plastics containing classified information. Headquarters Command, S2, 287-7427, operates a State-permitted incinerator at building 4659 for destruction of classified waste. Burning of plastics is not authorized, except as provided in this regulation.

**3-3. SPRAY PAINTING.** The requirements of this paragraph are applicable to spray painting where the nominal size of paint containers is 1 gallon or larger. Do not use this container size stipulation to circumvent the intent of this paragraph.

a. Spraying of chemical agent resistant coating (CARC) is authorized in permitted booths where emissions are processed through waterfall or dry filter systems having an efficiency of at least 90 percent.

b. To ensure compliance with State air quality standards, request certification of spray painting operations on a case-by-case basis. Address the requests to DEH, Environmental Management Branch, and include at least the following:

(1) Facility. Give building number, room number, or other specific descriptions that explain the exact location of the proposed spray painting operation. Describe the structure or area.

(2) Proposed inventory. List national stock number (NSN) and nomenclature of every fluid substance (paints, primers, thinners, solvents, and cleaners) intended for use in the proposed painting operation. Include paint/reducer mixing ratios, plus type and amount of thinner recommended by manufacturer. Generally, this information is given in the product label and the material safety data sheet (MSDS).

(3) Methods of application. State each method of application to be used, number of spray guns, and furnish original user manual or other document stating their performance specifications. Since Federal and State air quality regulations require employment of the best available technology, paint booths will only use high volume low pressure (HVLP) spray guns.

(4) Rate of application. For each paint, define the optimum quantity to be sprayed per hour, per day, per week, per year, and where applicable, give the schedule. For example, "8010-01-229-PINK is sprayed Tuesday and Friday during the 0700-1600 shift for 3 consecutive hours at a rate of .20 gal/hr."

(5) Personnel. Explain the composition of each painting crew, number of hours per shift, number of shifts per week, and the tentative schedule.

(6) Disposal plan. Delineate procedures for HAZWASTE disposal per paragraphs 6-5, 6-6, 6-7, 6-8, and 6-12.

(7) Production. Quantify the projected pieces to be painted per day and define the optimum quantity of each paint to be sprayed per piece.

(8) Exhaust filters data. Give source of supply, frequency of replacement, and performance documentation.

NOTE: Request includes original documents (user manuals, MSDS, filters data , and so forth), which DEH will return to requester. Coordinate safety and health requirements through G1, 287-3725.

c. DEH issues certificates in which specific parameters are established based on calculations of volatile organic compound (VOC) and particulate matter emissions and evaluation of conditions enumerated above.

(1) Organizations granted certification to spray paint should prominently display the certificate in the painting facility.

(2) Personnel working or supervising certified painting facilities shall become familiar with the parameters stipulated in their respective certification document.

(3) Painting operations shall comply with parameters stipulated in their respective certification document.

(4) Documents certifying a specific painting operation are not transferable.

(5) Changes in methods, paint materials, or location will void certification. Organizations shall coordinate with DEH, 287-8754, to amend their painting operation certificates as needed.

**3-4. STRATOSPHERIC OZONE PROTECTION.** Chlorofluorocarbons (CFCs) such as halons and freons are ozone depleting pollutants. Willful release of these controlled substances into the atmosphere is unlawful. Violators not subject to UCMJ are prosecuted for release of CFCs in violation of 18 USC 13 (Assimilative Crimes Act) and Vernon's Texas Codes Annotated, Article 4477-5.

a. Personnel in military occupational specialty (MOS) 52C and others whose duties include routine maintenance and repair of automotive and aircraft air conditioning systems are trained and certified per 40 CFR 82.40. Training and certification are available through the local community college or similar accredited institutions.

b. CFCs are recovered using refrigerant recovery/recycle system NSN 4130-01-338-2707 or equal equipment which is manufactured according to standards in 40 CFR 82.36.

c. Reuse recovered CFCs whenever possible. If reuse is not feasible at the source, DEH, 288-7627, assists to make lawful disposition of recovered CFCs.

# CHAPTER 4
# ENVIRONMENTAL CONSTRAINTS ON TRAINING, AND OTHER ACTIONS

**4-1. SUMMARY.** This chapter prescribes environmental quality considerations applicable to field training exercises, field testing, and other actions. Fort Hood pursues a program of conservation directed toward preserving and enhancing the quality of the natural environment. Consequently, field training, tactical exercises, and testing shall be conducted in a manner that least endangers the environment while completing training objectives.

**4-2. LAUNDRY, SHOWER, AND WATER SUPPLY POINTS.** Plan and coordinate with DEH, Fish and Wildlife Branch, 287-2885, tactical operations that demand large volumes of water. Coordinate before issuing operation order (OPORD) or tasking. When tactical training includes operation of field laundry, shower, or water supply points, the training mission/objective shall be accomplished without significant damage to the environment.

a. Water level in lakes is crucial to fish and wildlife habitats. Low water diminishes space for aquatic life movement. This condition increases suspended solids and affects biological oxygen demand. Insufficient water makes it difficult for aquatic life to breathe and wild animals to obtain adequate quality and quantity of drinking water. Operation of field laundry, shower, or water supply points in certain water sources may cause fish kills and fatal health hazards to wild animals. This is a constant concern, with a critical period from late spring to early fall.

b. DEH, Fish and Wildlife, Branch, 287-2885, manages the fish impoundments listed in table 4-1.

Table 4-1. Fish impoundments off-limits to tactical training

| LAKES | COORDINATE | PONDS | COORDINATE |
|---|---|---|---|
| *Airfield Lake | PK238460 | Cantonment A | PK197465 |
| Bratcher Lake | PK125356 | Cantonment B | PK204465 |
| Copperas Cove #3 | PK083460 | 12C | PK296491 |
| Crossville Lake | PK123404 | 22A | PK083416 |
| Eister Lake | PK128603 | 25A | PK102347 |
| Engineer Lake | PK275476 | 30A | PK113440 |
| Gray Lake | PK125362 | 31C | PK068456 |
| Heiner Lake | PK326450 | 36G | PK109547 |
| *Larned Lake | PK318477 | 43D | PK118611 |
| *Nolan Lake | PK366446 | 44E | PK170617 |
| Starnes #1 | PK070514 | 44G | PK139595 |
| * The outfall of Airfield, Larned, and Nolan lakes may be used as a water source during training. | | 52A | PK181716 |
| | | 53A | PK149681 |
| | | 53G | PK193703 |
| | | 90A | PK143493 |

c. Do not allow the sludge generated at water purification points to enter the water source. Locate water purification points on sites that allow for drying of sludge on level ground. Since retention pits shall not be excavated, deposit and abandon sludge on flat natural ground surface.

d. Do not operate or position vehicles and motorized equipment on dams or dikes.

**4-3. PLANTS AND ANIMALS.** Do not destroy plants and animals in violation of game and wildlife laws. Trees, whether alive or dead, shall not be cut without approval of DEH, Work Services Branch, 287-2113. Do not completely clear underbrush in command posts, bivouac, or field dining areas. This is detrimental to the natural environment, depletes wildlife foods, disrupts natural wildlife habitat, nesting, breeding, and foraging, and contributes to soil erosion and siltation. Hunters and fishermen shall consult local fish and game laws and III Corps & FH Reg 210-25.

## 4-4. SOIL EROSION AND STREAM SILTATION.

a. Operate vehicles on existing roads and trails to the maximum extent possible. Avoid arbitrary off-road short cuts and limit cross-country travel to that necessary for accomplishment of planned mission essential task list (METL) training. Establish new trails only when coordinated with DEH, using FHT Form 420-X10 (Coordination for Land Excavation) per chapter 11.

b. Do not wash vehicles and equipment at ponds or streams. Wash vehicles at established vehicle washracks and tank wash facilities only. Cross sizeable streams at authorized bridges or fording sites. Field washing of vehicles and random crossing of streams stirs up silt and detrimentally affect aquatic life.

## 4-5. LATRINES.

a. Permanent chemical latrines are located to support the frequently used training areas.

b. Temporary chemical latrine services are procured through Directorate of Contracting (DOC) as local purchase requests. Obtain funding authorization from G3/DPTM, Resource Management. If permanent latrines are not available and temporary facilities have not been authorized, use field expedient latrines according to FM 21-10, appendix A.

**4-6. AREA POLICE AND DISPOSAL OF SOLID WASTE.** Users police training and maneuver areas, including billets, food service, maintenance, and headquarters areas. Do not abandon or bury garbage, rubbish, and other solid waste. Collect solid wastes in the organization's area and transport it for disposal through dumpsters in the cantonment area or directly to the Fort Hood Sanitary Landfill at coordinate PK115475.

## 4-7. FUELS, OILS, AND OTHER LIQUIDS.

a. Intentional spillage of fuels, used oil, or other pollutants is prohibited. Personnel not subject to the UCMJ are prosecuted for unauthorized discharges in violation of 18 USC 13 (Assimilative Crimes Act) and Texas Water Quality Act. Leaders emphasize safe handling of petroleum, oils, and lubricants (POL) during transport, refueling, and maintenance operations.

b. Disposal of liquids in a manner such as dumping POL on the ground to control dust or pouring it into ditches or sewer systems is prohibited.

c. Collect and transport used oil, off-specifications fuel, hazardous waste, and salvable materials generated during field training for disposition as prescribed in chapters 5 and 6.

**4-8. LIQUID WASTES.** Discharging liquid wastes from field laundries, field showers, and field kitchens into stream beds or drainage ditches is prohibited. Dispose of liquid waste in soakage pits constructed, maintained, and closed according to field sanitation standards in FM 21-10, appendix A.

## 4-9. PIPELINES.

a. Crude Oil Pipeline. A crude oil pipeline traverses Fort Hood as it enters the reservation at coordinate PK357578 and lays in a straight line toward coordinate PK105676. The pipeline was constructed in 1929 and lies within an average of 3 feet below the surface. As a result of an accident in 1967, reinforcing sleeves were placed around the pipe at several points. The pipeline is "off-limits" to vehicles, except for crossing at established roads and tank trails. It is a safety hazard to violate this provision since the underground line operates at high pressure and carries a flammable material. The pipeline is marked every 100 meters with a sign warning against unauthorized crossing and directions to the nearest crossing sites. Crossing sites are clearly marked. Authorized crossing points according to the Training Area Maps, stock numbers V782SFHMIM1, 2, 3, and 4 are listed in table 4-2.

Table 4-2. Authorized pipeline crossing points

| WEST OF RANGE AREA | IN RANGE AREA | EAST OF RANGE AREA |
|---|---|---|
| PK105676 PK145661 | PK184645 PK233627 | PK257617 PK313595 |
| PK115672 PK153657 | PK199640 PK245622 | PK267613 PK319593 |
| PK121669 PK159655 | PK216633 PK246621 | PK274610 PK320593 |
| PK128667 PK161654 | PK225629 | PK287605 PK327589 |
| PK133665 PK179647 | | PK298601 PK335586 |
| PK135664 | | PK301599 PK348581 |
| | | PK306597 |

b. Natural Gas Pipeline. An underground natural gas pipeline enters at coordinate PK388420 and lays in and out of the south reservation boundary toward coordinate PK283438. It is off-limits to vehicles and there are no approved crossings.

**4-10. FIRES.** Fire has a tremendous impact on the environment. Leaders must ensure that precautions are taken to preclude fires and to promptly extinguish them. Fires should not be started intentionally without coordination with DEH according to paragraph 3-2. See III Corps & FH Reg 420-1, chapters 5 through 7, for guidance on fire prevention in the field and fire prevention involving field equipment.

# CHAPTER 5
# ENVIRONMENTAL PRESERVATION

## SECTION I
## INTRODUCTION

**5-1. SUMMARY.** This chapter contains policy and procedures to prevent, control, and clean up accidental or intentional spills of petroleum-base products or hazardous substances.

**5-2. GENERAL.**

a. This chapter supports the State of Texas Oil and Hazardous Substances Spill Contingency Plan, Environmental Protection Agency (EPA) Region VI Contingency Plan, and AR 200-1, chapter 8.

b. Willful discharge of petroleum products or hazardous substances onto the ground or into surface waters is punishable under provisions of State and Federal Laws and the UCMJ (see table 1-1).

c. Any person in charge of a facility or function, and with knowledge of any oil discharge or hazardous substance into navigable waters of the U.S. in violation of Title 33, U.S. Code, Section 1321(b)(3), shall immediately notify the appropriate agency of the U.S. Government of such discharge. Personnel not subject to the UCMJ are prosecuted under 33 USC 1321(b)(5). The maximum penalty for the Federal offense is a fine of $10,000 and imprisonment for 1 year.

d. This chapter and supporting plans are reviewed and evaluated at least once every 3 years, when a facility discharges more than 1,000 U.S. gallons of oil into navigable waters in a single spill event, or when there have been 2 spill events within any 12-month period.

**-3. DISCHARGE CLASSIFICATION.** The following classifications are provided for guidance. They do not imply or connote associated degrees of hazard to the public health or welfare, or a measure of environmental damage. Regardless of quantity, the on-scene coordinator (OSC) may classify discharges that substantially threaten the public as major discharge.

a. Minor Discharge. An oil discharge of less than 1,000 gallons into navigable waters or a discharge of any substance in a quantity which does not threaten the public health or welfare or the environment.

b. Medium Discharge. An oil discharge of 1,000 to 10,000 gallons into navigable waters or discharge of any hazardous substance of any quantity which threatens the public health or welfare or the environment.

c. Major Discharge. An oil discharge of more than 10,000 gallons into navigable waters or a discharge of any hazardous substance that substantially threatens the public health or welfare or generates public interest.

## SECTION II
## INSTALLATION OIL AND HAZARDOUS SUBSTANCE SPILL CONTROL AND CONTINGENCY PLAN

**5-4. SPILL PREVENTION CONTROL AND COUNTERMEASURE PLAN (SPCCP).** III Corps & FH Reg 200-10 is available through normal publication channels.

**5-5. INSTALLATION SPILL CONTINGENCY PLAN (ISCP).**

a. Responsibilities.

(1) DEH or designated representative is the Fort Hood OSC and responsible for:

(a) General supervision of ISCP implementation and performance of Installation Response Team (IRT).

(b) Liaison between Fort Hood and State or Federal agencies.

(c) Tasking requests through ACofS, G3/DPTM (Operations) as provided in table 5-1.

Table 5-1. Personnel and equipment for IRT

**This table prescribes the basic composition of the IRT. The OSC in coordination with G3/DPTM may add or delete from this listing as the situation may demand. G3/DPTM coordinates tasking of tactical resources. The resources of military units are the prime capability of the IRT. DEH augments the IRT with DEH assets as needed.**

| RESOURCES | TACTICAL | | | DEH | NOTES |
|---|---|---|---|---|---|
| | MINOR SPILL | MEDIUM SPILL | MAJOR SPILL | | |
| NCO or DAC supervisor | 1 | NA | NA | 1 | 1 and 6 |
| Enlisted Soldier | 10 | NA | NA | NA | 1 and 6 |
| Engineer Platoon (Combat) | NA | 1 | 2 | NA | 2 and 6 |
| Dump Truck | 1 | 3 | 6 | 2 | 3 and 6 |
| Cargo Truck | 1 | 3 | 6 | NA | 3 and 6 |
| Backhoe | 1 | 1 | 1 | 1 | 3 and 6 |
| Grader | NA | 1 | 1 | 1 | 3 and 6 |
| Dozer | NA | 1 | 1 | 1 | 3, 4, and 6 |
| Crane | NA | 1 | 2 | 1 | 3, 4, 5, and 6 |
| Front Loader | 1 | 1 | 1 | 1 | 3 and 6 |
| Gradeall | NA | NA | NA | 1 | 3 |
| Boat | 1 | 1 | 2 | NA | 3, 4, 5, and 6 |
| Vacuum Pump | NA | NA | NA | 1 | 3 |
| Vac-All | NA | NA | NA | 1 | 3 |
| Fuel Tanker (empty) | 1 | 1 | 2 | NA | 2, 3, 5, and 6 |
| Helicopter | 1 | 1 | 1 | NA | 2, 3, 5, and 6 |
| Floating Skimmer | NA | NA | NA | 2 | 3 and 4 |
| Firefighter's Truck | NA | NA | NA | As Needed | 3 |
| Miscellaneous Materials | NA | NA | NA | As Needed | 4 |

**NOTES:** 1. MOS immaterial 2. No weapons or NBC equipment. 3. With full crew. 4. Delivered to spill site. 5. OSC prescribes type and capacity. 6. Rations and drinking water for soldiers provided by their respective units.

(d) Coordination and supervision of annual IRT contingency training.

(e) Task assignment to the IRT.

(f) Procurement, maintenance, and distribution of specialized materials per III Corps & FH Reg 200-10, appendix C.

(2) MSC commanders provide soldiers and equipment as the OSC requests through the ACofS, G3/DPTM (Operations) (see table 5-1).

(3) Commander, MEDDAC, provides personnel to survey the potential impact of the discharge on human health. Renders staff advice and assistance to neutralize, control, an clean up ignitable, corrosive, reactive, or toxic substances.

(4) The SJA provides legal advice and assistance pertaining to spill events.

(5) The ACofS, G3/DPTM, Corps Operation Center, coordinates intercommand assistance to include acting as the installation response operation center.

(6) The Provost Marshal (PM) provides security and traffic control at spill sites.

(7) The 47th Explosive Ordnance Detachment handles explosive materials.

b. Response Procedures. Response to spill events is generally organized in five phases. Elements of more than one phase may take place concurrently.

(1) Phase I. Discovery and Notification.

(a) Persons discovering a discharge incident or immediate threat for a spill event shall judge the situation according to the criteria in figure 5-1 or FH Poster 420-3 (In Case of A Spill). Notify the Fort Hood fire department of spills defined as reportable, using the speediest means. Notification continues according to plan in figure 5-2 and progresses to the lowest organizational level with assets to control the situation. Notify as a minimum the fire department, DEH, Environmental Management Branch, and the organization responsible for the spill. The fire department maintains an on-call roster for notification after duty hours.

| Reporting is required when one or more of the following conditions exist. |
|---|
| ON-POST |
| 1. 25 gallons of petroleum products. |
| 2. Any hazardous substance. |
| 3. Spills covering a 100-square-foot area. |
| 4. Any spill judged to be harmful or that potentially threatens the public health and welfare. |
| OFF-POST |
| 1. Any spill causing a visible sheen on water. |
| 2. Same criteria as on post. |

Figure 5-1. Spill reporting criteria

(b) DEH performs on-site investigation of spill events and determines corrective action. Upon determination, DEH provides technical assistance to the organization responsible for the source of spill. When necessary, the IRT is activated as prescribed in figure 5-2 and table 5-1. Cleanup operations are done at the lowest possible level of organization, taking precautions to ensure expeditious and effective handling of the emergency. A spill event is treated as an emergency situation. If the discharger is unknown or unavailable, the OSC coordinates and proceeds with cleanup operations. MEDDAC, Preventive Medicine Service, is notified of spills which enter surface waters or occur within 100 meters of a well or water point.

(c) If the pollutant flows off post, into critical water areas, or has the potential to do so, the OSC notifies HQ United States Army Forces Command (FORSCOM) and the EPA Regional Response Team immediately (figure 5-2). The EPA Regional Response Team must concur with any water-pollution control actions taken involving the critical water areas.

(2) Phase II. Containment and Countermeasures. These are defensive actions initiated as soon as possible after discovery of a discharge.

(a) Table 5-1 lists tactical resources available to the OSC.

(b) ACofS, G3/DPTM, tasks tactical resources to avoid the possibility of conflict with other operations.

(c) The OSC directs construction of necessary berms, dams, fences, or other barriers to contain the flow of pollutants.

(3) Phase III. Cleanup and Disposal. This includes removal or chemical treatment of pollutants and biological remediation as appropriate.

(a) The organization or contractor accountable for the source of spillage is responsible for cleanup under the direction of the OSC.

(b) Begin cleanup as soon as possible after discovery and containment.

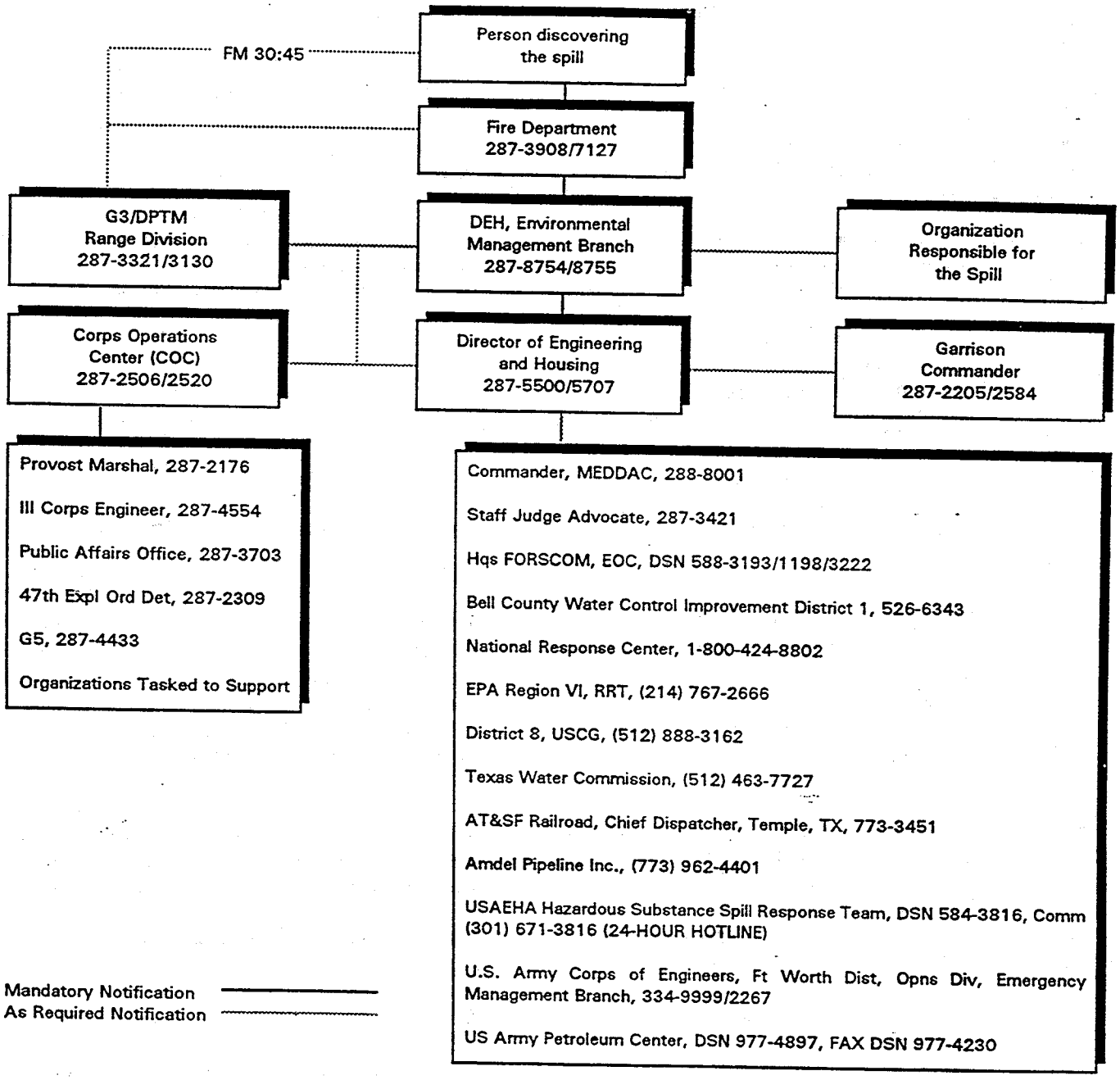


Figure 5-2. Communication and notification plan

(c) Extract or treat pollutants until the affected area is free of pollution.

(d) Pollutants shall not be washed into drainage systems.

(e) Dispersing or sinking pollutants is prohibited unless the EPA or Texas authorities concur.

(f) Dispose of recovered pollutants per OSC's directions. Filter or otherwise restore for use the recovered pollutants whenever possible. The OSC directs the disposal of contaminated soil and absorbents.

(4) Phase IV. Restoration. Assess damages and restore spill site to predischarge conditions. Restoration is a responsibility assigned to the organization or contractor who spilled and it is complete when the OSC approves.

(5) Phase V. Recovery of Damages and Enforcement. The actions taken depend on the circumstances and conditions of each spill event. DEH provides adequate information, photographs, samples, and technical advice to the SJA in support of the Fort Hood legal position in matters related to spills or other environmental incidents. When soldiers violate this regulation or related laws, commanders may take action according to AR 600-20 or UCMJ, as applicable. Civilian violators are referred to Federal Magistrates, Federal Courts, State or local authorities, as appropriate and according to the applicable laws and Federal regulations.

c. Reports (RCS exempt: 335-15, para 5-21). The OSC makes the following reports:

(1) Telephonically report to FORSCOM EOC spills with the potential to cause hazards to the public, considerable damage to the environment, or possibly generate public interest. This report alerts FORSCOM to the possibility of their involvement and forestalls alarmist reports from unofficial sources.

(2) Reporting requirements for spills of more than 1,000 gallons of oil or in harmful quantities as defined in 40 CFR 110 are delineated in AR 200-1, paragraph 8-3, and 40 CFR 112.4.

(3) Report to the National Response Center, telephonically, the release of hazardous substances to the environment if released in the reportable quantities defined in CERCLA. The EPA determines the need for written reports.

d. Training. DEH conducts an annual training exercise to test the ISCP effectiveness and responsiveness.

## Section III
## OIL RECLAMATION

### 5-6. GENERAL.

a. This chapter prescribes the authorized methods for collection of used oil. The economic success of recycling oil depends on the quality of the liquid. Segregate oils of radically different sources or properties, thus keeping each batch homogeneous. Do not dispose of used oil in an unauthorized manner, such as dumping it on the ground, ditches or sewer systems. Units performing maintenance away from their normal maintenance facilities collect and dispose of used oil according to this regulation.

b. Individuals assigned to Fort Hood who reside in Government quarters, barracks, or off post are encouraged to bring their used oil to the recycle center, building 4621; the Automotive Craft Shops, buildings 3202 and 9138; or the main Army and Air Force Exchange Service (AAFES) service station, building 224.

c. Commanders construct and maintain used oil reclamation points per minimum standards shown in figure 5-3.

### 5-7. PROCEDURES.

a. Construction (see figure 5-3).

(1) Locate reclamation points away from asphalt pavements if feasible. Consider user convenience and that the pod must be accessible to a tanker truck.

(2) Obtain assistance for design and construction of oil reclamation points from DEH, 287-8754/288-7627.

(3) Oil reclamation points shall meet fire prevention standards per III Corps & FH Reg 420-1, paragraph 2-30.

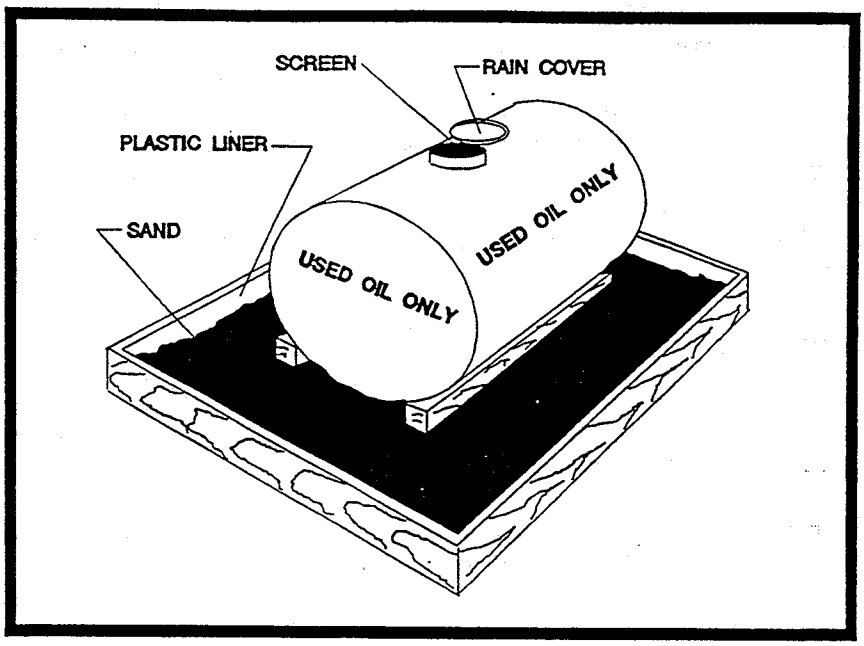


Figure 5-3. Typical used oil reclamation point

(4) Install a sand catch basin with a plastic film liner to prevent oil seepage into adjacent areas. The pod should be large enough to hold the quantity of used oil generated monthly. Suitable pods may be obtained from the Directorate of Logistics (DOL) cannibalization point or Defense Reutilization and Marketing Office (DRMO). The fill opening on the pod should be large enough to receive oil without spilling over the sides and fitted with a rain cover and removable screen to prevent extraneous matter from entering the pod. Steps or ramps may be installed to facilitate access to the fill opening.

b. Operation.

(1) Oil reclamation points provide for collection of used lubricating oil and hydraulic fluid. Segregate antifreeze, fuels, grease, solvents, and hazardous substances each in a separate container. Clearly label pods and other containers used for accumulation of waste substances according to paragraph 6-6.

(2) Keep extraneous materials such as rags, oil filters, trash, soil, vehicle parts, and water out of reclamation pods.

(3) Locking devices to preclude or control the use of oil reclamation pods are prohibited. The inconvenience of locks usually provokes improper disposal of used oil.

(4) Storage of oil in open containers is prohibited.

c. Maintenance.

(1) The using organization periodically inspects their oil reclamation points to ensure constant serviceability of components and to curb improper use.

(2) The sand basin provides absorption for spillage. When sand becomes highly saturated with oil, remove and replace with clean sand to preclude oil seepage into adjacent areas. Coordinate disposal of saturated soil with DEH, 288-7627/287-8754. Contaminated soil may be replaced with clean soil generated at washracks or clean sand obtained through DEH, Pavements Section, building 4489, 0730 on duty days. Users provide transportation for soil removal or replacement.

(3) Remove sediments from oil reclamation pods only if such removal can be done without any damage to the environment. Prior to removing those sediments request support and guidance from DEH, 287-8754.

(4) Contact DEH, 287-2113, to arrange for pickup when oil reclamation pods are three-quarters full. If DEH refuses to pick up oil because of extraneous materials, the user removes extraneous materials from the pod and arranges for pickup again. If the using organization cannot rectify the situation, contact DEH, 287-8754 for help.

d. Oil pick up. DEH picks up oil only. Turn in HAZWASTE and fuels to DEH, 288-7627, per paragraph 6-12.

## SECTION IV
## POLLUTION ABATEMENT

### 5-8. RESPONSIBILITIES.

a. DEH:

(1) Identifies potential pollution sources (see appendix B, and III Corps & FH Reg 200-10, appendix B) within Fort Hood, and provides guidance, training, or assistance to prevent pollution incidents.

(2) Conducts routine inspections of potential sources of pollution. Estimates their compliance with this regulation and requests appropriate corrective action. DEH visits each facility at least annually. Visits are coordinated and scheduled in advance to curtail conflicts with other operations. Undesirable results from water analysis, spills, discharges, environmentally unsafe practices, or conditions potentially harmful to the environment may warrant unscheduled DEH visits for determinations and assistance. Visits are performed according to this regulation and applicable Federal or Texas regulations. During visits, if a condition outlined in figure 5-1 is noted, a synopsis of the event is recorded on FH Form 2146 (Pollution Incident Report) and appropriate action implemented as prescribed in section II of this chapter.

(3) Assists organizations in procuring and obtaining specialized services, supplies, and equipment required to prevent or clean up spills and other pollution.

(4) Provides environmental training and technical assistance visits to assist organizations in maintaining a competent level of environmental compliance knowledge.

b. Commanders and activity chiefs:

(1) Appoint an environmental coordinator (EC) and as many assistants as necessary to administer an effective environmental program in their organization. EC shall be certified through completion of the environmental management course (EMC) (see appendix C). The EC reports directly to the commander and has sufficient rank and authority to direct environmental actions of subordinate organizations. The best candidates for EC are executive officers at each level of organization.

(2) Inspect and direct subordinates to inspect areas where pollution is a potential factor. Document inspections according to paragraph 5-8c(9) and 6-7.

(3) Provide environmental awareness and HAZWASTE management training for their personnel according to paragraph 6-10 and appendix C.

(4) Request assistance from DEH, 287-8754/8755, in matters pertaining to this regulation and other environmental compliance issues.

(5) Procure adequate pollution abatement equipment and supplies in sufficient quantities and timeliness (lack of resources does not justify noncompliance).

c. Environmental coordinators and their assistants:

(1) Administer the organization's environmental program.

(2) Manage HAZMAT/HAZWASTE operations.

(3) Advise their commander on matters related to environmental compliance and implementation of this regulation.

(4) Periodically inspect potential pollution sources according to this regulation and other related publications. Request, coordinate, program, or direct corrective action rapidly.

(5) Monitor fuel and oil storage facilities for compliance with established spill prevention procedures per this regulation and III Corps & FH Reg 200-10.

(6) Provide environmental/HAZWASTE training for their organizations according to appendix C.

(7) Maintain reference publications on environmental technical information.

(8) Publicize policies and procedures to ensure an effective environmental program.

(9) Document environmental/HAZMAT/HAZWASTE inspections and training per paragraphs 6-7 and 6-10.

(10) Inventory HAZMAT, HAZWASTE, and POL. Include NSN, nomenclature, unit of issue, quantity on hand, quantity used monthly, quantity of waste on hand, waste disposal method, and indicate if the MSDS is on hand or not. Deliver a complete inventory update to DEH, building 4468, quarterly (RCS exempt: 335-15, para 5-2b(2)).

## 5-9. PROCEDURES.

a. Operate and maintain oil reclamation points according to section III of this chapter.

b. Implement the following guidance for use of oil-sand interceptors and washracks.

(1) Oil-sand interceptors (figure 5-4) provide a safe containment for oils and sediments. Inspect interceptors weekly. Take appropriate corrective action as needed. To inspect an interceptor: insert a long rod into the oil to a depth of approximately 12 inches and observe for water while briskly agitating the rod from side to side. If no water becomes visible, an excessive amount of oil is present. Insert the rod vertically into the fluids until sediments are felt. If sediments are encountered within 3 feet from the fluid level, the interceptor is overloaded. Check the baffle for leaks. Request skimming, sediment removal, and repairs from DEH, 287-2113.

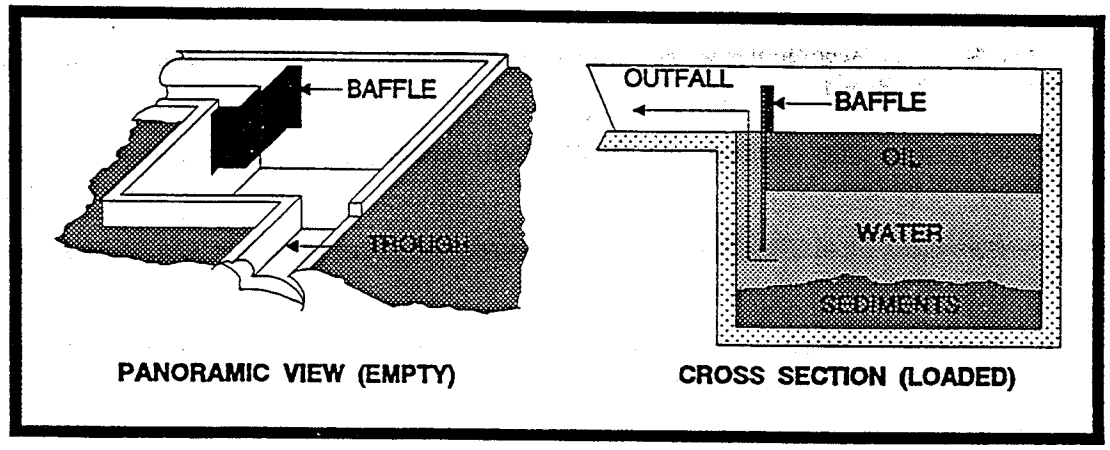


Figure 5-4. Typical oil-sand interceptor

(2) Do not allow soil and other solids to flow into the oil-sand interceptors. Stockpile soil at a convenient location or later disposal or use. Soils not oil-saturated, may be used as fill, topsoil, or absorbent material to clean spills. Avoid piles of soil against fences, as this practice causes damage to fences and landscape. Minimize quantities of soil generated at washracks, through use of prewash facilities (Birdbath) located at South Range Road and 37th Street, PK184470, 288-3004, and Turkey Run Road, PK147473, 287-2697.

(3) Use, acquisition, and demonstrations of cleaning compounds.

(a) Use of chemicals, detergents, and solvents at vehicle washracks is not authorized unless the product is specifically authorized through local regulations or written authorization is obtained through DEH, Environmental Management Branch. Before a cleaning agent is used or approved, consider the environmental consequences of its use, and disposal requirements.

(b) Since no single compound provides generic applicability which is practical to our total cleaning needs, consider the recommendations in the Expendable Supplies and Materials List in the specific equipment's technical manual. After making product selection, coordinate with DEH, 287-8754, to ensure use of the proposed product will not generate an environmental incident. If specific disposal procedures are required, make adequate provisions for waste accumulation and disposal before using the product.

(c) Use cleaning compounds when absolutely necessary and only for their specific intended purposes. Follow precautions and instructions given in MSDS and product label. When instructions are not available, contact DEH, 287-8754, to obtain guidance. If detergents must be employed at washracks, use small amounts of general purpose detergent, NSN 7930-00-526-2919 or NSN 7930-00-527-1207. Do not apply these detergents in heavy concentrations unless the rinsate outfalls into the sanitary sewer. Accumulations of detergents can dissolve oils in oil-sand interceptors and cause discharges. Generally, steam cleaning will do adequate degreasing without the use of hazardous chemicals and without causing environmental incidents.

(d) MSCs coordinate product demonstrations with G3, G4, DOC, and DEH. "Free" demonstrations of cleaning compounds are allowed when a standard vendor agreement has been processed through DOC. Product demonstrations are not allowed below division or separate brigade level.

(4) Report to DEH, 288-7627/287-8754 whenever fuels enter oil-sand interceptors.

(5) Contact DEH, 287-2113, to request repairs for oil-sand interceptors and washracks.

c. Do not operate steam cleaners in areas where an oil-sand interceptor is not provided.

d. General housekeeping at motor pools includes but is not limited to cleaning of spills promptly. Do not leave spills unattended, especially when rain is expected.

e. Conspicuously post FH Poster 420-3 in facilities adjacent to fixed or mobile fuel dispensing equipment, and wherever spills can be expected (motor pool, POL storage, battery shop, HAZMAT storage, and so forth). Include FH Poster 420-3 in the equipment dispatch book when mobile equipment is used for transporting fuels, POL, or HAZMAT.

f. Make disposition of HAZWASTE and off-specifications fuel as provided in paragraph 6-12. Collect liquid waste other than used oil in compatible containers suitable for accumulation and turn-in of specific waste. Coordinate HAZWASTE accumulation according to paragraph 6-6. Source segregate HAZWASTE and avoid mixtures. Disposal of HAZWASTE mixtures is dangerous and expensive.

g. Disposal of automotive oil filters through the sanitary landfill is prohibited. Drain and collect used filters. Accumulate drained filters in a closable container to prevent rain saturation. Obtain open head drums from DEH, 288-7627, where DEH will receive the filters for crushing and recycling once the drum is full.

h. Coordinate disposal of contaminated soils with DEH, 288-7627/287-8754.

i. Triple rinse (see glossary) POL containers at vehicle washracks except when using solvents. Containers are acceptable for turn in if after triple rinsing there is no dripping oil or visible grease residue in the container, although a very light oily coat or stain may remain. This may be done using water pressure, detergent solution, steam cleaning, or stoddard solvent, whichever appropriate. Turn in rinsed 55-gallon drums to DEH, 288-7627, undocumented. Turn in rinsed containers smaller than 55-gallon drums as recyclable material to DRMO, 287-2723, using DD Form 1348-1 (DOD Single Line Time Release/Receipt Document) per III Corps & FH Reg 420-6, appendix A and proceed according to III Corps & FH Reg 755-725, appendixes F and M. Coordinate with DEH, 288-7627, for guidance and assistance for turn in of HAZMAT empty containers.

**5-10. BULK STORAGE TANKS.** This paragraph applies to permanent and temporary tank facilities, mobile or portable tank equipment, and includes tactical and nontactical operations.

a. Deploy portable and collapsible drums or tanks, and other dismounted tanks always with a secondary containment. Do not use a tank for storage of a substance unless the material, construction, and condition of the tank are compatible with the substance.

b. Operational deployment of tanks includes arrangement of secondary containments. Earth berms alone are generally not acceptable secondary containment, especially when the berm is uncompacted earth. They provide little or no spill containment and usually leave the water table unprotected. For that reason protective liners are placed under tanks and extend to overlap the top of berms. Adequate secondary containment is unpenetrable and capable of containing at least the entire capacity plus 20 percent of the largest tank. Impervious berms, curbs, and pits are often used for this purpose. Where these methods are not appropriate, other alternatives may be applied. Secondary containment may consist of an impermeable ditch, trench, or trough routed to terminate spillage through confining or safely channeling fluids into a tight holding basin. Secondary containment systems must provide the means for controlled drainage of rain water. When pollutants are present in rain accumulations, remove or neutralize them before draining the containment. Always request assistance from DEH, 287-8754, before attempting to remove or neutralize pollutants.

c. During tactical operation of mobile tanks, the need for construction of secondary containments is decided through a prudent evaluation of applicable mission requirements, resources available, and the potential for surface waters pollution from accidental spills. Because a tanker truck is expected to move frequently, construction of a secondary containment may not always be reasonable. Nevertheless, take precautions to prevent contamination of surface and ground waters. One method to implement spill countermeasure is to position mobile tanks on advantageous terrain features. These terrain features include depressions, large flat areas away from bodies of water, and areas not subject to flash floods or washouts.

**5-11. PROCEDURES FOR DRAINING AND PURGING FUEL TANKS.** There are several methods to eliminate explosive fumes from fuel tanks. The primary method is through use of a purging chemical. Chemical purge saves time, labor, and material. It reduces the possibility of a combustible vapor buildup after the purging procedure has been completed and after vapor test readings show a safe level. Alternate methods which will not be described here include steam, forced air, and oil purge. Regardless of method, make adequate provisions for waste disposal before the start of purging operations.

a. Safety.

(1) Discontinue operations if an electrical storm is threatening or in progress. Open flames or other sources of ignition such as welding and cutting torches and ordinary electrical equipment should not be introduced in areas where flammable vapor may be present. Tanks must be statically grounded prior to and during purging operations.

(2) Discharge all static from the body by grasping the static ground wire before climbing onto the fuel tank.

(3) Do not wear wool, nylon, silk, rayon, or other clothing material likely to generate static electricity. Wear clean cotton clothing with no metal buttons, zippers, or fasteners. Remove contents from pockets.

(4) Wear rubber boots and rubber gloves.

(5) Should an emergency arise requiring entry into a tank which is not vapor-free, or which has an oxygen content less than 19.5 percent, personnel who enter the tank must have an attached lifeline and wear protective respiratory equipment in the form of self-contained breathing apparatus or a full facepiece mask with a pressure supply of respirable air. Another person, also wearing similar protective equipment, is stationed at the tank opening and remains there with full ability to watch personnel in the tank and summon assistance in the event a rescue operation becomes necessary. Personnel will not enter a tank which is in the explosive range.

(6) Use cotton rags for cleaning purposes. Other material may generate static electricity.

(7) Personnel exposed to hydrocarbon or toxic vapors who exhibit weakness, nausea, coughing, intoxication, nosebleed, cramps, or any other unusual conditions need immediate medical attention. Have someone available who is qualified to administer artificial respiration and simple first aid throughout the entire purging operation.

(8) Unless adequate mechanical ventilation is provided indoors and sources of ignition are eliminated, vapor-freeing work through any method must be carried on outdoors, remote from vehicles and other known sources of ignition. Park or station tank where flammable vapors will not blow or drift indoors.

(9) Test for explosive vapor as prescribed in FM 10-20, paragraph 4-14e. Do not conclude vapor testing during steam cleaning because excess moisture or lack of oxygen may cause false readings.

b. Draining Tank. Drain fuel from compartments and connecting piping systems into suitable containers for reuse or disposal as appropriate. Prevent generation of fuel waste if possible.

(1) Select a level area at least 100 feet from nearest building, source of ignition, or sewer system. Position equipment so that the tank sump is in the lowest position possible.

(2) Have sufficient fire extinguisher available 50 feet upwind, manned by qualified individuals.

(3) Static ground the tank to an approved (earth) ground.

(4) Place conductive metal or galvanized containers under drain points. Bond containers to the grounded tank. Make grounding and bonding connections at clean, unpainted surfaces.

(5) Completely drain each fuel tank compartment including piping, pumps, meters, filters, and segregators. Remove accessories, such as gages and floats, which might entrap fuel. Drain the equipment that has been removed. Wipe dry connections and wash rags or mops in soapy water, dry and store for reuse or dispose of safely. Always consult the equipment's organizational maintenance technical manual and applicable technical bulletins.

(6) Containerize and dispose of off-specification fuels per paragraphs 5-9f and 6-12.

(7) Coordinate disposal of fuel-saturated filters, absorbents, and soil with DEH, 288-7627.

c. Materials Required for Chemical Purge.

(1) Source of nonpotable water with a large diameter hose such as tank wash facilities (Birdbath).

(2) Compressed air source and air hose of sufficient length to reach the entire bottom of fuel tank.

(3) Purging chemical No. 913 available from Product-Sol Inc., 2010 Cole Avenue, Birmingham, Michigan 48008; or RC 605 from Research Chemicals, Inc., 5717 Hart Street, Fort Worth, TX 76112, are obtained through local purchase.

(4) Combustible gas indicator set, NSN 6665-00-664-4650 or NSN 6665-00-292-9945, which is a Common Table of Allowance (CTA) item listed in SB 700-20 and assigned line number E57351.

(5) Entry into a tank which is not vapor-free or has less than 19.5 percent oxygen content requires use of protective respiratory equipment, lifeline, explosion-proof extension light or flashlight, and steam or air-operated venture-type air mover or a fan-type blower with an air duct (see paragraph 5-11a).

d. Purging--Chemical Method.

(1) Close or seal drains after draining fuel as described in 5-11b above.

(2) Fill and overflow tank with cold nonpotable water for 5 minutes or until visible traces of flammable material are removed. Simultaneously circulate water through piping system to displace fuel entrapped in piping. Fill the rear compartment first and continue to fill each compartment, filling the front compartment last. Reverse the procedure when emptying the tank. Drain fuel tank completely. NOTE: This procedure is accomplished at the tank wash facility (Birdbath).

(3) Close or seal drains again.

(4) Add to the empty fuel tank 44 fluid ounces (128 fluid ounces equals 1 gallon) of purging chemical for each 100-gallon capacity or as shown in table 5-2. Insufficient amount of chemical will cause incomplete purging. Once purging has begun, do not stop until process is complete.

Table 5-2. Purging chemical requirements

| TANK | CAPACITY (GAL) | PURGING CHEMICAL (GAL) |
|---|---|---|
| 600-Gal Pod | 600 | 2. |
| M49 Series Tanker | 1,200 | 4. |
| M978 Tanker | 2,500 | 8.5 |
| M559 Goer | 2,500 | 8.5 |
| M967, 969, and 970 Semi | 5,000 | 17. |
| M131 Series Semi | 5,000 | 17. |

(5) Fill fuel tank to top with nonpotable water. Do not overflow. NOTE: This procedure is accomplished at the tank wash facility (Birdbath).

(6) To dislodge solids, insert into fuel tank an air line with 3 to 5 pounds per square inch of air pressure for 40 minutes. Frequently move air hose around in tanks, covering as much area as possible, especially near the bottom and around baffles. Remove air line and drain solution into sanitary sewer manhole designated by DEH, 287-8754.

(7) Fill fuel tank with cool nonpotable water and overflow for 5 minutes or until water is clear. Simultaneously circulate water through the pipe system to displace purging solution in the pipes. Drain fuel tank completely. NOTE: This procedure is accomplished at the tank wash facility (Birdbath).

(8) Test for combustible vapor according to FM 10-20, paragraph 4-14e, to determine if fuel tank is safe to repair, clean, paint, store, change product, or ship. If not safe, repeat the procedure prescribed in subparagraph (7) above.

# CHAPTER 6
# HAZARDOUS MATERIAL AND HAZARDOUS WASTE MANAGEMENT

**6-1. SUMMARY.** This chapter assigns responsibilities, establishes policies, prescribes procedures, and provides a management system to control accumulation, collection, source separation, storage, transportation, processing, treatment, recovery, and disposal of HAZMAT and HAZWASTE. Provisions in this chapter consider the life cycle of HAZMAT from selection, procurement, storage, use, hazardous waste minimization (HAZMIN) to recycling or disposal of corresponding HAZWASTE.

**6-2. GENERAL.** This chapter incorporates current procedures and restrictions mandated through Federal and State laws for handling, accumulation, storage, transportation, and disposal of HAZWASTE.

**6-3. RESPONSIBILITIES.**

a. DEH:

(1) Assists organizations to develop environmentally safe procedures for the handling, treatment, and storage or accumulation of HAZMAT and HAZWASTE.

(2) Provides HAZMAT and HAZWASTE training courses according to appendix C, and assist commanders to obtain specialized training for personnel assigned to HAZMAT and HAZWASTE facilities.

b. Commanders, directors, and leaders:

(1) Coordinate with DEH to ensure compliance with this regulation.

(2) Conduct environmental and HAZWASTE training per paragraph 6-10, and inspect according to paragraph 6-7.

**6-4. POLICY.**

a. This command shall maintain records to enable tracking and tracing every HAZWASTE from generation to disposal.

b. Every level of command shall seek specialized training for their personnel who handle, transport, store, accumulate, treat, or dispose of HAZMAT or HAZWASTE. This training shall be reinforced through effective supervision.

c. HAZMAT resource conservation and HAZMIN shall be of prime concern to personnel in this command.

d. Store and handle HAZMAT and HAZWASTE in a manner that has no adverse effects on the public health and the environment.

e. Substitute nonhazardous materials for HAZMAT whenever practical.

**6-5. HAZWASTE ANALYSIS.** Obtain laboratory analysis through DEH, 288-7627, to characterize HAZWASTE or to identify materials suspected of being HAZWASTE. DEH personnel take samples and provide analysis as needed. Once the sample is taken, secure the container to prevent adding, mixing, or in any way changing the chemical composition of the sampled HAZWASTE. HAZWASTE analysis normally requires 2 weeks. After characterization is completed, DEH provides disposal guidance to the requesters.

**6-6. HAZWASTE ACCUMULATION.** Plan HAZWASTE accumulation so that users understand the safe and legal procedures to manage their specific HAZWASTE beforehand. Contact DEH, 288-7627, to establish accumulation sites. DEH provides containers, labels, and training as needed. DEH will label each HAZWASTE container according to example in figure 6-1. Adequate containers and arrangements for source segregation shall be in place before accumulation starts.

Proper D.O.T. SHIPPING NAME

# HAZARDOUS WASTE

**FEDERAL LAW PROHIBITS IMPROPER DISPOSAL**

IF FOUND, CONTACT THE NEAREST POLICE, OR PUBLIC SAFETY AUTHORITY, OR THE U.S. ENVIRONMENTAL PROTECTION AGENCY.

IN EVENT OF EMERGENCY CALL U.S. ARMY, FORT HOOD, TX. (817) 287-3908 (24 hours)

GENERATOR INFORMATION:

NAME: U.S. Army, HQ III Corps & Fort Hood

ADDRESS: Directorate of Engineering and Housing
Bldg 4468, 72nd and Warehouse Ave
Fort Hood, TX 76544-5057

EPA ID: TX8214020424 STATE ID: 66005

ACCUMULATION START DATE: _____ MANIFEST DOCUMENT NO: _____

TRANSFER START DATE: _____ TSDF STORAGE DATE: _____

**HANDLE WITH CARE!**

SAMPLE

Figure 6-1. HAZWASTE label

a. Organizations may accumulate 55 gallons of each HAZWASTE up to 90 days from date accumulation starts.

b. When accumulation ends, the 90-day limit expires, or the 55-gallon limit is reached, coordinate with DEH, 288-7627, to transfer HAZWASTE to a permitted storage facility.

**6-7. INSPECTIONS.** Inspect HAZWASTE accumulation or management facilities and potential sources of pollution listed in appendix B at least weakly. Search for malfunctions, deterioration of equipment, operation errors, spills, discharges, and conditions which may cause release of HAZWASTE into the environment or pose a threat to human health. Make these inspections often enough to identify and correct deficiencies before harm to human health or the environment occurs. Develop an inspection plan or SOP. Include the schedule or frequency of inspections and a detailed scope of procedures or, if appropriate, a checklist. Determine frequency of inspections on the basis of specific conditions at each facility or operation. Consider the specific probability of environmental or health hazard incidents. Inspect areas where frequent HAZWASTE incidents may occur, such as battery shops and storage areas, daily when in use.

a. Inspect each HAZWASTE accumulation area weekly. Check containers for:

(1) Damage such as corrosion, rust, leaks, and pressure bulging. These damages are prevented through protection of containers from the weather in a well ventilated, cool and dry area.

(2) Marking according to figure 6-1.

(3) Adequate outage allowing 5 inches for 55-gallon drums, 2 inches for 30-gallon drums and 1 inch for 5-gallon containers.

(4) Accumulation start date is less than 90 days before current date. If accumulation is ended, coordinate with DEH, 288-7627, for transfer to a permitted HAZWASTE storage facility.

(5) Compatible storage which prevents chemical reactions that may cause fires, heat, explosions, or toxic fumes in the event of spills.

(6) Fire protection, according to III Corps & FH Reg 420-1.

(7) Secondary containment according to paragraph 5-10b.

b. Inspect HAZMAT storage areas at least monthly. Check containers for:

(1) Damage such as corrosion, rust, leaks, and pressure bulging. These damages are prevented through protection of stock from weather in a well ventilated, cool and dry area.

(2) Labeling and marking. Keep product name, instructions, precautions, test or shelf-life expiration date, warning labels, and other pertinent information legible. Replace lost or unserviceable labels using DD Form 2521 (Hazardous Chemical Warning Label) or DD Form 2522 (Hazardous Chemical Warning Label).

(3) Validation of shelf-life. Request guidance from Base POL Laboratory, building 7046, to determine use or disposal of products affected by expiration or extension of shelf-life. Mark test dates or shelf-life extensions on each container affected. Individual containers in unbroken skids, pallets, or other multiple container packaging need no marking until the packaging is opened.

(4) Compatible storage. Store incompatible HAZMAT in a safely segregated area per product label and MSDS.

(5) Rotation of stock. Avoid shelf-life expiration and decay of containers through use of oldest product first. Arrange storage in a manner that encourages use of the oldest product first (old on top, old in front, and so forth).

(6) Excess. Identify HAZMAT excess and turn it in through supply channels per paragraph 6-12.

(7) Fire protection. See III Corps & FH Reg 420-1.

(8) Secondary containment. See paragraph 5-10b.

c. Correct deficiencies on the spot or program corrections. If an environmental or health hazard is imminent or has occurred, make immediate remediation. Lack of resources does not justify continued operation without fixing deficiencies.

d. Record HAZWASTE inspections on an inspection log. Maintain the log on file for 3 years after date of last entry. As a minimum, include: date and time of inspection, name and signature of inspector, organization to which the inspector is assigned, findings or observations, dates and explanations of repairs, or remedial actions generated through the inspection.

**6-8. HAZARDOUS WASTE MINIMIZATION (HAZMIN).** The objectives of HAZMIN are to eliminate or reduce volume or toxicity of HAZWASTE to the extent proven technologically and economically practical. Most HAZMIN techniques require no significant funding and generally yield monetary and labor savings. Successful HAZMIN requires individual training and proactive management. Minimizing volumes of specific HAZWASTE categories is the obvious technique to achieve HAZMIN, although other techniques are employed before reduction can be realized. For that reason, the Fort Hood HAZMIN effort includes the widest combination of the following HAZMIN techniques:

a. Selection and procurement of HAZMAT. Much HAZWASTE is the result of overstock or expired shelf-life. For example, excess paints that are stored too long will separate or cure, thus they become HAZWASTE. Avoid undue damage to container, deterioration, expiration, misuse, and pilferage of HAZMAT through wise selection and procurement practices.

(1) Procure HAZMAT in the smallest size and quantity that will satisfy the demonstrated need. Although larger containers are usually cheaper per unit of issue, always consider disposal cost for the unwanted leftovers or HAZMAT excess which ultimately becomes HAZWASTE.

(2) Maintain a sensible stock level. Select chemical compounds using equipment technical manuals and equipment density as the basis for stockage. Procure HAZMAT proportionate to established needs. Consider facts and circumstances. For example, an armored battalion should not procure "aircraft surface cleaning compound" since no equipment manual for ground armored equipment prescribes that product. Avoid acquisition of HAZMAT for ambiguous reasons like "In case we need it." Before final selection of a HAZMAT consider product substitution.

b. Hazardous material substitution. Give constant attention to substituting nonhazardous or less hazardous materials for HAZMAT. ECs use the HAZMAT/HAZWASTE inventory prescribed in paragraph 5-8c(10) for evaluation of HAZMAT in stock and corresponding HAZWASTE to determine if substitutions are advantageous and possible. Examples of advantageous substitutions are:

| | |
|---|---|
| nontoxic | for toxic |
| high flashpoint solvent | for low flashpoint solvent |
| 1,1,1-trichloroethane | for trichloroethylene |
| unleaded paint | for leaded paint |
| waterless hand cleaner | for paint brush cleaning solvents |

c. Reuse, recycle, or exchange HAZWASTE if practical. For example, solvents used for cleaning paint sprayers are suitable for thinning paint at the site of generation or in another painting operation. The same recyclable material can also be restored for its original purpose through passive recycling. Accumulate used solvent in an open head drum, close the container, and leave undisturbed for 1 or 2 days. After settlement of solids, siphon clean solvent from the top and use it to complete passive recycling. Certain expired products can be exchanged for fresh ones at a minimal cost. For example, most pharmaceutical manufacturers exchange expired medicines which otherwise would be managed as HAZWASTE. Make reasonable efforts as a HAZWASTE generator to devise safe and legal uses for recyclables before they are managed as HAZWASTE. Contact DEH, 288-7627, for specific guidance and assistance.

d. Source segregation. Avoid increasing the volume of HAZWASTE through unnecessary mixing of HAZWASTE with nonhazardous waste or with other types of HAZWASTE. Mixed HAZWASTE is often more dangerous for handling and always more expensive to be legally disposed of.

e. On-site treatment. If technology and resources are reasonably available, treat HAZWASTE on-site. The advantages are that no manifesting is required, the reporting quantity of HAZWASTE is reduced or eliminated, and potential liabilities associated with offsite shipping, treatment, and disposal are eliminated. Treat HAZWASTE safely and within the parameters of applicable laws, regulations, and permits. An example of on-site HAZWASTE treatment is the neutralization of sulfuric acid at battery shops.

f. Change the process that generates HAZWASTE. For example, cleaning paintbrushes using solvents, thinners or mineral spirits generates HAZWASTE. Instead, clean paintbrushes using waterless hand cleaner, NSN 7930-00-D02-5140, general purpose detergent, NSN 7930-00-526-2419, and warm water. Discharge the resulting waste into the sanitary sewer. (The foregone example applies to occasional use. Its intent shall not be construed as authorization for unlimited disposal of paints and paint wastes. See paragraph 6-12 for HAZWASTE turn-in.)

g. HAZMAT stock protection. Maintain HAZMAT storage according to standards provided in paragraph 6-7b. Protect HAZMAT from corrosion, damage, pilferage, and undue exposure to extreme weather conditions (rain, freezing, high temperature, and so forth). Preserve product labels so that the product name, NSN, safety requirements, and instructions are readable. Replace lost or unserviceable product labels using DD Form 2521 or DD Form 2522.

h. Issue guidance. Forced issue of HAZMAT is prohibited. Issue HAZMAT for their specific intended purposes, in support of demonstrated need, and always in the least possible amounts. Leaders of personnel issuing or receiving HAZMAT ensure that users receive the smallest package/container/quantity that suffices their specific need. Provide the appropriate MSDS and make the user understand the following information as applicable to specific HAZMAT before issue transactions are completed:

(1) Specific applications of the HAZMAT.

(2) How to use the HAZMAT safely and do the job spending the least amount.

(3) What to do with leftover HAZMAT in terms of resource conservation.

(4) What to do with the resulting HAZWASTE.

i. Containment of HAZWASTE. If a HAZMAT/HAZWASTE spill occurs, minimize the volume of spill residue and the extent of contamination through deployment of containment. Once contained, the spillage is recovered or collected along with cleanup materials for recycle, treatment, or disposal. Containment is an advantageous HAZMIN technique because the smaller the spill the less to clean up and dispose of.

j. Schedule and consolidate events that generate HAZWASTE. For example, spot painting vehicles and equipment requires use of HAZMAT and generates HAZWASTE. Less HAZMAT is used and less HAZWASTE generated per capita, if several pieces are spot painted in one operation instead of one piece at a time. Thus, consolidation in this case allows for HAZMAT economy, if the entire can of paint is consumed there is no HAZWASTE, and yields only one brush to clean.

## 6-9. RECORDS AND REPORTS.

a. Records. The following records are on file at DEH for not less than 3 years:

(1) The results of environmental staff visits to HAZMAT and HAZWASTE facilities.

(2) Summaries and reports generated during ISCP execution.

(3) HAZWASTE analysis results.

b. Reports (RCS exempt: 335-15, para 5-21).

(1) DEH submits the annual HAZWASTE report and monthly waste shipment summary to Texas regulatory authorities and keeps file copies for 3 years.

(2) MSCs ensure that subordinate organizations submit their consolidated HAZMAT/HAZWASTE/POL inventory to DEH quarterly.

(3) DRMO and DEH ensure that HAZWASTE is not transported from Fort Hood without a correctly prepared Uniform Hazardous Waste Manifest. DEH and DRMO each maintain a copy of the manifest for 3 years. DRMO or DEH as required initiate follow-up actions when the white copy of a manifest has not been returned within 45 days after shipment.

## 6-10. TRAINING.

a. Individuals managing or handling HAZWASTE complete a HAZWASTE training program within the first 6 months of assignment or employment. The scope of training required depends on the specific hazards, equipment, tasks, and other conditions of the site. Certified personnel conduct the HAZWASTE training and must include specific HAZWASTE management procedures. After completion of the HAZWASTE training, the individuals are able to respond to emergencies and to perform their duties in compliance with the standards established in this regulation. HAZWASTE training is done through a formal course or on-the-job training which includes but is not limited to:

(1) Safe operation of specific equipment in the respective HAZWASTE facility.

(2) Spill prevention and contingency plans.

(3) Response to emergencies through established procedures, emergency equipment, and systems.

(4) Procedures for using, inspecting, repairing, and replacing facility emergency and monitoring equipment.

(5) HAZWASTE accumulation, labeling, and marking.

(6) Communications and alarm systems.

(7) Response to fires or explosions.

(8) HAZMIN techniques.

(9) Operations shutdown.

(10) Specific HAZWASTE treatment procedures.

(11) Use and care of respirators and other personal protective equipment.

(12) Specific health and physical hazards associated to the job.

(13) Department of Defense Federal Hazard Communication Training Program.

(14) Personnel and equipment decontamination.

(15) Records and reports.

b. Personnel working in a HAZWASTE facility must not work unsupervised until they have completed the HAZWASTE training requirements.

c. HAZWASTE facilities commanders conduct or obtain HAZWASTE refresher training for their personnel to maintain and update their proficiency in HAZWASTE management annually.

d. HAZWASTE facility managers maintain the following documents and records:

(1) Job title for each position with names of persons filling each job (manning chart). Maintain job description which includes required skills, education, training, other qualifications, and duties assigned to each position.

(2) Records documenting that the training or job experience required in this paragraph has been complied with. Keep individual training records on file for at least 3 years from the date the individual last worked at the HAZWASTE facility. A copy of individual training records may accompany personnel transferred within Fort Hood.

**6-11. SECURITY.** HAZMAT or HAZWASTE activity leaders must prevent unauthorized entry of persons or livestock onto the active part of HAZMAT or HAZWASTE facilities. HAZMAT or HAZWASTE facilities must have an artificial or natural barrier surrounding its active portion and controlled entry through gates or entrances. Signs with the legend, "Danger - Unauthorized Personnel Keep Out," and "No Smoking" if flammables are present, must be posted at each entrance to the active portion of the facility and at locations in sufficient numbers to be seen from any approach to the facility. The text must be legible from as far as 25 feet, written in English and any other language predominant among workers in the facility.

**6-12. DISPOSITION PROCEDURES.** HAZWASTE is turned in through DEH, 288-7627. When HAZMAT is used, spent, or becomes unserviceable, defective, damaged, or shelf-life expired, and cannot be restored or recycled, it is classified and managed as HAZWASTE (see table 6-1). Containerize HAZWASTE so that no leaks will occur and the item can be safely handled, transported and stored. Transfer or overpack leakers into compatible containers as appropriate.

Table 6-1. Hazardous substance disposition protocol

| *HAZMAT | *HAZWASTE IF: |
|---|---|
| Acids | Spent |
| Adhesives and glues | Expired shelf-life |
| Asbestos bearing materials | Damaged or excess |
| Batteries (dry) | Spent or damaged |
| Chemical compounds | Expired shelf-life, off-specification, or waste |
| Decontaminating and impregnating agents | Unserviceable or spent |
| Filters of NBC protective masks | Wet or unserviceable |
| Fuels and packaged POL products | Unserviceable, off-specification, or expired shelf-life |
| Insecticides | Unserviceable or banned |
| Paints and related substances | Expired shelf-life, unserviceable, or cleanup waste |
| Photographic chemicals | Expired shelf-life, or spent |
| Solvents and other cleaners | Spent |

*Not all inclusive.
Certain shelf-life-expired products may be turned in to DOL as HAZMAT.
Unusable leftovers are generally treated as HAZWASTE.

| MATERIALS CONDITION | | POINTS OF COORDINATION |
|---|---|---|
| **HAZMAT** (for reissue as is) | **HAZMAT** (unusable as is) | 1. DEH, Environmental Management Branch, Classification Unit, building 1345, 288-7627<br>2. DOL, Supply Division, building 4126, Yard #37, 287-7595 |
| ■ Valid shelf-life | ■ Expired shelf-life | |
| ■ Unused material | ■ Unused material | |
| ■ Undamaged package | ■ Undamaged package | |
| ■ Unopened container | ■ Unopened container | |
| ■ Readable label | ■ Readable label | |
| **HAZWASTE** | | 1. DEH, Environmental Management Branch, Classification Unit, building 1345, 288-7627 |
| ■ Identified | | |
| ■ Containerized | | |
| ■ Documented | | |
| ■ Labeled | | |

a. Safe disposition of HAZMAT and HAZWASTE can be made only if the pertinent hazards and chemical composition are known. For HAZWASTE this information is generally developed when accumulation areas are established per paragraph 6-6. DEH, 288-7627, can assist to identify or characterize chemical compounds according to paragraph 6-5.

b. DOL, Base POL Laboratory, building 7046, 287-2504, analyzes POL products to determine their quality. The results on DA Form 2077 (Petroleum Product Laboratory Analysis Report) generally indicate that the product can be used for its intended purpose as is, may be restored to acceptable specifications standards, or that it must be disposed of.

c. To ensure safe accumulation, handling and transportation of HAZMAT/HAZWASTE, the package, repackage or overpackage must be compatible with the substance and meet the following qualities:

(1) Free of leaks.

(2) Clean and without considerable corrosion.

(3) Labeled and marked per paragraph 6-6.

(4) Serviceable bungs, plugs, lids, caps, or collars tightly in place.

(5) Without rust or damage (such as large dents on the seams) which may result in leaks.

(6) Dry batteries may be packaged in a cardboard box lined with a plastic bag.

(7) Whetlerite charcoal filters (from NBC masks) may be packaged in doubled transparent plastic bags.

d. Documents required for HAZMAT/HAZWASTE turn-in include one or more of the following:

(1) DD Form 1348-1 is required for turn-in transactions at DEH and DRMO.

(2) DA Form 2077 is required for POL turn-ins, except for outdated packaged products which are not listed in current Department of Defense Quality Status List as having shelf-life extended. If the product is not listed it is not usable for military operations as is (see table 6-1).

(3) Other laboratory reports are issued through DEH as required when mixtures and unknown substances are characterized or identified through chemical analysis per paragraph 6-5.

(4) Turn in serviceable HAZMAT through the supporting direct support unit (DSU) to DOL, Supply Division at Yard #37, building 4125, using DA Form 2765-1 (Request for Issue or Turn-In).

(5) MSDS are required for HAZMAT turn-in.

e. Other preparations for turn-in.

(1) Extract water from POL products (run fuels through filter separator) before sampling.

(2) Treat empty containers which previously contained a hazardous substance as if they were full of their original contents. When required, triple rinse empty containers per paragraph 5-9i. Contact DEH, 288-7627, for specific guidance relevant to turn-in of empty hazardous containers.

(3) Obtain shelf-life validation through DOL, POL Laboratory, building 7046, 287-2504, to determine use or disposal of products affected by expiration or extension of shelf-life.

**6-13. CALCIUM HYPOCHLORITE STORAGE.** Calcium hypochlorite, NSN 6810-00-255-0471 (also available under other NSNs) is extremely corrosive to ferrous metals. Calcium hypochlorite is incompatible with petroleum products, DS2 and several insecticides. Their proximity to calcium hypochlorite can result in fire and toxic fumes. Store calcium hypochlorite overpacked in a serviceable ammunition chest (ammo can), NSN 8140-00-828-2938 or equal. Paint the ammunition chest yellow and label it "CALCIUM HYPOCHLORITE CLASS III OXIDIZER."

**6-14. SULFURIC ACID (BATTERY ELECTROLYTE).**

a. When handling sulfuric acid wear face shield, rubber gloves, rubber apron, and work in a well ventilated area. Eye wash and deluge shower must be located within 25 feet of the working area. Potable water is piped to these devices in permanent facilities. At other facilities approved portable devices capable of delivering enough potable water to last at least 15 minutes shall be made available. Contact MEDDAC, Preventive Medicine Activity, 287-3974, for more guidance.

b. Palletize and store sulfuric acid containers in well ventilated storage areas, with an unpenetrable secondary containment in place for spill control. Electrolyte shall not be stored where it may leak or spill into drainage systems or water supply.

c. Turn in empty sulfuric acid containers (ensure acid residue is neutralized) to DRMO as recyclable material, using DD Form 1348-1 per III Corps & FH Reg 420-6, appendix A.

d. Specifically designed battery shops are the only facilities authorized to treat sulfuric acid waste. Only personnel qualified according to paragraph 6-10 are permitted to neutralize acid. Confirm neutralization (pH between 6 and 9) using pH paper or pH meter, then discharge the treated waste into the sanitary sewer. Other generating facilities must dilute their waste acid through addition of one part acid to two parts water and turn it in to their DSU for neutralization. Always pour acid into water; never pour water into acid. Place diluted electrolyte into Department of Transportation containers specification 37M or 37P, or fiberglass pods.

**6-15. HAZARDOUS BATTERIES.** Several common dry batteries have one or more hazardous characteristic. Hazards remain even after batteries are depleted. To determine if a battery is hazardous, check the special control item (SCI) code for the corresponding NSN listed in the monthly Army master data file (AMDF). Batteries given SCI code 7 are HAZMAT and become HAZWASTE when unserviceable. Figure 6-2 provides characteristics of batteries by type number.

| BATTERY TYPE NUMBER | COMPOSITION | HAZARD CATEGORY |
|---|---|---|
| BA-1 through BA-471/U (except BA-245/U, BA-259/U and BA-380/U), BA-500 Series and BA-700 through BA-999/U | LeClanche/Zinc-Manganese Dioxide ($Zn\text{-}MnO_2$) | Nonhazardous |
| BA-1000 through BA-1999/U, including: Duracell (Mallory) RM400R, RM42RT, TR135R, TR164, TR234R, TR286, and W2 | Mercury (Hg) | Hazardous |
| BA-3000 through BA-3999/U | Alkaline | Nonhazardous |
| BA-4000 through BA-4999/U | Magnesium (Mg) | Hazardous |
| BA-5000 through BA-5999/U (except BA-5372/U) | Lithium-Sulfur Dioxide ($Li\text{-}SO_2$) | Hazardous |
| BB-XXXX | Lead-Acid | Hazardous |
| BB-XXXX | Nickel-Cadmium (NICAD) | Hazardous |

Figure 6-2. Characteristics of batteries

a. Upon receipt, inspect batteries for damage and leaks. Thereafter, inspect in storage weekly. Place damaged or leaking batteries in a plastic bag or suitable nonleaking container for turn-in per paragraph 6-12.

b. Turn in unserviceable batteries to DSU per applicable turn-in procedures or to DEH according to paragraph 6-12. Do not discard hazardous batteries into trash.

c. Wear rubber gloves, rubber apron, face shield, and shirt with long sleeves rolled down whenever handling damaged or leaky batteries.

**6-16. STANDARD ARMY DECONTAMINANT, DS2.** DS2 is a corrosive substance. Health and environmental hazards may result when mishandled. If stored in a compatible storage area, DS2 is not a fire hazard. When stored next to super tropical bleach (STB), acids, or oxidizers, there is a potential for fire and explosion.

a. Protect DS2 in storage from damage, rain, moisture, and rust. Store DS2 in a dry, cool place. Position crates and containers on pallets and avoid resting DS2 directly on the ground.

b. Inspect each DS2 container for serviceability at least monthly and maintain as needed.

(1) Turn in leakers and probable leakers according to paragraphs 6-12 and 6-16c.

(2) Restore rusty DS2 cans. Remove rust and spot paint the affected surface. Consider that the material of 1-1/3-quart cans and the cap on the 5-gallon can are very thin.

(3) Maintain markings and labels on DS2 containers or crates clearly readable.

c. Turn in leaking, severely corroded, or badly damaged DS2 per paragraph 6-12. Overpack leakers using open-head drums furnished through DEH, 288-7627.

(1) Do not transfer unserviceable DS2 from its original container to another.

(2) Use the smallest possible open-head drum for the specific quantity and contain as many unserviceable cans of DS2 as it may adequately accommodate. Every DS2 can in an overpack drum should be of the same size.

(3) Tightly seal and label overpack drums before transporting.

d. During unserviceable DS2 cans overpacking, leaders enforce safety precautions.

(1) Overpack DS2 at well ventilated areas which are accessible only to personnel engaged in overpacking.

(2) Have sodium bisulfate, NSN 6810-00-270-9984, and hot soapy water available to neutralize, clean up spills, and decontaminate equipment.

(3) Personnel engaged in or observing DS2 overpacking shall use the following protective equipment:

(a) Protective mask, NSN 4240-01-143-2017, or similar.

(b) Rubber gloves, NSN 8415-01-033-3517, or similar.

(c) Rubber apron, NSN 8415-00-281-7813, or similar.

(4) Severe respiratory tract, skin, or eye irritation may result from contact with DS2 or its fumes. Do not employ personnel who suffer medical conditions related to lungs, kidneys, skin, or nervous system to overpack unserviceable DS2.

e. Use of DS2 during field training is unauthorized.

**6-17. SUPER TROPICAL BLEACH.** STB is a general purpose decontaminant for standard chemical agents. Health and environmental hazards may result when mishandled. If stored in a compatible storage area, STB is not a fire hazard. When stored next to POL, disinfectants, acids, ammonia, or DS2, there is a potential for fire, explosion, and toxic fumes.

a. Protect STB stock from heat, rain, moisture, damage, and rust. Store STB in a dry, cool place and preserve markings on the container. Position containers on pallets and avoid resting STB directly on the ground.

b. Inspect STB for serviceability at least monthly and maintain containers as needed.

(1) Restore rusty STB containers. Remove rust and spot paint the affected surface.

(2) Maintain markings on STB containers clearly readable.

(3) Validate test date as explained in paragraph 6-7b(3).

c. Turn in leakers, badly damaged, or shelf-life expired STB per paragraph 6-12. Overpack leakers using open-head drums furnished through DEH, 288-7627. Do not dispose of STB through the sanitary sewer unless coordinated through DEH, 288-7627. Indiscriminately dumping STB into sewer systems will damage the sewage treatment plant.

(1) Do not transfer STB from its original container to another.

(2) Overpack drum should be the smallest possible for the specific quantity and contain as many unserviceable STB containers as it may adequately accommodate.

(3) Tightly seal overpack drums before transporting.

d. Use of STB during field training is unauthorized.

**6-18. PAINTS.** Most paints exhibit two hazardous characteristics - ignitability and toxicity. Painting operations shall not significantly contribute to personnel endangerment or environmental pollution.

a. Stockage of CARC paint in 1-gallon or larger cans is not authorized except for certified paint booths. Organizational maintenance may stock a 90-day supply of paint materials listed in figure 6-3, for spot painting.

| NOMENCLATURE AND SPECIFICATION | COLOR | SIZE | NSN |
|---|---|---|---|
| Primer (wash) pretreatment, DOD-P-15328 | na | 1 1/4 qt kit | 8030-00-850-7076 |
| Epoxy, Water reducible, MIL-P53030 | Reddish-brown | 1 1/4 qt kit | 8010-01-193-0519 |
| CARC Single Component, Topcoat, MIL-C-53039 | Green 383 | 1 qt can | 8010-01-229-7546 |
| CARC Single Component, Topcoat, MIL-C-53039 | Brown 383 | 1 qt can | 8010-01-229-7543 |
| CARC Single Component, Topcoat, MIL-C-53039 | Black | 1 qt can | 8010-01-229-7540 |
| CARC Single Component, Topcoat, MIL-C-53039 | Sand | 1 qt can | 8010-01-234-2934 |
| CARC Single Component, Topcoat, MIL-C-53039 | Aircraft Green | 1 qt can | 8010-01-246-0717 |
| Thinner, Type I (for polyurethane), MIL-T-81772 | na | 1 gal can | 8010-00-181-8080 |
| Thinner, Type II (for epoxy), MIL-T-81772 | na | 1 gal can | 8010-01-200-2637 |

Figure 6-3. Paint materials selection for spot painting

b. Implement the following guidance for repainting vehicles and equipment.

(1) Totally repainting vehicles and equipment solely for uniformity or other cosmetic reasons is prohibited. Unessential repainting generates unnecessary HAZWASTE and needlessly exposes personnel and the environment to hazards.

(2) Regardless of need and method of paint application, total repainting of vehicles and equipment at organizational maintenance is not authorized. Makeshift paint shops are not authorized.

(3) DOL determines which vehicles and equipment need total repainting. Coordinate with DOL, 287-5109, to obtain determinations.

(4) Repainting and spot painting alkyd paint over CARC is prohibited.

c. Spot painting of vehicles and equipment using brushes is authorized at all levels of maintenance.

d. Coordinate safety and health requirements through G1, 287-3725.

# CHAPTER 7
# POLICE AND MAINTENANCE OF GROUNDS

**7-1. SUMMARY.** This chapter delineates a general plan for police, maintenance of grounds, and sanitation.

**7-2. GENERAL.**

a. Dumping trash onto the ground or places other than trash receptacles is prohibited. Personnel not subject to the UCMJ are prosecuted for dumping trash in violation of 18 USC 13 and Vernon's Texas Codes Annotated, Article 4477-9a. Violators of the Texas statutes as assimilated into Federal law are subject to a maximum fine of $400.

b. Do not paint trees and rocks for ornamental purposes. Preserve the natural look.

**7-3. RESPONSIBILITIES.**

a. Garrison Commander. The Garrison Commander assigns police sectors to MSCs.

b. DEH:

(1) Provides overall staff supervision of police and maintenance of roads and grounds.

(2) Conducts frequent visits to Fort Hood areas to ensure acceptable standards of police, sanitation, and maintenance of grounds. Location of illegal dump sites or other discrepancies are reported to the Garrison Commander sergeant major.

(3) Mows and trims lawns adjacent to unoccupied family quarters.

(4) Mows open areas which are larger than 2 acres of continuous grass.

(5) When requested, DEH, 287-2113, provides the available resources and technical advice for maintenance of grounds beyond the capability of the organization or occupants.

c. Commanders:

(1) MSCs establish the "on-the-ground" limits of police sectors through direct coordination. Sectors of police responsibility are assigned through the Garrison Commander. Specific tasks of police responsibility include police, sanitation, maintenance of drainage, pruning trees and shrubs, fertilizing, watering, mowing, weed control, and trimming grass around drives, walks, utility poles and objects which obstruct the path of mowers.

(2) Organizations and activities located or operating within a police sector not assigned to their parent command are responsible for the police and grounds maintenance of the area they occupy or use. The host command shall not assign additional police areas to these organizations or activities. The final responsibility for these areas rests upon the command to which the police sector is assigned.

(3) Commanders are responsible for police and ground maintenance around recreation facilities, Fort Hood activities, athletic facilities, swimming pools, and vacant buildings within their respective sectors assigned through the Garrison Commander.

(4) Commanders are responsible for the police and grounds maintenance of common areas and large open areas within the family housing communities in their sponsored regions.

(5) Commanders are responsible for directing the legal disposition of Government or abandoned personal property recovered during police and maintenance of grounds.

(6) Commanders or their representatives are responsible for daily checks of trash containers to prevent usable or salvageable Government property from being discarded.

(7) Regardless of police sector assignment, the unit commander ensures range or training area used is policed and damaged grounds are reasonably restored. When a training area is found in an unsatisfactory state of police, the using unit reports the circumstances to: Range Division, 287-5519, for range areas; or DEH, 287-8754, for outside the range area.

(8) Airfield commander directs the police and maintenance of grounds within the airfields.

d. PM:

(1) Issues citations to soldiers and civilian personnel suspected of littering within Fort Hood.

(2) Reports illegal dump sites to DEH, 287-8754. In cooperation with DEH, establishes the identity of persons or organizations responsible for illegal dumping and issues citations or reports. Cases involving civilians are referred to the U.S. Magistrate Court through the SJA.

(3) Directs the disposition of abandoned vehicles.

e. Fort Hood activities:

(1) Organizations and agencies operating or occupying Fort Hood activities police and maintain the areas they use or occupy. This includes parking lots, half the distance between buildings, and 75 feet from facilities where boundaries are not physically defined. Where applicable, existing fences are the boundaries.

(2) The general manager of the Central Texas Area Exchange is responsible for police and grounds maintenance around AAFES facilities.

(a) AAFES manages its waste collection and disposal contracts independently.

(b) Contractors performing waste collection and disposal for AAFES are required to comply with this regulation.

(c) AAFES and its contractors may use the post landfill to dispose of municipal waste free of HAZWASTE.

f. Family Housing. Family housing responsibilities are assigned in publications issued through DEH, Housing Division, building 108.

g. Refuse Collection and Disposal Contractor. The contractor operates the post sanitary landfill according to contract specifications and applicable Federal and State laws and regulations.

## 7-4. PROCEDURES.

a. Where a road or street is the boundary between two police sectors, the limits of responsibility are the northern and western curb or shoulder-line except sectors bordering the range area, which include shoulders, ditches, and cleared areas on both sides of the range road.

b. Avoid company formations for the purpose of regular police call. Assign this task to small units or work details.

c. Report abandoned vehicles to the PM, Operations Division, 287-5407.

d. Report large dead animals to DEH, 287-1090/8754.

e. Report illegal dumping sites to DEH, 287-8754.

f. Make legal disposition of government property and abandoned personal property recovered during police. Deposit obvious trash in refuse containers or the sanitary landfill. Turn in scrap metal, usable lumber, field telephone wire, concertina wire, and empty containers to DRMO according to III Corps & FH Reg 755-725.

g. Use the following guidelines for lawn maintenance.

(1) Mowing should provide a finished appearance, free of ridges, ragged edges, or scalping. The frequency of mowing depends on weather conditions; however, it should be done as often as necessary to maintain a constant trim appearance. The ideal height of the cut is 1 1/2 to 2 inches. Adjust mower blade height while the mower is parked on a flat surface before mowing.

(2) Occupants are not authorized to apply chemicals for weed control. When necessary, chemical weeding is accomplished through certified DEH personnel. A well fertilized, properly mowed and watered lawn requires very little weed control. When hand weeding becomes necessary, the best time to do it is after a rain or watering.

(3) Occupants may obtain fertilizer from DEH, Self-Help Issue Point (SHIP), or DEH may do the fertilization through contracting when feasible. Prevent burning lawns when applying fertilizers. Never apply fertilizer to a wet lawn.

(4) Trim lawns along walks, driveways, curbs, buildings, utility poles, hydrants, and other spots where a neat appearance is necessary. Avoid ditching along paved surfaces.

(5) Lawns should be watered sufficiently to prevent drying, but not to waste water. Thorough watering each 3 to 4 days is normally adequate. A good rain may also be adequate watering. Do not leave lawn sprinklers unsupervised, or so long in one place as to cause excessive saturation or a wasteful overflow onto curbs, streets, drives, walks, and pavements. Do not wash away topsoil and fertilizer with excessive watering.

(6) Ruts and soil erosion along sidewalks, paved areas, structures, and similar areas should be filled, seeded, and fertilized to deter further erosion. Report extensive erosion beyond the occupant's repair capabilities to DEH, 287-2113.

h. Use the following guidelines for maintenance of ornamental vegetation.

(1) Trees and shrubs may be trimmed to form an ornamental shape if the particular species is suitable for that effect and the survival of the tree or shrub would not be threatened. DEH provides major pruning of trees and shrubs annually while occupants trim shrubs and hedges neatly in a manner that promotes their natural shape and growth pattern. Remove dead or broken parts of trees and shrubs. Obtain guidance for pruning and trimming shrubs or trees from DEH, 287-1090.

(2) Planting flowers to enhance the natural beauty of the surroundings is encouraged. Cultivate established flower beds, and keep them free of grass and weeds.

i. Remove dead vegetation and trash from paved areas, flower beds, lawns, and beneath shrubs or trees. Place the collected rubbish in suitable containers for disposal.

j. Do not use earth-moving capabilities of combat vehicles for restoration or modification of landscape. Exceptions are made for tactical operations in suitable training areas when excavation is coordinated prior to the exercise, according to chapter 11.

## 7-5. SANITATION.

a. The refuse collection contractor, 532-2256, makes special trash pickups upon request.

b. The post sanitary landfill is open from 0730 to 1700, Monday through Friday, and 0730 to 1300, Saturday. It is "off-limits" any other time. Users should coordinate with the attendant before unloading any refuse.

c. Scavenging of trash containers or the post sanitary landfill is prohibited.

d. Maintain well-fitted covers on garbage or trash containers and keep them closed as much as practical. Do not fill these receptacles beyond their capacity. When multiple refuse containers become 3/4 full, contact the refuse collection contractor, 532-2256, to ensure timely service. Keep the areas around waste containers free of spillage. Place bulky items alongside of waste containers, and maintain access to multiple refuse containers clear to permit the contractor to empty them. The only refuse containers to be painted are the multiple refuse containers. The contractor may refuse to empty containers having hazardous or salvageable materials. Using organization must remove such items.

# CHAPTER 8
# SPRING AND FALL CLEANUP PROGRAM

**8-1. SUMMARY.** This chapter establishes a cleanup program which emphasizes environmental maintenance biannually. The objectives are to enhance the environment at training areas, beautify appropriate areas, and police and repair range areas.

**8-2. RESPONSIBILITIES.**

a. Commanders:

(1) Police and repair range areas per assigned task.

(2) Appoint a project officer to delineate and coordinate a plan for implementing the cleanup and requesting DEH support as needed.

b. DEH:

(1) Coordinates the overall cleanup effort.

(2) Provides technical advice on planting and maintaining vegetation.

(3) Makes topsoil and equipment such as mowers and garden tools available.

(4) Distributes fertilizer and grass seeds during the spring.

c. G3/DPTM. G3/DPTM distributes schedules and tasking for the live-fire area and range facilities.

**8-3. PROCEDURES FOR MILITARY UNITS.**

a. MSCs consolidate their requests for topsoil, fertilizer, and grass seeds.

b. During each cleanup week, military organizations devote 1 day to beautify the cantonment area. Tasks may include, but are not limited to:

(1) Replacing turf through tilling or loosening the soil, filling ruts, covering exposed tree roots, seeding, fertilizing, and watering as necessary.

(2) Policing assigned sectors according to chapter 7. Special effort is given to training facilities, picnic sites, ponds and lakes, and areas of high public visibility. Make disposition of recyclable materials per III Corps & FH Reg 420-6.

c. Common areas and large open areas in family housing villages are policed and maintained per paragraph 7-3c(4).

**8-4. FAMILY HOUSING PARTICIPATION.** Occupants may support the cleanup and assist sponsor units in maintenance of common areas. Area cleanup and beautification includes ground adjacent to quarters, common and large open areas. Occupants may plant small trees, flowers, and shrubs at their own expense. Residents must coordinate with DEH, building 4228, 287-9735, using FHT Form 420-X10 before excavating. This is necessary because of the underground utility systems. Consider future plant growth in relation to conflict with sidewalks, drives, buildings, streets, and overhead utility lines. A listing of flowers, trees, and shrubs suitable to Central Texas is available from DEH, 287-1090, at building 4468.

# CHAPTER 9
# EXCAVATIONS

**9-1. SUMMARY.** This chapter delineates procedures to prevent damage or destruction of historical or archeological resources and underground utility lines. The restrictions and coordination requirements established through this regulation are designed to carry out provisions of applicable Federal laws and ensure safety of personnel.

## 9-2. EXCAVATIONS OUTSIDE CANTONMENTS.

a. Coordinate with DEH, 287-7965, building 4468, using FHT Form 420-X10, training or other actions associated with earth moving or excavations demanding use of machinery. The most common actions requiring coordination are berms, bunkers, crossing sites, defilade positions, fighting positions, fire breaks, general construction, land clearing, new trails or roads, ponds, tank traps, and trenches. Hand digging of foxholes and other small excavations may be accomplished without coordination, except in designated endangered species habitats, according to paragraph 10-2e.

b. Keep foxholes and field fortifications to a minimum consistent with training objectives. Fill foxholes and emplacements upon completion of training. Units conducting training shall not excavate areas for fill or as a training task without approval from the DEH. If a training area shows evidence of unauthorized excavations, report discrepancies to DEH, 287-7965.

c. Do not excavate within 100 meters of streams, ponds, or lakes, and never orientate the length of excavations up and down the inclination of slopes. Coordinate excavation requirements with DEH using FHT Form 420-X10. This coordination includes consideration of:

(1) When archeological survey of the area is incomplete, or the sites are located within high risk areas where archeological find is probable, DEH shall conduct a field inspection of the proposed sites. The field inspection results provide the deciding factors relevant to the proposed excavation. DEH monitors excavations within high risk areas.

(2) If archeological resources are discovered during excavation, prior coordinations become invalid. Therefore, excavation or disturbance of the site shall be interrupted until DEH evaluates the significance of the finding and issues new guidance.

(3) Excavation sites shall be restored upon termination of use, unless otherwise coordinated with DEH.

**9-3. EXCAVATIONS NEAR UNDERGROUND UTILITIES.** Excavation through underground utility lines may cause lethal hazards and catastrophic environmental consequences. Coordination of excavations, using FHT Form 420-X10, is imperative when utility lines are expected.

a. There are underground utilities at the following ranges:

| | |
|---|---|
| Black Gap | Crittenberger |
| Blackwell | Dalton Mountain |
| Brown's Creek | Henson Mountain |
| Clabber Creek | Jack Mountain |
| Clear Creek | Pilot Knob |
| Cowhouse Machinegun | Sugar Loaf Mountain |

b. There are underground utilities in training areas 1, 14, 15, 16, 17, 45, 51, 53, 54, 65, 66, 71, 73, and 74.

**9-4. EXCAVATIONS AT CANTONMENTS.** Coordinate proposed excavations in or near developed areas with DEH, 287-0768, building 4228, using FHT Form 420-X10.

# CHAPTER 10
# THREATENED AND ENDANGERED SPECIES

**10-1. SUMMARY.** This chapter provides parameters to prevent damage to habitats and reduce disturbance of mating and nesting activities. Endangered species such as the black-capped vireo and golden-cheeked warbler nest on Fort Hood from 1 March to 31 July. The bald eagle comes to spend the winter. One of the detriments to survival of endangered species is the loss of habitat. Fort Hood manages habitats in compliance with the Endangered Species Act. Personnel not subject to the UCMJ are prosecuted for disturbing or destroying endangered species or their habitat in violation of 18 USC 13.

**10-2. COEXISTENCE.** Known endangered species habitats are designated in the Training Area Maps, stock numbers V782SFHMIM1, 2, 3, and 4. Vehicular travel through these areas is not harmful if movement is confined to established tank trails. Other uses of the areas are subject to restrictions promulgated in this regulation.

a. Limit the time span of activity within a habit to less than 2 hours per day during the nesting period occurring from 1 March to 31 July. This limitation shall not be circumvented or defeated through rotation of subordinate elements, brief displacements, or yielding training areas to other organizations.

b. Drive vehicles on established tank trails. Do not create new roads and trails unless permitted through coordination with DEH as provided in chapter 9. Park vehicles in open areas if travel to and from does not include vehicular movement over trees or brush.

c. Prevent damage to vegetation. Cutting of brush or trees within habitat areas is not authorized.

d. Protect vegetation against fire. Take necessary precautions to prevent fires and promptly extinguish fires started accidentally.

(1) Outdoor fires are not authorized except as provided in paragraph 3-2.

(2) Avoid unnecessary use of pyrotechnics and incendiary munitions.

(3) Report fires to Range Division through frequency modulated (FM) 30:45. When FM radio is not available, send a messenger to building 56000 or nearest fire station.

e. Use existing tactical emplacements such as artillery firing points depicted on current topographic maps. Digging or construction of new emplacements within woodlands is not authorized.

f. Refrain from tampering or interfering with the bird traps located throughout habitats.

**10-3. OPERATIONAL CONFLICTS.** Coordinate with DEH, Fish and Wildlife Branch, 287-2885, if there is a conflict between mission and the requirements of this chapter.

# APPENDIX A
# REFERENCES

**A-1. REQUIRED PUBLICATIONS.** These publications are necessary at users level to comply with or to understand this regulation:

| | |
|---|---|
| AR 200-2 | Environmental Effects of Army Action (cited in paragraph 1-4a(2), and 2-1) |
| FM 10-20 | Organizational Maintenance of Military Petroleum Pipelines, Tanks, and Related Equipment (cited in paragraphs 5-11a(9), and 5-11d(8)) |
| FM 21-10 | Field Hygiene and Sanitation (cited in paragraphs 4-5b and 4-8) |
| III Corps & FH Reg 200-10 | Spill Prevention Control and Countermeasure Plan (SPCCP) (cited in paragraphs 5-4, 5-5a(1)(f), 5-8a(1), and 5-8c(5)) |
| III Corps & FH Reg 420-1 | Fire Regulations (cited in paragraphs 4-10, 5-7a(3), 6-7d(6), and 6-7e(7)) |
| III Corps & FH Reg 420-6 | Recycle Program (cited in paragraphs 5-9i, 6-14c, and 8-3b(2)) |
| Not Numbered | ARMS Monthly AMDF (cited in paragraph 6-15) |
| SB 700-20 | Army Adopted and Other Items Selected for Authorization/List of Reportable Items (cited in paragraph 5-11c(4)) |

**A-2. RELATED PUBLICATIONS.** These publications are a source of additional information. Isolated need for these publications occur and considering that the majority of them are not reasonably available to users, DEH maintains the related publications on file. Users may coordinate with DEH, 287-8754, to gain access to the following publications.

| | |
|---|---|
| AR 40-5 | Preventive Medicine |
| AR 40-13 | Medical Support - Nuclear/Chemical Accidents and Incidents |
| AR 50-6 | Chemical Surety Program |
| AR 190-5 | Motor Vehicle Traffic Supervision |
| AR 190-29 | Misdemeanors and Uniform Violations Notices Referred to U.S. Magistrate or District Courts |
| AR 200-1 | Environmental Protection and Enhancement (cited in paragraphs 1-4a(2), 5-2a, and 5-5c(2)) |
| AR 210-20 | Master Planning for Army Installations |
| AR 385-10 | Army Safety Program (cited in paragraph C-1) |
| AR 420-47 | Solid and Hazardous Waste Management |
| AR 420-74 | Natural Resources; Land, Forest, and Wildlife Management |
| AR 500-60 | Disaster Relief |

| | |
|---|---|
| AR 600-20 | Army Command Policy and Procedures (cited in paragraph 5-5b(5)) |
| FM 10-69 | Petroleum Supply Point Equipment and Operations |
| III Corps & FH Reg 190-5 | Motor Vehicle Traffic Supervision |
| III Corps & FH Reg 210-25 | Hunting, Fishing, and Natural Resources Conservation Regulations (cited in paragraph 4-3) |
| III Corps & FH Reg 350-12 | Tasking III Corps and Fort Hood |
| III Corps & FH Reg 420-27 | Care, Maintenance, and Alterations of Facilities |
| III Corps & FH Reg 600-20 | Community Life Program |
| III Corps & FH Reg 755-725 | Procedures for Turn-In to and Withdrawal From Defense Reutilization and Marketing Office (DRMO) (cited in paragraphs 5-9i, and 7-4f) |
| TM 3-261 | Handling and Disposal of Unwanted Radioactive Material |
| Not Numbered | Vernon's Texas Codes Annotated |
| 18 USC 13 | Assimilative Crimes Act |
| 29 CFR | Labor-Occupational Safety and Health Administration, Department of Labor |
| 40 CFR | Protection of Environment |
| 49 CFR | Transportation-Research and Special Program Administration, Department of Transportation |

A-3. FORMS.

| | |
|---|---|
| DA Form 2077 | Petroleum Product Laboratory Analysis Report |
| DA Form 2765-1 | Request for Issue or Turn-In |
| DA Form 4283 | Facilities Engineering Work Request |
| DD Form 1348-1 | DOD Single Line Time Release/Receipt Document |
| DD Form 2521 | Hazardous Chemical Warning Label |
| DD Form 2522 | Hazardous Chemical Warning Label |
| FH Form 2146 | Pollution Incident Report |
| FHT Form 420-X10 | Coordination for Land Excavation |
| FH Poster 420-3 | In Case of A Spill |

# APPENDIX B
# POTENTIAL SOURCES OF POLLUTION

Table B-1. Potential sources of pollution.

| SOURCE | POTENTIAL POLLUTANTS |
|---|---|
| Motor pools, automotive, or aircraft maintenance shops. | Used oil and hazardous substances. |
| Printing shops. | Solvents and the waste generated from their use. |
| Laboratories (research, analytical, hospital, and production). | Chemical substances listed in 40 CFR 261.33, and waste generated from their use. |
| Film processing shops. | Photographic waste, hospital X-ray waste. |
| Paint operations. | Paint waste, VOCs and particulate pollutants. |
| Pesticides storage facilities. | Pesticides, herbicides, rodenticides, (conforming or not conforming to specifications); and any residue, contaminated soil, water, or other waste resulting from the cleanup of a spill or use of such substances. |
| Hospitals and clinics. | Infectious waste, chemical substances, and drugs. |
| Trade shops (carpentry, electrical, plumbing, metal working, and so forth). | Chemical substances, used oil, and miscellaneous HAZWASTE. |
| Transformers and capacitors containing polychlorinated biphenyls(PCBs) | PCBs and PCB materials. |
| Chemical storage areas including warehouses. | Chemical substances conforming or not conforming to specifications, chemical residue, contaminated soil, water, or other waste resulting from cleanup of spills. |
| Industrial waste treatment facilities. | Sludges exhibiting characteristics of HAZWASTE. |
| Incinerators. | Ash, scrubber, and baghouse waste that exhibit characteristics of HAZWASTE. |
| Battery shops. | Sulfuric acid and lead. |
| Fuel storage and transporters. | Petroleum fuels. |
| Laundry | Solvents and waste generated from their use. |

# APPENDIX C
# ENVIRONMENTAL TRAINING

**C-1. ENVIRONMENTAL MANAGEMENT COURSE.** DEH and G1 present the Environmental Management Course quarterly. This 2-day training provides working knowledge of responsibilities, techniques, records, resources, Federal and State laws, and procedures applicable to additional duties according to paragraph 5-8b(1). The course also includes Hazard Communication training to enable students to give Hazard Communication training and perform additional duties per FH Supplement 1 to AR 385-10. MSCs coordinate with DEH, 287-8755, to obtain allocations for the EMC. The EMC is designed for ECs, however, Sergeants First Class and above whose duties include commanding or leading potential spill sites listed in III Corps & FH Reg 200-10, appendix B may attend. The EMC agenda includes classes on:

a. Pollution abatement.

b. HAZWASTE management, disposition, and HAZMIN.

c. Selection, acquisition, and management of HAZMAT.

d. Spill prevention and contingency plans.

e. Recycling.

f. Conservation and environmental preservation during field training excersises (FTX).

g. Department of Defense Federal Hazard Communication Training Program.

h. Environmental liabilities (administrative and criminal).

i. ECs responsibilities.

**C-2. COMMANDERS' ENVIRONMENTAL ORIENTATION.** DEH provides a 3-hour executive summary of the EMC for brigade, group, battalion, company, and detachment commanders, at least semiannually.

**C-3. TROOP SCHOOL.** DEH provides environmental training in support of the Commanders/First Sergeants Course, Maintenance Officers Course, Motor Sergeants Course, and other courses, as coordinated (287-8755). The topics of this training include pollution abatement, recycling, HAZWASTE management, and HAZMAT management.

**C-4. SPILL PREVENTION BRIEFING.** Commanders or activity chiefs conduct a monthly briefing to ensure understanding of spill prevention procedures applicable to their facilities or operations. The recommended outline in figure C-1 provides a concept for presentation of a 15-minute briefing to assist commanders in their compliance with 40 CFR 112, RCRA, and paragraph 6-10.* Organizations should modify the recommended outline as needed to satisfy the specific spill prevention training needs of their personnel. Certified ECs should present the monthly spill prevention briefing.

**C-5. ORGANIZATIONAL ENVIRONMENTAL TRAINING.** Commanders and activity chiefs conduct environmental training at least quarterly. Unusual circumstances may require additional one-time environmental classes to satisfy specific mission or FTX requirements. Unit commanders determine frequency of supplemental environmental training. The training outline in figure C-2 provides a concept for presentation of a 2-hour environmental awareness class. Organizations should modify this concept to satisfy the specific needs of their personnel. A certified EC should present environmental training. Obtain assistance and guidance for the trainer, graphic aids, artwork for overhead transparencies, and other support from DEH, 287-8755, at building 4468.

**C-6. LEADERS' ENVIRONMENTAL ORIENTATION.** Organizations may coordinate through DEH, 287-8755, to obtain environmental orientations for their officers, warrant officers, and noncommissioned officers. These orientations last 1 or 2 hours and are presented at facilities provided by the requesting organization. Requesting organizations determine the

agenda, or DEH may provide recommendations for the organization to consider. The organization's EC also can provide this training.

MONTHLY SPILL PREVENTION BRIEFING

TYPE: Information Briefing

TIME: 15 minutes

REFERENCES: III Corps & FH Regs 200-10, 420-2, 755-725 and organization's HAZWASTE inspection/training log.

WHO SHOULD ATTEND: Leaders and operators of potential spill sites.

TRAINING AIDS: To be established and procured to meet the needs.

1. INTRODUCTION

a. Greeting.

b. Purpose. To maintain understanding of spill prevention procedures applicable to (name of facility, operation or organization).

c. Procedure. Explanation of how briefing is organized.

2. EXPLANATION

a. Assumptions (if any were made).

b. Summary of inspections received from external sources.

c. Summary of inspections made internally.

d. Potential sources of spillage within organization's areas.

e. Spill prevention procedures applicable to the organization's storage of HAZMAT, HAZWASTE accumulation, use of HAZMAT, fuel transfer and storage, oil reclamation, transportation of HAZMAT/HAZWASTE and POL, disposal procedures, maintenance, etc.

f. Spill Contingency Plan including reportable quantities, reporting procedures, cleanup, resources available, and sources of assistance.

g. Training Plan including who, what, when, where, and how to rectify training deficiencies related to pollution abatement, spill response, and Hazardous Communication Program.

h. Responsibilities clarification, reassignment, and guidance.

3. CLOSE

a. Solicitation for questions.

b. Closing statement.

Figure C-1. Briefing outline

ORGANIZATIONAL ENVIRONMENTAL TRAINING

TYPE: Conference

TIME: 2-hour (may be condensed to 1-hour)

REFERENCES: III Corps & FH Regs 200-10, 420-2 and organization's HAZWASTE inspection/training log

WHO SHOULD ATTEND: All

TRAINING AIDS: To be established by trainer as needed

1. INTRODUCTION

a. Greeting.

b. Reasons for training. Our operations have the potential to cause pollution incidents (give examples). Pollution abatement and environmental preservation cannot be left to chance. A clean and safe environment is an idea that makes sense and is also mandated in State and Federal laws.

c. Objectives of training. To maintain a "how-to" understanding of pollution abatement and HAZWASTE management.

2. POLLUTION ABATEMENT (1st Period)

a. How do we generate pollution?

b. What can we do about pollution?

(1) Recognize potentials for pollution

(2) Understand and employ what is required to protect the environment

(3) Program and procure resources and assistance

(4) Reduce waste of natural resources

(5) Consider the environment when performing mission or changing operations

c. National Pollutant Discharge Elimination System

(1) Effluent standards

(2) Use of washrack and steam cleaning

Figure C-2. Training outline, page 1 of 2

d. Facilities, resources and procedures

(1) Oil reclamation

(2) Oil-sand interceptor

(3) POL and HAZMAT storage

(4) HAZWASTE accumulation site and procedures

(5) Recycling and disposition procedures

(a) Oil and off-specification fuels

(b) HAZWASTE and excess HAZMAT

(c) Empty containers

(d) Contaminated soil

(e) Recyclable materials

(6) Spill prevention, reporting and cleanup

NOTE: Recapitulate and allow a 10-minute break.

3. HAZWASTE MANAGEMENT (2nd period)

NOTES: Briefly introduce and capitulate the following main topics.
Good place to show TVT 20-949, Every Little Bit Hurts (available at TASC).

a. Laws and regulations

b. Punitive provisions

c. Hazardous recognition and characteristics - Ignitable, corrosive, reactive and toxic

d. HAZWASTE accumulation

e. HAZMAT selection, substitution and procurement

f. Hazards and cost of HAZWASTE mismanagement

g. HAZMIN procedures - conservation and recovery

4. CLOSE Solicit questions, summarize main ideas, concluding statement

Figure C-2. Training outline, page 2 of 2

# GLOSSARY

## ABBREVIATIONS.

AAFES - Army and Air Force Exchange System

AMDF - Army master data file

AR - Army Regulation

AT&SF - Atchison Topica and Santa Fe

CARC - chemical agent resistant coating

CFC - chlorofluorocarbons

CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act of 1980

CFR - Code of Federal Regulations

COC - Corps Operations Center

CTA - Common Table of Allowances

DAC - Department of the Army civilian

DA - Department of the Army

DEH - Directorate of Engineering and Housing

DOC - Directorate of Contracting

DOD - Department of Defense

DOIM - Directorate of Information Management

DOL - Directorate of Logistics

DPTM - Directorate of Plans, Training, and Management

DRMO - Defense Reutilization and Marketing Office

DS - direct support

DSN - defense systems network

DSU - direct support unit

EA - environmental assessment

EC - Environmental Coordinator

EIS - environmental impact statement

EMC - Environmental Management Course

EOC - Emergency Operations Center

EPA - Environmental Protection Agency

FM - field manual; frequency modulated

FORSCOM - United States Army Forces Command

FTX - field training exercise

GC - Garrison Commander

HAZMAT - hazardous material

HAZMIN - hazardous waste minimization

HAZWASTE - hazardous waste

HVLP - high volume low pressure

IRT - Installation Response Team

ISCP - Installation Spill Contingency Plan

MEDDAC - Medical Department Activity

METL - Mission Essential Task List

MOS - military occupational specialty

MSC - major subordinate command (of III Corps)

MSDS - material safety data sheet

NBC - nuclear, biological, chemical

NEPA - National Environmental Policy Act

NIOSH - National Institute for Occupational Safety and Health

NSN - national stock number

NPDES - National Pollutant Discharge Elimination System

OPORD - operation order

OSC - on-scene coordinator

PL - public law

PM - Provost Marshal

POL - petroleum, oils, and lubricants

RCRA - Resource Conservation and Recovery Act of 1976, PL 94-580

REC - record of environmental consideration

SCI - special control item

SJA - Staff Judge Advocate

SHIP - Self-Help Issue Point

SOP - standing operating procedure

SPCCP - Spill Prevention Control and Countermeasure Plan

STB - super tropical bleach

TM - technical manual

USAEHA - United States Army Environmental Hygiene Agency

UCMJ - Uniform Code of Military Justice

USCG - United States Coast Guard

VOC - volatile organic compound

TERMS.

BAFFLE. As applicable to oil-sand interceptors; a deflector made of metal or concrete that allows the flow of water under the fluid surface, while arresting or deflecting the oil on the surface.

CONSERVATION. Preservation from decay, loss, or waste of surface and ground water, forest, other natural resources, and protection of historical or archeological sites.

CRITICAL WATER AREAS. Waters which may flow off the post to include the Leon River, Cowhouse Creek, Belton Lake, North Nolan Creek, South Nolan Creek, Reese Creek and North Reese Creek, and their tributaries.

DISCHARGE. Includes, but is not limited to, any spilling, leaking, pumping, pouring, emitting, emptying, or dumping of any petroleum-base or hazardous substances, whether accidental or intentional.

DISPOSAL OF HAZWASTE. Intentionally placing any HAZWASTE into or upon land or water so that such HAZWASTE or its constituents may enter the environment.

ENVIRONMENTAL PROTECTION AGENCY HAZWASTE NUMBERS. The number EPA assigns to each HAZWASTE listed in 40 CFR 261, subpart C and subpart D.

GENERATOR. Any person, organization, or activity whose act or process produces HAZWASTE.

HAZARDOUS MATERIAL AND HAZARDOUS WASTE. A substance that may cause or significantly contribute to serious illness or death or that poses a substantial threat to human health or the environment when improperly managed. Generally, these substances have one or more of the four hazardous characteristics; ignitable, corrosive, reactive, and toxic.

IMPERVIOUS. Not permitting passage or penetration. Impermeable. Unpenetrable.

INCOMPATIBLE WASTE. Material unsuitable for placement in a particular device or facility because it may cause corrosion or decay of containment materials; or its combination with another waste or material under uncontrolled conditions may produce heat, pressure, fire, explosion, violent reaction, toxic dusts, mists, fumes, or gases.

INSTALLATION. Fort Hood.

INSTALLATION RESPONSE TEAM. Those units, activities, and directorates within the post designated to respond or otherwise participate in the control, abatement, cleanup, and other procedures associated with spill events.

NAVIGABLE WATERS. All navigable waters of the U.S. and tributaries of such waters; intrastate lakes, rivers, and streams interstate travelers use for recreational or other purposes; and interstate lakes, rivers, and streams from which fish or shell fish are taken and sold in interstate commerce.

OFFICIAL USE. Use by an employee, agency, or designated representative of the Department of Defense or one of its contractors in the course of employment or agency representation.

OIL. Any form of oil including, but not limited to, petroleum, fuel oil, sludge, oil refuse, and motor oils. The terms "oil, petroleum, lubricants, and POL" are used interchangeably in this regulation.

OIL-SAND INTERCEPTOR. A structure designed to allow flow of water while segregating and containing oil and sediments.

ON-SCENE COORDINATOR. The person the post commander predesignates to coordinate and direct cleanup efforts at the scene of an oil or hazardous substances discharge on or adjacent to Fort Hood.

OUTAGE. Unoccupied space above the product in a storage tank or container. Adequate outage allows for expansion of the product.

OUTFALL. Permitted point-source of pollution discharge, or location where water exits from lakes.

POLLUTANT. Any substance, chemical, or waste material discharged into or upon water, land, or air in harmful quantities or conditions.

RECYCLE. The process in which materials that would otherwise be discarded as waste are transformed into usable products.

REUSABLE. An item that may be used repeatedly in its present form. Certain containers and cargo pallets are examples of reusable items.

SOURCE SEPARATION. The segregation of recyclable materials at their point of generation. Source separation is one of the most important procedures in the recycle process. It includes storage that prevents further damage or loss of the qualities that make a recyclable material marketable. For instance, if used oil and cleaning solvents are stored in the same container, the resulting mixture becomes a HAZWASTE which, to be legally disposed of, the Government may have to spend funds. However, if used oil and cleaning solvents are segregated and free of other contaminants, the Government is able to sell them separately as recyclable materials.

SPILL EVENT. A discharge of POL or hazardous substance on land or into or upon the navigable waters in a harmful quantity.

TACTICAL. Pertaining to military units.

TOXIC MATERIALS. Poisonous materials or materials having the characteristics to produce the effects of a poison.

TREATMENT. Any method, technique, or process such as neutralization, detonation, chemical or biological change in character, or composition of any HAZWASTE to render it nonhazardous or less hazardous.

TRIPLE RINSE. To remove hazards or clean polluting residue of last known content from empty containers. The term generalizes the numerous procedures or techniques which are specific to the characteristics of the last known content. Rinsing techniques include and are not limited to draining, washing with water or detergent solution, degreasing through steam cleaning or application of solvent, wiping with rags or towels, and chemical treatment or neutralization.

WASTE. Used or unused property, residue, by-products, sludges, and other materials which have no known uses and must be discarded.

The proponent of this regulation is DEH.

FOR THE COMMANDER:

LEON J. LAPORTE
Colonel, GS
Chief of Staff

WILLIAM E. PARKER
LTC, SC
DOIM

DISTRIBUTION:
IAW FH Form 1853, B
PLUS: DEH (2400)
PTM-T-AVMC (400)
IM-PUBS (400)
IM-AO (5)
IM-ARL (2)

# Appendix H

# Sewer Repair Records

# Appendix H

## Sewer Repair Records

The sanitary sewer repair records available from the computer database were obtained from the Directorate of Public Works Engineering Plans and Services Division. These documents are germaine to this report in that a source of contamination of the environment through the sanitary sewer lines is through broken or poorly maintained lines. These reports document problem lines which would indicate possible releases. To interpret the reports the reader should refer to the following abbreviations:

u/s = unstop
rpr/prl = repair or replace
plt = plant
utl = utility

Each call is recorded with the date, building number, caller, and the type of response.

Enter value for timeframe: 1-OCT-93' AND '5-DEC-96
Enter value for facility_number_in_caps: SSWR5
PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 00577 US SWR LINE BLDG 9422 | | | | CMP |
| 06-OCT-93 | MR SLAUGHTER | RPR/PRL UTL LINES | 1 | |
| V0441 BLOW OUT STORM DRAIN | | | | CMP |
| 19-OCT-93 | RICHARD | RPR/PRL UTL LINES | 3 | |
| 05991 U/S MANHOLE AT S/EAST CORNER 723 | | | | CMP |
| 03-NOV-93 | P-3 | RPR/PRL UTL LINES | 1 | |
| 10121 2319 U/S LATERAL LINE | | | | CMP |
| 30-NOV-93 | P-6 | RPR/PRL UTL LINES | 1 | |
| 48298 BLDG 9214, SEWERAGE COMING OUT OF GROUND OUTSIDE | | | | CMP |
| 08-AUG-94 | 1SG AYERS | CUST NO SHOW/TURN BK | 1 | |
| 50150 U/S SEWER DRAIN | | | | CMP |
| 17-AUG-94 | D-35 | CUST NO SHOW/TURN BK | 1 | |

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| [illegible]39 U/S SEWER LINE | | | | CAN |
| [illegible]-AUG-94 | P-13 | CUST NO SHOW/TURN BK | 1 | |
| 53218 U/S STORM DRAIN AT DARNALL LOOP AND 58TH ST | | | | CMP |
| 02-SEP-94 | S-22 | U/S STORM DRAIN AT DARNALL LOO | 3 | |
| 56064 RPR/RPL VALVE COVER TOP ON N/EAST SIDE OF BLDG 410 | | | | CMP |
| 20-SEP-94 | SSG FRANKLIN | RPR/PRL UTL LINES | 1 | |
| 56595 20122 REDLIGHT BLINKING AT SEWER LIFT STN | | | | CMP |
| 22-SEP-94 | DOYLE | SEWER PLT/SEWER LIFT | 1 | |
| 56853 RPR/CK LGHT ON AT LIFT STATION | | | | CMP |
| 25-SEP-94 | H-1 | SEWER PLT/SEWER LIFT | 1 | |
| 57266 RPR SEWERAGE BACKING UP FROM GROUND OUTSIDE BLDG 6950 | | | | CMP |
| 27-SEP-94 | SGT TORRES | RPR/PRL UTL LINES | 1 | |

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 57608 RPR REW SEWERAGE COMING UP OUT OF GROUND NEAR CAMP SITE 4950 | | | | CMP |
| 29-SEP-94 | MS KEMPP | RPR/PRL UTL LINES | 1 | |
| [illegible]50 U/S SEWER DRAIN ON EASTSIDE OF BLDG 9407 | | | | CMP |
| 30-SEP-94 | 710F | RPR/PRL UTL LINES | 1 | |
| 58003 PUMP STAION 20148 HAS RED LIGHT | | | | CMP |
| 30-SEP-94 | MR ARROYO | SEWER PLT/SEWER LIFT | 1 | |
| [illegible]0003 RPR/RPL 2 IMPELLERS | | | | CMP |

01-OCT-94 H-1 VARGAS SEWER PLT/SEWER LIFT 1 CI

01260 U/S SEWER LINE
11-OCT-94 PAPA 8 RPR/PRL UTL LINES 1 CI

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 02055 SEWAGE BACK UP | | | | |
| 17-OCT-94 | SGT HALL | RPR/PRL UTL LINES | 1 | CM |
| 02725 U/S SEWER MANHOLE SOUTHEAST CORNER OF BLDG | | | | |
| 19-OCT-94 | MIKE REGEL | RPR/PRL UTL LINES | 1 | CM |
| 03239 ASSIST S-22 AT SEWER LIFT STN 20104 BLORA | | | | |
| 22-OCT-94 | S-22 | RPR UTL SYS CTRLS | 1 | CM |
| 03461 RPR SEWER LINE | | | | |
| 24-OCT-94 | P-5 | RPR/PRL UTL LINES | 1 | CM |
| 03467 U/S SEWER LINE IN PLAYGROUND AREA | | | | |
| 24-OCT-94 | SHANNON | U/S SEWER LINE IN PLAYGROUND A | 1 | CM |
| 04299 RPR WATER COMING OUT OF MANHOLE ON SIDEWALK BLDG 12006 | | | | |
| 28-OCT-94 | SGT HEATH | RPR/PRL UTL LINES | 1 | CM |

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 05034 U/S SEWAGE MAIN 50004 | | | | |
| 02-NOV-94 | S-22 | RPR/PRL UTL LINES | 1 | CM |
| 05156 U/S SEWER LINE 14020 | | | | |
| 02-NOV-94 | P-13 | RPR/PRL UTL LINES | 1 | CM |
| U0177 20122 RED LIGHT BLINKING AT SEWER LIFT STN | | | | |
| 06-NOV-94 | MR ECHOFF | SEWER PLT/SEWER LIFT | 1 | CM |
| 05951 U/S SEWER LINES 40007 | | | | |
| 08-NOV-94 | S-22 | RPR/PRL UTL LINES | 1 | CM |
| U0275 U/S SEWER BLDG 16004 W/SIDE | | | | |
| 12-NOV-94 | E4 CASTILLEJA | RPR/PRL UTL LINES | 1 | CM |
| 07384 RPL PUMP CONTROL AND FLOAT | | | | |
| 17-NOV-94 | S-25 | RPR UTL SYS CTRLS | 1 | CM |

PLEASE HIT (CR) TO CONTINUE
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| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 07385 RED LIGHT BLINKING AT LIFT STN | | | | |
| 17-NOV-94 | H-1 | SEWER PLT/SEWER LIFT | 1 | |
| 07889 SEWER STOPPED UP BTW ROSEBUD AND 16TH | | | | |
| 18-NOV-94 | SPC WHITE | RPR/PRL UTL LINES | 1 | CM |
| 07974 SEWER STOPPED UP BY 16004 | | | | |
| 21-NOV-94 | SPC HENLEY | RPR/PRL UTL LINES | 1 | CM |

08007 RPR SEWER LINE/SERV LINE CMF
21-NOV-94 S-23 RPR SERVICE LINE AND SEWER LIN 1

08146 RPR SEWER LINE/16004 CMF
21-NOV-94 S-25 RPR SEWER LINE 1

90 5764 U/S OUTSIDE SEWER LINE NEAR LOADING DOCK CMF
21-NOV-94 P-13 RPR/PRL UTL LINES 1

PLEASE HIT (CR) TO CONTINUE
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| RECEIVED | NAME OF CALLER | DESCRIPTION | P |
|---|---|---|---|
| 09758 DIG UP AND RPR SEWER LINE S/SIDE OF 90050 | | | CMF |
| 01-DEC-94 | RAY | DIG UP AND RPR SEWER LINE SOUT | 1 |
| 09771 ASSIST 76X WITH CLEANING OUT DRAINS AT BLDG 39052 | | | CMF |
| 01-DEC-94 | P-5 | R/R PLUMBING | 1 |
| U0399 52053 CLEAN OUT DRAINS WITH TRUCK | | | CMF |
| 06-DEC-94 | O-4/DYSON | 52053 CLEAN OUT DRAINS WITH TR | 2 |
| U0400 52051 CLEAN OUTSIDE DRAINS WITH TRUCK | | | CMF |
| 06-DEC-94 | O-4/DYSON | 52051 CLEAN OUTSIDE DRAINS WIT | 2 |
| 10813 U/S SEWER ON SOUTHWEST SIDE OF BLDG 16008 | | | CMF |
| 07-DEC-94 | SAM | RPR/PRL UTL LINES | 1 |
| 12105 5782 RPR BROKEN SEWER LINE | | | CMF |
| 13-DEC-94 | S-26 | 5782 RPR BROKEN SEWER LINE | 1 |

PLEASE HIT (CR) TO CONTINUE
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| RECEIVED | NAME OF CALLER | DESCRIPTION | P |
|---|---|---|---|
| 12147 U/S OUTSIDE SEWER LINE | | | CMF |
| 14-DEC-94 | P-13 | U/S OUTSIDE SEWER LINE | 1 |
| 12301 CLEAN OUT STOPPED UP SEWER LINE | | | CMF |
| 14-DEC-94 | P-8 | CLEAN OUT STOPPED UP SEWER LIN | 2 |
| 13015 U/S OUTSIDE SEWER LINE | | | CMF |
| 20-DEC-94 | P-8 | CK RPR U/S OUTSIDE SEWER LINE | 2 |
| 13103 U/S BACKED UP SEWER LINE IN FRONT OF BLDG 90050 | | | CMF |
| 21-DEC-94 | MR STARKEY | U/S BACKED UP SEWER LINE, 15 F | 1 |
| 13594 93008 U/S MANHOLE LOCATED 1/2 MILE NORTH OF BLDG | | | CMF |
| 27-DEC-94 | S-20 | 93008 U/S MANHOLE LOCATED 1/2 | 1 |
| 13596 21007 U/S LOADING DOCK DRAIN MESS HALL | | | CMF |
| 27-DEC-94 | MR ELLIS | 21007 U/S LOADING DOCK RAMP DR | 1 |

PLEASE HIT (CR) TO CONTINUE
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| RECEIVED | NAME OF CALLER | DESCRIPTION | P |
|---|---|---|---|
| 13751 37TH/CENTRAL U/S SEWER MAIN | | | CM |
| 28-DEC-94 | S-24 | 37TH/CENTRAL U/S SEWER MAIN | 1 |
| 14163 9211 U/S SEWER LINE | | | CM |

14174 9211 CLEAN OUT ON NORTHSIDE OF BLDG IS BURIED DEEP AND NEEDS RAISING CMP
01-JAN-95 P-7 9211 CLEAN OUT ON NORTHSIDE OF 2

14320 RE-SEAL AROUND MANHOLE RING NORTHEAST CORNER OF BLDG CMP
03-JAN-95 S-25 RE-SEAL AROUND MANHOLE RING NO 2

14414 CK RPR END CAP TO SEWER PIPE. SEWER IS PRESENTLY BACKING UP. 39013
03-JAN-95 CSSM SINGLETON CK RPR END CAP TO SEWER PIPE L 2

14607 U/S SEWER N/SIDE OF BLDG 14023 CMP
04-JAN-95 P-13 U/S SEWER NORTHSIDE OF BLDG 14 1

PLEASE HIT (CR) TO CONTINUE
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| RECEIVED | NAME OF CALLER | DESCRIPTION | P |
|---|---|---|---|
| 14633 RPR/CK SEWER OVER FLOWING NEAR BLDG 213 | | | CMP |
| 04-JAN-95 | TECOM OPER 25 | RPR/CK SEWER OVER FLOWING NEAR | 1 |
| 14966 14023 U/S O/S SEWER LINE ON NORTH CORNER | | | CMP |
| 05-JAN-95 | P-13 | 14023 U/S O/S SEWER LINE ON NO | 1 |
| 15578 205 U/S OUTSIDE SEWER LINE | | | CMP |
| 09-JAN-95 | P-13 | 205 U/S OUTSIDE SEWER LINE | 1 |
| 16680 205 DIG UP AND LOCATE SEWER LINE TO BLDG | | | CMP |
| 12-JAN-95 | P-13 | 205 DIG UP AND LOCATE SEWER LI | 1 |
| 16884 51400 ALARM GOING OFF AT SEWER LIFT STN | | | CMP |
| 16-JAN-95 | H-1 FRY | 51400 ALARM GOING OFF AT LIFT | 1 |
| 17139 CLN OUT MAIN SEWAGE SYST/31007 | | | |
| 17-JAN-95 | SSG BISHOP | CLEAN OUT MAIN SEWAGE SYSTEM T | 3 |

PLEASE HIT (CR) TO CONTINUE
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| RECEIVED | NAME OF CALLER | DESCRIPTION | P |
|---|---|---|---|
| 17430 90036 U/S OUTSIDE SEWER LINE | | | CMP |
| 18-JAN-95 | E-6 | 90036 U/S OUTSIDE SEWER LINE | 1 |
| 17476 RPR PUMP STATION EQUIPMENT NOT WORKING BLDG 20141, SIERRA BEACH BLORA | | | CMP |
| 18-JAN-95 | MR HALL | CK/RPR PUMP STATION EQUIPMENT | 1 |
| 18387 RPR SEWER BACKED UP AT SITE 38, WFH TRAVEL CAMP BLDG 70004 | | | CMP |
| 23-JAN-95 | MR KEMPT | CK/RPR SEWER BACKED UP AT SITE | 1 |
| 19604 BLORA/VIC 20130 MANHOLE OVERFLOWING | | | CMP |
| 28-JAN-95 | CAROL | BLORA/VIC 20130 MANHOLE OVERFL | 1 |
| 20224 CHECK/RPR MANHOLE ON S/SIDE 2103 | | | CMP |
| 31-JAN-95 | R-14 | CHECK/RPR AMNHOLE ON S/SIDE O | 1 |
| 20449 ASSIST E-6 IN U/S SEWER LINE BLDG 88039 | | | CMP |
| 01-FEB-95 | S-20 | ASSIST E-6 IN U/S SEWER LINE A | 1 |

PLEASE HIT (CR) TO CONTINUE
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| RECEIVED | NAME OF CALLER | DESCRIPTION | P |
|---|---|---|---|
| 20470 BLOW OUT AMIN SWR LINE FOR DOL | | | CMP |

20486 CHECK SWR LIFT 41012 CMF
01-FEB-95 RICHARD CHECK LIFT STATION 41012, IT I 1

20625 U/S SEWER MAIN BLDG 41007 CMF
02-FEB-95 S-22 U/S SEWER MAIN, ATT S-22 BLDG 2

[illegible]09 RPR 3 PUMP BLDG 41012 CMF
02-FEB-95 S-22 RPR 3EA PUMP, ATT S-22 2

U0797 SEWER BACK UP AT ROW 3, NEAR SITE 49 CMF
02-FEB-95 MARY KEMP CHECK SEWAGE BACKUP, NEAR SITE 1

21084 RPR CRACKED CONCRETE AROUND MANHOLE SITE 21 AND 22 WFH TRAVEL CAMP CMF
06-FEB-95 MRS KEMPT CK/RPR CRACKED CONCRETE AROUND 3

PLEASE HIT (CR) TO CONTINUE
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| RECEIVED | NAME OF CALLER | DESCRIPTION | P |
|---|---|---|---|
| 22149 CLEAN DEBRIS BLDG 8001 | | | CMF |
| 09-FEB-95 | S-25 | CLEAN WET WELL AND CLEAN DEBRI | 2 |
| 22150 RPR 1 PUMP CHK VALVE BOX, BLDG 8001 | | | CMF |
| 09-FEB-95 | S-25 | RPR/RPL #1 PUMP CHK VAL;VE BOX | 2 |
| 22151 RPL FITTING ON 1 1/4IN. LINE ON AMMMONIA BOOSTER PUMP BLDG 6898 | | | CMF |
| 09-FEB-95 | S-25 | RPL FITING ON 1 1/4 LINE ON AM | 2 |
| 22799 RAW SEWAGE ON GROUND,LK END CAP | | | CMF |
| 14-FEB-95 | SGT STANIER | CK RPR RAW SEWAGE AT SEWER P | 2 |
| 23357 U/S SEWER BLDG 16006 | | | CMF |
| 16-FEB-95 | P-13 | U/S SEWER BLDG 16006, PER P-13 | 1 |
| 23358 CK RPR END CAP. | | | CMF |
| 16-FEB-95 | SFC. PHILBRICK | CK RPR END CAP TO SEWAGE LINE. | 3 |

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS CW

| RECEIVED | NAME OF CALLER | DESCRIPTION | P |
|---|---|---|---|
| 23541 ASSIT 76X AT 41013 | | | CMI |
| 16-FEB-95 | S-25 | CHECK/RPR 12 INCH MAIN IN VICI | 1 |
| 23542 CHECK/RPR 12 INCH MAIN AT 41013 | | | CM |
| 16-FEB-95 | S-25 | CHECK/RPR 12 INCH MAIN IN VICI | 1 |
| 23843 U/S OUTSIDE SWR | | | CM |
| 21-FEB-95 | P-1 | U/S OUTSIDE SEWER AT CLEAN OUT | 1 |
| 24089 CLEAN OUT STORM DRAINS ON 58 STR | | | CM |
| 22-FEB-95 | P-25 | CLEAN OUT STORM DRAINS ON 58 S | 2 |
| 24303 U/S STORM DRAINS BY 88005/88007 | | | CM |
| [illegible]-FEB-95 | P-26 | U/S STORM DRAINS BY 88005/8800 | 3 |
| 24496 EMPTY DUMP STATION AT CEDAR PARK IS FULL BLORA | | | CM |
| 24-FEB-95 | MR JASON | EMPTY OUT DUMP STATION BY RV A | 1 |

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS CW

4555 16005 SEWAGE COMING UP FROM GROUND ON BACK DOCK CMP
5-FEB-95 SGT STOLTZ 16005 SEWAGE COMING UP FROM GR 1

1097 U/S OUTSIDE SEWER CMP
2-MAR-95 P-11 U/S OUTSIDE SEWER 1

1119 TOWER OVERFLOWING AT RAILHEAD C
2-MAR-95 S-24 RPR/CK RAILHEAD OVERFLOWING AT 1

4913 U/S MANHOLE BY 90061 CMP
6-MAR-95 S-26 U/S MANHOLE BY 90061 2

5048 U/S SWR MAIN,HAAF/KILLEEN BDRY LINE CMP
7-MAR-95 S-25 U/S SEWER MAIN, HAAF AND KILLE 1

5339 U/S SEWER AT STEWART ST CMP
7-MAR-95 S-25 U/S SEWER AT STEWART STREET AT 1

PLEASE HIT <CR> TO CONTINUE
SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 25710 | U/S OUTSIDE SWR MAIN | | | CMP |
| 09-MAR-95 | P-13 | U/S OUTSIDE SEWER MAIN | 1 | |
| 25772 | U/S SEWER AVE A NFH | | | CMP |
| 09-MAR-95 | MR BURNEY | CK RPR UNSTOP SEWER AT NORTH | 2 | |
| 25911 | CEDAR PK DUMP STATION NOPT FLOWING | | | CMP |
| 10-MAR-95 | MR BASS | CHECK CEDAR PK DUMP STATION, N | 1 | |
| 26022 | U/S OUTSIDE SEWER | | | C |
| 10-MAR-95 | P-8 | U/S OUTSIDE SEWER LINE | 1 | |
| 26083 | RPR/CK ALARM AT SEWER LIFT STATION | | | CMP |
| 12-MAR-95 | H-1 | RPR/CK ALARM AT SEWER LIFT STA | 1 | |
| 26141 | STOPPED UP SEWER WEST FT HOOD | | | CMP |
| 13-MAR-95 | MR MCBRIDE | CK RPR STOPPED UP SEWER AT WE | 2 | |

PLEASE HIT <CR> TO CONTINUE
SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 27114 | RPR MANHOLE N/SIDE 37007 | | | CMP |
| 17-MAR-95 | S-24 | RPR MANHOLE ON NORTHSIDE OF 37 | 1 | |
| 27115 | RPR MANHOLE E/SIDE 4501 | | | CMP |
| 17-MAR-95 | S-24 | RPR MANHOLE ON EAST/SIDE OF 45 | 1 | |
| 27743 | RPL MANHOLE 1/2 MILE NORTH OF BLDG 93008 | | | CMP |
| 21-MAR-95 | S-20 | RPL MANHOLE 1/2 MILE NORTH OF | 2 | |
| 27788 | 330 DENTAL CLINIC O/S SEWER LINE STOPPED UP | | | CMP |
| 21-MAR-95 | P-13 | 330 DENTAL CLINIC O/S SEWER | 1 | |
| 28251 | U/S SEWAGE LINE VIC 13030 | | | |
| 23-MAR-95 | MR MAREK | UNSTOP SEWAGE LINE (PROBABLY 8 | 1 | |
| 28266 | DIG UP AND RPR SEWER LINE 14020 | | | CMP |
| 23-MAR-95 | P-13 | DIG UP AND RPR SEWER LINE 1402 | 2 | |

PLEASE HIT <CR> TO CONTINUE

SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 28353 | ASSIST 82X UNSTOP SEWER LINE 14020 | | | CMI |
| 23-MAR-95 | P-13 | ASSIST 82X UNSTOP SEWER LINE 1 | 1 | |
| 10 5788 U/S SEWER LINE | | | | CMI |
| 24-MAR-95 | P7/31 | 5788 U/S SEWER LINE | 1 | |
| 29099 | 37008/37009 U/S SEWER LINE | | | CMI |
| 28-MAR-95 | S-25 | 37008/37009 U/S SEWER LINE | 1 | |
| 29399 | 91060 SEWAGE COMING UP FROM GROUND ON SOUTHSIDE OF BLDG | | | CMI |
| 29-MAR-95 | DIN 17 | 91060 SEWAGE COMING UP FROM GR | 1 | |
| 29643 | RPR FOUL SEWER ODOR IN REAR OF BLDG 4930 | | | CMI |
| 30-MAR-95 | MR WALKER | REAL FOUL SEWER ODOR BY PUMP S | 1 | |
| 30027 | U/S SEWER LINE NORTH CORNER OF BLDG 14020 | | | CMI |
| 03-APR-95 | P8 | U/S SEWER LINE NORTH CORNER OF | 1 | |

PLEASE HIT (CR) TO CONTINUE
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| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 30202 | U/S SEWER LINE ON STEWARET STREET | | | CMI |
| 04-APR-95 | S-25 | U/S SEWER LINE ON STEWART STRE | 1 | |
| 30567 | U/S SEWER LINE STEWART ST | | | CMI |
| 05-APR-95 | G-20 | U/S SEWER LINE STEWART ST | 1 | |
| 30610 | RPR/CK ALARM AT SEWER LEFT STATION. | | | CMI |
| 05-APR-95 | O-1 | RPR/CK ALARM AT SEWER LEFT STA | 1 | |
| 30634 | REPLACE MAN HOLE COVER IN FRONT OF BLDG 56135 | | | CMI |
| 05-APR-95 | MS. HOOVER | REPLACE MAN HOLE COVER LOC: I | 1 | |
| 30657 | 56418 U/S MANHOLE NEAR BLDG | | | CMI |
| 05-APR-95 | S-22 | U/S MANHOLE NEAR BLDG 56418 | 1 | |
| 30955 | 20146 CK/RPR SEWER LIFT STATION PUMP AT BLORA | | | CMI |
| 07-APR-95 | S-21 | 20146 CK/RPR SEWER LIFT STATIO | 2 | |

PLEASE HIT (CR) TO CONTINUE
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| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 31700 | U/S SEWER BATTERY SHOP OUTSIDE OF BLDG 92038 | | | CM |
| 12-APR-95 | P-9 | U/S SEWER BATTERY SHOP OUTSIDE | 1 | |
| 31740 | RPL 2EA HOSES ON WASHRACK | | | CM |
| 12-APR-95 | S-20 | RPL 2EA HOSE ON WASHRACK | 2 | |
| 32444 | 41007 CLEANOUT BACKING UP ON WESTEND OF MESSHALL | | | CM |
| APR-95 | P-11 | 41007 CLEANOUT BACKING UP ON W | 1 | |
| 32973 | 91065 U/S SEWER MAIN | | | CM |
| 19-APR-95 | MIKE 51 | 91065 U/S SEWER MAIN ATTN S | 1 | |
| 33451 | BLOW LINE ON MANHOLE BETWEEN 1912 AND 1913. | | | CM |
| 24-APR-95 | G-21 | BLOW LINE ON MANHOLE BETWEEN B | 2 | |

LEASE HIT (CR) TO CONTINUE
0 NO SHORT REMARKS

CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P |
|---|---|---|---|
| 3701 | 9214 U/S OUTSIDE SEWER LINE | | |
| 5-APR-95 | P-13 | 9214 U/S OUTSIDE SEWER LINE | 1 |
| 3751 | 9001 REMOVE CONCRETE COVER FROM MANHOLE NORTHEAST CORNER | | |
| 5-APR-95 | S-22 | 9001 REMOVE CONCRETE COVER FRO | 1 |
| 3753 | U/S SEWER MAIN--BLDG 9406 NORTHWEST CORNER | | |
| 5-APR-95 | S-22 | U/S SEWER MAIN BLDG 9406 NORTH | 1 |
| 34501 | ASSIST CONTRACTORS AT 31ST/TD | | |
| 7-APR-95 | MIKE KRIEGEL | ASSIST CONTRACTORS AT 31ST/TD | 1 |
| 35583 | WTR MAIN BREAK AT 18TH & PARK | | |
| 3-MAY-95 | MAREK | CK WATERMAIN BREAK N.F.H AT 18 | 1 |
| 36060 | RAW SEWERAGE BACKING UP SITES 47,48,49,50 WFH TRAVEL CAMP 70004 | | |
| 5-MAY-95 | MRS KEMPT | CK/RPR RAW SEWERAGE BACKING UP | 1 |

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS

CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P |
|---|---|---|---|
| 36069 | MANHOLE OVERFLOWING ON SOUTHSIDE OF BLDG | | |
| 5-MAY-95 | P-1 | 37008 MANHOLE OVERFLOWING ON S | 1 |
| U1598 | RPR PUMP #3 AT LIFT STN | | |
| 9-MAY-95 | DELTA 26 | CK/RPR #3 PUMP AT LIFT STATION | 1 |
| 37623 | U/S SEWER LINE BLDG 9213 | | |
| 5-MAY-95 | P-13 | U/S SEWER LINE, ATT S-22 | 1 |
| 37718 | U/S MANHOLE OVER FLOWING BEHIND BLDG 16001 | | |
| 5-MAY-95 | SFC MELAN | U/S MANHOLE OVER FLOWING BEHIN | 1 |
| 37927 | ASSIST CONTRACTOR OUTAGE SEWAGE LN/29013 | | |
| 6-MAY-95 | MR HOOKS | ASSIST CONTRACTOR IN TIE-IN AN | 2 |
| S0417 | U/S SEWER BACKING/SHOTTING WTR IN AIR PRKG LOT BLDG 70001 SHOPETTE | | |
| 5-MAY-95 | MS HARRISON | U/S SEWER BACKING/SHOOTING UP | 1 |

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS

CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P |
|---|---|---|---|
| 38054 | 14022 WTR BUBBLING FR GRND 75 NORTH OF BLDG SMELLS LIKE SEWER | | |
| 6-MAY-95 | SGT GAILLAID | CK/RPR WATER BUBBLING OUT OF G | 1 |
| 38883 | U/S SEWER LINE BACKUP IN FRONT OF BLDG | | |
| 0-MAY-95 | MS FREEMAN | U/S SEWER LINE BACKUP IN FRONT | 1 |
| 38918 | BETWEEN 56418 ND 56419 SEWER MANHOLE OVERFLOWING ON HQ AVE | | |
| 1-MAY-95 | SGT DODY | BETWEEN 56418 AND 56419 SEWER | 1 |
| 40115 | LIFT STATION BLDG 20131 BLORA OVERFLOWING | | |
| 5-MAY-95 | MS TUCKER | CK/RPR LIFT STATION OVERFLOWIN | 1 |

```
40901 RPR 6IN SEWER MAIN BLDG 4404                                          CM
31-MAY-95 G-20              RPR 6" SEWER MAIN BLDG 4484     2

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS                                                         CW
------------------------------------------------------------------------------
RECEIVED  NAME OF CALLER  DESCRIPTION                          P
--------- --------------- ------------------------------------ -
41052 COTTAGE PARK RV. PAD #1 U/S SEWER LINE                                CM
01-JUN-95 BASS              COTTAGE PARK RV. PAD #1 U/S SE 2

41181 U/S RAW SEWERAGE BACKING UP BY COTTAGE 6 MANHOLE   BLORA              CM
01-JUN-95 MR FRYE           U/S SEWERAGE BACKING UP OUT OF 1

41339 U/S OUTSIDE DRAIN NEAR BLDG 70003                                     CM
05-JUN-95 E-6               U/S OUTSIDE DRAIN NEAR BLDG 70 1

41473 DUMP STATION #1 RV NEXT TO BLDG 20104 U/S                             CM
05-JUN-95 MR BASS           DUMP STATION #1 RV NEXT 20104  2

41488 DIG UP SEWER LINE NEAR BLDG 9213                                      CM
05-JUN-95 S-20              DIG UP SEWER LINE NEAR BLDG 92 1

41806 RPR RAW SEWERAGE COMING OUT OF PIPE ON OUTSIDE OF BLDG                CM
06-JUN-95 SGT LAMOTHE       CK/RPR RAW SEWERAGE COMING OUT 1

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS                                                         CW
------------------------------------------------------------------------------
RECEIVED  NAME OF CALLER  DESCRIPTION                          P
--------- --------------- ------------------------------------ -
41852 U/S DRAIN OUTSIDE OF 39016                                            CM
06-JUN-95 DIN 16            U/S DRAIN OUTSIDE OF BLDG 3901 1

43299 RPR STORM DRAIN LINE AT 4281                                          CM
12-JUN-95 S-23              RPR STORM DRAIN LINE            3

43392 PULL/RPR/RPL #1 PUMP MOTOR                                            CM
12-JUN-95 S-25              PULL/RPR/RPL #1 PUMP MOTOR      1

43471 39053 U/S SEWER LINE                                                  CM
12-JUN-95 P-5               39053 U/S SEWER LINE            1

43859 ALARM AT POWER STATION SOUNDING.                                      CM
14-JUN-95 SGT OSHAUGHNESY CK RPR SEWER LIFT STATION   AL 1

43893 U/S SWR LINE OUTSIDE 29011                                            CM
14-JUN-95 P-1               U/S SEWER LINE OUTSIDE 29011    1

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS                                                         CW
------------------------------------------------------------------------------
RECEIVED  NAME OF CALLER  DESCRIPTION                          P
--------- --------------- ------------------------------------ -
44684 193 CK O/S SEWER LINE MAY BE STOPPED UP                               CM
17-JUN-95 BRAVO             193 CK TO SEE IF O/S SEWER LIN 1

45397 CHK SWR LIFT,IN ALARM                                                 CM
21-JUN-95 DEL 37            CHECK SEWER LIFT STATION 41012 1

45434 PUMP SEWAGE FROM MANHOLE BY 7042                                      CM
21-JUN-95 MR WOODELL        PUMP SEWAGE FROM MANHOLE NEXT  2
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5774 U/S O/SIDE SEWER LINE CMP
2-JUN-95 P-31 U/S OUTSIDE SEWER LINE FROM MH 1

5848 U/S STORM DRAIN EAST OF 10045 CMP
2-JUN-95 MR HEIGES U/S STORM DRAIN EAST OF 10045 1

LEASE HIT (CR) TO CONTINUE
O NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 46787 SEWER LIFT BACKING UP, VICINITY 9535 | | | | CMP |
| 27-JUN-95 | R-5 | CHECK SEWER LIFT, SEWAGE BACKI | 1 | |
| 47583 U/S DRAIN AT FLOOR. | | | | CMP |
| 30-JUN-95 | RANDY | U/S FLOOR DRAIN | 2 | |
| 47707 RV PARKING/CAMPING RIGHT ON TOP OF HILL U/S MAIN SEWER LN (BLORA) | | | | CMP |
| 01-JUL-95 | BASS | RV PARKING/CAMPING RIGHT ON TO | 1 | |
| 47717 1002 U/S SEWER MAIN | | | | CMP |
| 01-JUL-95 | H-8 | 1002 U/S SEWER MAIN | 1 | |
| 47812 U/S DUMP STATION #2 | | | | CMP |
| 03-JUL-95 | MR HEIGES | U/S DUMP STATION #2, PER MR HE | 1 | |
| 47866 DIG UP,U/S, AND INSTALL CLEAN OUT,WEST END 21006 | | | | CMP |
| 05-JUL-95 | MR MCPHEARSON | DIG UP, U/S AND INSTALL CLEAN | 1 | |

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 32095 U/S SEWER LINE AT 21006 | | | | CMP |
| 04-JUL-95 | P-7 | U/S SEWER LINE AT 21006 | 1 | |
| 48149 RPR/CK ALARM GOING OFF AT SEWER LIFT STATION. | | | | CMP |
| 05-JUL-95 | 710F | RPR/CK ALARM GOING OFF AT SEWE | 1 | |
| 48423 ASSIST P-5 AT 2121 | | | | CMP |
| 06-JUL-95 | P-5 | ASSIST P-5 AT 2121 WITH SEWER | 3 | |
| 49221 REMOVE DIRT AND WATER FOR AREA SHOP WITH SEWER TRUCK. | | | | CMP |
| 11-JUL-95 | S-22 | REMOVE DIRT AND WATER FOR AREA | 1 | |
| 49413 9214 SEWAGE COMING UP FROM GROUND ON SOUTHSIDE OF BLDG | | | | CMP |
| 11-JUL-95 | SGT PHINNEY | 9214 SEWAGE COMING UP FROM GRO | 1 | |
| 49550 U/S SEWAGE LN VIC 29011 COURTYARD S/W CORNER | | | | CMP |
| 12-JUL-95 | MR MAREK | UNSTOP SEWAGE MANHOLE LOCATED | 1 | |

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 49663 SEWER BACKING UP BY LOADING DOCK | | | | |
| 12-JUL-95 | MR FRYER | CK RPR SEWER BACKING UP IN PA | 1 | |
| 49710 14023 ROD OUT SEWER LINE | | | | CMP |
| 12-JUL-95 | P-7 | 14023 ROD OUT SEWER LINE | 1 | |
| 49741 CK RPR LIFT STATION (RAW SEWAGE IS BACKING-UP.) | | | | CMP |

49848 DIG UP SEWER LINE OUTSIDE OF BLDG ON EASTSIDE CMP
13-JUL-95 O-2 DIG UP SEWER OUTSIDE OF BLDG 1 1

50089 CAP TO SEWER LINE BRK W.SIDE BLD CMP
14-JUL-95 MR JONES CK RPR CAP TO SEWER LINE BROK 2

50221 SWR LIFT 20143 IS ON RED FLASH CMP
15-JUL-95 MRS HAVLIK CHECK SEWER LIFT 20143, RED LI 1

PLEASE HIT <CR> TO CONTINUE
SO NO SHORT REMARKS CWS

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| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 50885 EVAC. THE SUMP | | | | CMP |
| 19-JUL-95 | MR BURNEY | EVACUATE THE SUMP AT 87017 | 1 | |
| 52344 RPR/CK SEWER LIFT STATION 51400 | | | | CMP |
| 26-JUL-95 | S-22 | RPR/CK SEWER LIFT STATION | 1 | |
| 52843 U/S OUTSIDE SEWER 41007 | | | | CMP |
| 27-JUL-95 | P-11 | U/S OUTSIDE SEWER 41007 | 1 | |
| 52992 U/S SEWER LINE S8030 | | | | CMP |
| 28-JUL-95 | S-25 | U/S SEWER LINE S8030 | 1 | |
| T0814 RPR SEWERAGE BACKING UP OUT GROUND 10 FT FR BLDG 9210 | | | | CMP |
| 27-JUL-95 | E4 METLEN | CK/RPR SEWERAGE COMING OUT OF | 1 | |
| 53459 U/S LAT LINE OUTSIDE OF BLDG 2804 | | | | CMP |
| [illegible]JL-95 | DIN 16 | U/S LAT LINE OUTSIDE OF BLDG 2 | 1 | |

PLEASE HIT <CR> TO CONTINUE
SO NO SHORT REMARKS CWS

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| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 53811 U/S OUTSIDE SWR LINE | | | | CMP |
| 02-AUG-95 | P-11 | U/S OUTSIDE SWR LINE TO MH | 1 | |
| 53812 DIG UP/RPR/RPL OUTSIDE SWR LINE AS NEEDED | | | | CMP |
| 02-AUG-95 | P-11 | DIG UP/RPR/RPL OUTSIDE SWR LIN | 1 | |
| 54080 U/S STORM DRAIN N/EAST CONRER OF BLDG 92060 | | | | CMP |
| 03-AUG-95 | S-22 | U/S STORM DRAIN NORTHEAST CORN | 1 | |
| 54800 U/S MANHOLE | | | | CMP |
| 07-AUG-95 | S-20 | U/S MANHOLE DPW | 2 | |
| 55395 U/S SEWER OUTSIDE OF BLDG 5784 | | | | CMP |
| 09-AUG-95 | MS CHAPIN | U/S SEWER OUTSIDE OF BLDG, 578 | 1 | |
| 55446 RPL SEWAGE LN BTWN 1148 AND 1149 | | | | CMP |
| 09-AUG-95 | MR HALL | REPLACE SEWAGE LINE BETWEEN BL | 2 | |

PLEASE HIT <CR> TO CONTINUE
SO NO SHORT REMARKS CWS

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| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 55484 5784 RPR SEWER LINE | | | | CMP |
| 09-AUG-95 | S-25 | 5784 RPR SEWER LINE | 2 | |

55815 U/S OUTSIDE LINES LIVE OAK.
11-AUG-95 BASS U/S OUTSIDE LINES LIVE OAK, BL 1 C

55918 U/S SWR FOR RV PAD #5
12-AUG-95 MR FRY U/S SWR DRAIN FOR RV PAD #5 2 CI

57096 U/S MANHOLE OVER FLOWING OUTSIDE OF BLDG 9421
18-AUG-95 G-13 U/S MANHOLE OVER FLOWING OUTSI 1 CI

U2457 20122 SEWER LIFT STATION RED LIGHT FLASHING
19-AUG-95 MR ARROYA 20122 SEWER LIFT STATION RED L 1 CI

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS
CW

| RECEIVED | NAME OF CALLER | DESCRIPTION | P |
|---|---|---|---|
| 57678 CK RPR AND REPLACE MANHOLE COVER AND RING.....( TOTAL 2 )..... | | | |
| 22-AUG-95 | MR. SEVERES | CK RPR AND REPLACE MANHOLE COV | 3 |
| 59613 U/S SEWAGE DRAINS 2EA OUTSIDE OF BLDG NORTHWEST CORNER OF BLDG 9213 | | | |
| 30-AUG-95 | P-13 | U/S SEWAGE DRAINS 2EA OUTSIDE | 1 |
| 60011 U/S SEWER LINE IN FRONT OF BLDG 3985 | | | |
| 01-SEP-95 | ROY | U/S SEWER LINE IN FRONT OF BLD | 1 |
| 60720 U/S STORM DRAIN BOX | | | |
| 06-SEP-95 | S-25 | U/S STORM DRAIN BOX DPW | 2 |
| 61110 CK RPR RAW SEWAGE IS BACKING INTO THE BLDG. | | | |
| 08-SEP-95 | MS. SCOTT | CK RPR RAW SEWAGE IS BACKING I | 1 |
| 61253 51400 SEWER LIFT STATION IN ALARM | | | |
| 09-SEP-95 | H-1 (ORANGE) | 51400 SEWER LIFT STATION IN AL | 1 |

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS
CW

| RECEIVED | NAME OF CALLER | DESCRIPTION | P |
|---|---|---|---|
| 62966 RPR MANHOLE NEXT TO BLDG 56505 | | | |
| 18-SEP-95 | MR DEATON | REPAIR MANHOLE NEXT TO BLDG 56 | 2 |
| 62969 RPR MANHOLE NEXT TO BLDG 56531 | | | |
| 18-SEP-95 | MR DEATON | REPAIR MANHOLE NEXT TO BLDG 56 | 2 |
| 62973 REPAIR MANHOLE BY BLDG 56508 | | | |
| 18-SEP-95 | MR DEATON | REPAIR MANHOLE BY BLDG 56508 | 2 |
| 64416 51400 LIFT STN IN ALARM | | | |
| 23-SEP-95 | H-1 FRY | 51400 LIFT STN IN ALARM | 1 |
| 64435 BEHIND 41015 ALARM RINGING (MIGHT BE SEWER LIFT STATION) | | | |
| 23-SEP-95 | FPD | BEHIND 41015 ALARM RINGING FI | 1 |
| 64780 BLDG 16001 SEWERAGE BACKING UP BY FENCE SCIF BLDG | | | |
| 26-SEP-95 | SPC QEEVIS | 16001, SEWERAGE BACKING UP FRO | 1 |

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS
CW

| RECEIVED | NAME OF CALLER | DESCRIPTION | P |
|---|---|---|---|
| 65008 RPR SEWER BREAK | | | |

65085 U/S GREASE TRAP OUTSIDE OF BLDG 9214 CMP
27-SEP-95 P-13 U/S GREASE TRAP OUTSIDE OF BLD 1

65446 51400 VIC//BROKEN SEWER LINE NEAR CLEAR CREEK GOLF COURSE CMP
28-SEP-95 S-22 51400 VICINITY//NEAR GOLF COUR 1

65716 RPR/CK ALARM GOING OFF IN SEWER PLANT CMP
29-SEP-95 BRAVO RPR/CK ALARM GOING OFF IN SEWE 1

00532 51400 ALARM KEEPS GOING OFF/ON CMP
03-OCT-95 H-1 VARGAS 51400 ALARM KEEPS GOING OFF/ON 1

00681 RPR 6 " WTR MAIN CMP
04-OCT-95 MR DEATON CK RPR 6" WATER MAIN DPW 3

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P |
|---|---|---|---|

01161 CHECK WATER COMEING FROM MANHOLE BEHIND MESSHALL 10003 CMP
10-OCT-95 SP LANUE CHECK WATER COMEING OUT OF MAN 1

01298 RISE MANHOLE ON DRAIN LEVEL CMP
10-OCT-95 S-26 RISE MANHOLE ON DRAIN LEVEL, B 2

01759 MAIN SEWAGE LINE BACKING UP BY LIVE OAK BELTON LAKE CMP
12-OCT-95 BLORA CK RPR MAIN SEWAGE LINE. BACK 1

01830 U/S SEWER MAIN BY BLD 16005 CMP
[illegible]CT-95 S-25 CK RPR UNSTOP SEWER MAIN BY BL 1

U0068 16001 WTR COMING UP FROM GROUND IN BACK OF BLDG (INSIDE FENCED AREA) CMP
13-OCT-95 SSG PRATT U/S SEWER DRAIN IN BACK OF BLD 1

02037 U/S OUT DOOR SEWAGE LINE. BACKING ON THE LAWN. CMP
13-OCT-95 SGT. BRATTEN U/S OUTDOOR SEWAGE DRAIN. SYS 1

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P |
|---|---|---|---|

03266 U/S SEWER BY BLD 90033 CMP
20-OCT-95 E-6 CK RPR U/S SEWER DPW 2

03457 ASSIST TO U/S SEWER LINE BLD 90036 CMP
23-OCT-95 E-6 CK RPR ASSIST TO UNSTOP SEWE 2

04167 CK/RPR SEWERAGE COMING OUT OF GROUND RIGHT NEXT TO REAR OF BLDG CMP
25-OCT-95 PFC ORTIZ CK/RPR SEWERAGE SPITTING UP AB 1

04200 9214 U/S SEWER MAIN ON SOUTHEND OF BLDG CMP
25-OCT-95 P-13 9214 U/S SEWER MAIN ON SOUTHEN 1

[illegible]92 7027 REMOVE GREASE BUILDUP CMP
[illegible]OV-95 S-28 7027 REMOVE GREASE BUILDUP 2

06000 CMP
03-NOV-95 MS JACOBSON CK/RPR MAIN SEWERAGE LINE BUST 1

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS CWS

| | | | | |
|---|---|---|---|---|
| 248 -NOV-95 | P-11 | CK RPR U/S SEWER | 2 | CMP |
| 236 -NOV-95 | SSS MOSCHILLI | RPR MANHOLE NEXT TO LATRINE | 3 | CMP |
| 561 -NOV-95 | S-22 | CK RPR SEWER MAIN AT BLORA D | 2 | CMP |
| 592 -NOV-95 | O-25 | CK RPR SEWER MAIN BY BLDG | 1 | CMP |
| 808 -NOV-95 | MR SMITH | RPR/CK ALARM GOING OFF AT SEWE | 1 | CMP |
| 871 -NOV-95 | OPER 40 | CK RPR BROKEN WATER MAIN VIC | 1 | CMP |

LEASE HIT (CR) TO CONTINUE
) NO SHORT REMARKS CWS

| CEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 3036 3-NOV-95 | MR. RARROYO | RPR/CK LIGHT COMING ON AT SEWE | 1 | SHP |
| 3039 9-NOV-95 | MR RARROYO | 20141 ALARM LIGHT IS ON AT SEW | 1 | CMP |
| 0269 9-NOV-95 | MR BUMPERS | 51400 SWR LIFT IN ALARM | 1 | CMP |
| 8295 0-NOV-95 | S-22 | CK RPR BROKEN SEWER LINE BLDG | 1 | CMP |
| 8975 2-NOV-95 | P-12 | CK RPR WATER MAIN BLOW OUT 19T | 2 | CMP |
| 9039 4-NOV-95 | S-25 | 20146 SEWER LIFT STN///RPL IMP | 2 | CMP |

LEASE HIT (CR) TO CONTINUE
O NO SHORT REMARKS CWS

| ECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 09089 26-NOV-95 | MR ARROYO | 20141 SEWER LIFT STATION ALARM | 1 | CMP |
| 09697 28-NOV-95 | P-13 | CK RPR SEWER MAIN | 2 | CMP |
| 10597 01-DEC-95 | P-8 | CK RPR U/S SEWER BY BLD 9215 | 1 | CMP |
| J0388 SEWER LINE BRK N/E 87017 04-DEC-95 | GUYCO CONST | CK RPR BROKEN SEWER LINE N/E O | 1 | CMP |
| 11127 06-DEC-95 | EPS MIKE | CK RPR BROKEN WATER MAIN | 1 | CMP |
| 11503 07-DEC-95 | G-6 | CK RPR U/S SEWER SOUTH SIDE OF | 1 | CMP |

SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| S0711 19-DEC-95 | MR. RACICOT | CK/RPR MANHOLE COVER OVER SEWE | 2 | CMF |
| U0309 18-DEC-95 | MS. KRIEDGER | CK RPR RAW SEWAGE THAT IS BACK | 1 | CMF |
| U0497 U/S SEWER BLD 9001 11-DEC-95 | O-25 | CK RPR U/S SEWER BLD 9001 | 1 | SHF |
| U0513 U/S MAN HOLE 11-DEC-95 | S-20 | CK RPR U/S MANHOLE WEST SIDE | 2 | CMF |
| U0549 12-DEC-95 | S-25 | CK RPR U/S SEWER MAIN WEST SID | 1 | CMF |
| 12169 20-DEC-95 | P-13 | CK RPR SEWER OVERFLOW NORTH SI | 1 | CMF |

PLEASE HIT <CR> TO CONTINUE

SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 12343 21-DEC-95 | S-25 | CK RPR CLEAN OUT CAPS N/SIDE | 2 | CMF |
| 12385 DEC-95 | E8 ESTRADA | CK/RPR RAW SAEWERAGE BACKING U | 1 | CMF |
| 12609 26-DEC-95 | MR BASS | CK RPR SEWER LIFT WARNING LIG | 2 | CMF |
| 12646 27-DEC-95 | MR MCPHEARSON | RPR PUMP 1&3 AT SEWER LIFT 523 | 1 | CMI |
| 12919 28-DEC-95 | S-22 | CK RPR SEWER MANHOLE COVER E/ | 2 | CMI |
| 13056 29-DEC-95 | MR BASS | CK RPR U/S SEWER LINE BETWEEN | 2 | CM |

PLEASE HIT <CR> TO CONTINUE

SO NO SHORT REMARKS CW

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 13366 02-JAN-96 | S-24 | CK RPR U/S SEWER LINE AT BLD | 1 | CM |
| 13380 02-JAN-96 | P-8 | CK RPR TO ASSIST WITH U/S OF S | 1 | CM |
| 928 -JAN-96 | MR BASS | CK RPR U/S SEWERLINE AT MANHOL | 1 | CM |
| 15167 09-JAN-9 | S-20 | RPR SEWER LINE. 52/BN | 1 | CM |
| U0956 11-JAN-9 | TAYLOR MOONEY | 51400 SEWER LIFT STN ALARM GOI | 1 | CM |

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P |
|---|---|---|---|
| 16496 16-JAN-96 | S-25 | CK RPR U/S SEWER BLD 56431 | 1 |
| 16815 17-JAN-96 | P-11 | U/S OUTSIDE SEWER LINE | 2 |
| 16920 17-JAN-96 | MR. ZIELKIEWITC | CK/RPR SEWER LINE ON NORTH SID | 1 |
| 17427 18-JAN-96 | DARNELL BOILERM | CK RPR LIFT STATION | 2 |
| 17952 21-JAN-96 | J/J MANT | RPR/CK SEWER ALARM GOING OFF | 1 |
| 18250 22-JAN-96 | S-28 | U/S SEWER MAIN BY 302 ON BN AV | 1 |

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P |
|---|---|---|---|
| 19315 26-JAN-96 | S-25 | CK RPR DIG UP WALL ON TREATMEN | 2 |
| 19878 29-JAN-96 | P-8 | CK RPR U/S OUTSIDE SEWER LINE | 1 |
| 20034 30-JAN-96 | P-13 | CK RPR U/S SEWER LINE S/END O | 1 |
| 20707 31-JAN-96 | MR BASS | CK RPR U/S SEWER AT BLD | 1 |
| 20758 31-JAN-96 | O-3 | U/S SEWER LINE 56422 | 1 |
| 21023 02-FEB-96 | S-25 | U/S SEWER MAIN NEAR BLDG 9004 | 1 |

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P |
|---|---|---|---|
| 21290 05-FEB-96 | MR BASS | CK RPR U/S SEWER LINE (DIG UP) | 1 |
| 21722 06-FEB-96 | S-29 | CK RPR COUNTER BALANCE BROKEN | 2 |
| 21785 06-FEB-96 | MR BASS | CK RPR LIFT STATION | 1 |
| 21881 07-FEB-96 | 1SG ESTRADA | 9213 RAW SEWAGE BACKING UP ON | 1 |

07-FEB-96 MR TALLEY CK RPR CHECK ALARM AT LIFT 689 1 C

21982
07-FEB-96 MR. ZIEGLER U/S SEWER LINE (OUTSIDE FROM S 1 CI

PLEASE HIT (CR) TO CONTINUE
NO SHORT REMARKS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 22102 | | | | |
| 08-FEB-96 | MRS HAVLIK | CHECK ON NOISE AT SEWER PLANT, | 1 | CM |
| 22340 | | | | |
| 08-FEB-96 | G-6 | CK RPR SEWAGE BACKING UP S/SID | 1 | CM |
| 22515 | | | | |
| 09-FEB-96 | DELTA 8 | 90110 SEWER LIFT OVERFLOWING / | 1 | CM |
| 22582 | | | | |
| 09-FEB-96 | S-25 | RPR BROKEN SEWER LINE AT 31ST | 1 | CM |
| 22774 | | | | |
| 12-FEB-96 | P-11 | CK RPR U/S SEWER BLD 41007 | 1 | CM |
| 23150 | | | | |
| 13-FEB-96 | MR JACKSON | CK/RPR BUSTED 4IN PIPE NORTH O | 1 | CM |

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 23766 | | | | |
| 15-FEB-96 | S-29 | CK RPR 2 EA PUMPS FOR BLD LI | 2 | CMI |
| 24360 | | | | |
| 20-FEB-96 | R-5 | U/S MANHOLE | 1 | CMF |
| 24394 | | | | |
| 20-FEB-96 | S-25 | RPR/CK SEWER LIFT STATION OVER | 1 | CMI |
| 24408 | | | | |
| 20-FEB-96 | S-29 | U/S SEWER LINE 9211 | 1 | CMF |
| 24962 | | | | |
| 22-FEB-96 | MR WESTLAKE | CK/RPR SEWER UNDER BLDG BACKIN | 1 | CMF |
| 25280 | | | | |
| 23-FEB-96 | S-25 | RAISE SEWER MAN-HOLE ON WILMER | 2 | SHF |

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 25356 | | | | |
| FEB-96 | BOILER RM DACH | CK RPR SEWER ALARM SOUNDING | 1 | CMF |
| 25993 | | | | |
| 27-FEB-96 | S-28 | 9214 U/S SEWER MAIN | 1 | CMF |
| 26892 | | | | |
| 01-MAR-96 | SST NINELIST | CK/RPR SEWER LINE SPRAYING WAT | 1 | CMF |

08-MAR-96 P-1 U/S MANHOLE OUTSIDE OF BLDG 11 1

27879 SHP
12-MAR-96 CW2. HODGE DRAIN MAN HOLE. LOCATED IN MA 2

28811 CMP
15-MAR-96 S-21 MAIN GATE//CONTRACTOR HIT SEWE 1

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 29035 | | | | CMP |
| 18-MAR-96 | G-20 | ROLL STAINLESS METAL,3X4 AND R | 1 | |
| 29247 | | | | CMP |
| 19-MAR-96 | P-13 | U/S OUTSIDE SWR BY MH 9211 | 1 | |
| 30055 | | | | CMP |
| 21-MAR-96 | SPC KENNEDY | CK/RPR SEWER WATER COMING OUT | 1 | |
| 30190 | | | | SHP |
| 22-MAR-96 | SPC. EGBERT | U/S STORM DRAIN. LOCATED WEST | 2 | |
| 30228 | | | | CMP |
| 22-MAR-96 | MR FAW | SEWER LIFT IN ALARM | 1 | |
| 30310 | | | | CMP |
| 22-MAR-96 | S-25 | 20101 U/S SEWER MAIN ATTN S | 1 | |

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 30475 | | | | CMF |
| 25-MAR-96 | MR BASS | SWR BACKING UP ON HILL, BY 201 | 1 | |
| 30575 | | | | CMF |
| 25-MAR-96 | S-20 | RPR SEWER MANHOLE BY 9563 | 2 | |
| 30786 | | | | CMF |
| 26-MAR-96 | M-7 | CHECK SEWER MANHOLE BACKING UP | 1 | |
| 32048 | | | | CMF |
| 30-MAR-96 | MR TAUGHRON | CK RPR SEWER LINE COVER MISSI | 2 | |
| 32183 | | | | SHI |
| 01-APR-96 | MR HOLMES | RPR/RPL MANHOLE COVER MISSING/ | 2 | |
| 32418 | | | | CMI |
| 02-APR-96 | DEL 37 | CHECK SWR LIFT 52380, IN ALARM | 1 | |

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS CW

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 32872 | | | | CM |
| 03-APR-96 | S-29 | RPR PUMP #2 AT 51400 | 2 | |
| 32998 | | | | CM |
| 04-APR-96 | MR ENDGLEDINGER | UNSTOP FLOOR DRAIN BACKING UP | 1 | |

04-APR-96 S-26 U/S SEWER MAIN EAST SIDE OF B 2 CMP

33672
08-APR-96 P-11 37007 RAW SEWAGE COMING UP FRO 1 CMP

[illegible]
[illegible]PR-96 P-11 41007 U/S OUTSIDE SEWER LINE 1 CMP

34002
10-APR-96 S-25 REMOVE GREASE FRIM WATER 4101 2 SHP

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 34217 X<br>11-APR-96 | CPT CASSIDY | CK/RPR SMELL OF RAW SEWERAGE O | 2 | CMP |
| 34323<br>11-APR-96 | DIN16 | U/S SEWER OUTSIDE 3967, NOT DR | 1 | CMP |
| 34442<br>11-APR-96 | S-25 | 90024 U/S SEWER MAIN ATT | 1 | CMP |
| 34715<br>15-APR-96 | P-11 | U/S SEWER OUTSIDE BLDG, 41007 | 1 | CMP |
| 34761<br>15-APR-96 | S-22 | 90024 RPR MANHOLE NEAR BLDG | 2 | CMP |
| [illegible]<br>[illegible]-APR-96 | S-25 | 56135 RPR MANHOLE APPROX. 200- | 2 | CMP |

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 36129<br>20-APR-96 | S-26 | U/S SEWER COMING FOM MANHOLE B | 1 | CMP |
| 36826<br>23-APR-96 | D-26 | 51400 RPL BELTS ON #2 PUMP | 2 | CMP |
| 37068<br>24-APR-96 | GHOLSON | 51400 RPL PUMP AT SEWER LIFT S | 1 | CMP |
| 37933<br>27-APR-96 | J.J. CONSTRUCTN | ALARM GOING OFF TO LIFT STATIO | 1 | CMP |
| 38252<br>29-APR-96 | DIN 16 | 36006 U/S OUTSIDE SEWER LINE | 1 | CMP |
| 38318<br>30-APR-96 | O - 25 | SUCK-OUT, FLUSH, AND SUCK-OUT | 2 | CMP |

[illegible]SE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 38602<br>01-MAY-96 | BASS - BLORA | U/S COTTAGE CAMPING - RV DUMP | 1 | CMP |

02-MAY-96 J/J MANT RPR/CK SEWER ALARM GOING OFF 5 1

39017 SHP
02-MAY-96 P-8 10003 ASSIST 82X - U/S OUTSIDE 1

39081 MP
02-MAY-96 P-8 10003 UNSTOP OUTSIDE SEWER LIN 1

39105 CHANGED SHOP FROM 88 TO 76 ..... CMP
02-MAY-96 S - 22 90034 RPR CLAY VALVE 2

40244 CMP
08-MAY-96 E6 JONES U/S SEWER BY 9543, COMING UO F 1

PLEASE HIT <CR> TO CONTINUE
SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P |
|---|---|---|---|
| 40406 | | | CMP |
| 08-MAY-96 | G-20 | 90031 CHECK SEWER LINE | 1 |
| 40947 | | | CMP |
| 09-MAY-96 | O-3 | CK RPR BLD 87017 DIG UP SEWER | 2 |
| 41230 | | | CMP |
| 11-MAY-96 | SGT WINTERS | U/S MANHOLE OVER FLOWING IN FR | 1 |
| 42203 | | | CMP |
| 15-MAY-96 | S-25 | U/S STORM DRAIN AT INTERSECTIO | 2 |
| 42716 | | | MP |
| 17-MAY-96 | MR BASS | CK RPR MANHOLE OVERFLOWING BLD | 1 |
| 42904 | | | CMP |
| 19-MAY-96 | MRS UNDERWOOD | U/S SEWAGE BACKING UP NEXT TO | 1 |

PLEASE HIT <CR> TO CONTINUE
SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P |
|---|---|---|---|
| 42935 | | | CMP |
| 20-MAY-96 | MR BASS | CK RPR U/S SEWER AT BLORA | 1 |
| 43264 | | | CMP |
| 20-MAY-96 | S-25 | CHECK SEWER LIFT STATION 51400 | 1 |
| 44166 | | | CMP |
| 23-MAY-96 | MR GLAZENER | UNSTOP SEWER LINE WHICH IS BAC | 1 |
| 44582 | | | CMP |
| 26-MAY-96 | MR TURNER | CK RPR U/S SEWER AT BLD 20141 | 1 |
| 44647 | | | CMP |
| 28-MAY-96 | MRS TUCKER | CK/RPR PUMP STATION LIGHTS ARE | 1 |
| 45525 | | | |
| 29-MAY-96 | 1SG ESTRADA | U/S SEWAGE BACKING UP ON NORTH | 1 |

PLEASE HIT <CR> TO CONTINUE
SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P |
|---|---|---|---|

| | | | | |
|---|---|---|---|---|
| [illegible] | | | | CMF |
| 31-MAY-96 | MAJ RUSSELL | CK/RPR WATER BACKING UP AND OV | 1 | |
| 46214 | | | | CMF |
| 31-MAY-96 | MR DOLEY | RPR/CK RED LIGHT ON SEWER LIFT | 1 | |
| 4[illegible]43 | | | | CMF |
| [illegible] JUN-96 | MR. KIRKMAN | CK RPR SEWAGE BACKED INTO SHOW | 1 | |
| 46632 | | | | CMF |
| 05-JUN-96 | O-26 | CLEAN CULVERT PIPE ACROSS FROM | 3 | |
| W0051 | | | | SHF |
| 11-JUN-96 | MS SILKWOOD | CK/RPR WATER/SEWER SEEPING UP | 2 | |
| U1947 | | | | CMF |
| 07-JUN-96 | S-25 | RPL DISCHARGE GATE ON #1 VALVE | 2 | |

PLEASE HIT <CR> TO CONTINUE
SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| U1982 | | | | CMF |
| 08-JUN-96 | MRS VOLK | CHECK SWG BACK UP,7002, LINES | 1 | |
| U2101 | | | | SHF |
| 11-JUN-96 | P-9 | ASSIST 88 SHOP WITH WATER / SE | 1 | |
| U2106 | | | | CMF |
| 11-JUN-96 | S-26 | RPR/CK 6" SEWER LINE BROKEN BY | 1 | |
| [illegible]18 | | | | CMF |
| [illegible] JUN-96 | Z-23 | RPR SEWER LINE 30025 | 2 | |
| U2171 | | | | CMF |
| 13-JUN-96 | MR. BASS | US SEWER BY THE WATERSLIDE | 1 | |
| 48414 | | | | CMF |
| 14-JUN-96 | P-8 | U/S GREASE TRAP OUTSIDE OF BLD | 1 | |

PLEASE HIT <CR> TO CONTINUE
SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 48875 | | | | CMF |
| 17-JUN-96 | WOODELL | 51400 SEWER LIFT STN///PUMPS N | 1 | |
| U2209 | | | | CMF |
| 17-JUN-96 | MR JOANIS | 70004 SEWER MANHOLE OVERFLOWIN | 1 | |
| U2211 | | | | CMF |
| 17-JUN-96 | S-28 | REMOVE FLEX HOSE FROM MANHOLE | 1 | |
| 49717 | | | | CMF |
| 20-JUN-96 | S-26 | CK RPR U/S SEWER BLD 9420 | 1 | |
| [illegible]88 | | | | CMF |
| 23-JUN-96 | MR TALLEY | CK RPR ALARM SOUNDED AT LIF | 1 | |
| 50300 | | | | CMF |
| 23-JUN-96 | MR LANE | CK RPR ALARM GOING OFF AT SEWE | 1 | |

PLEASE HIT <CR> TO CONTINUE

| ECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 0873 | | | | CMP |
| 5-JUN-96 | MR BUCHANAN | CK/RPR SEWERAGE BACKING UP ABO | 1 | |
| 1620 | | | | CMP |
| 7-JUN-96 | S-21 | U/S SEWER MAIN 3608 | 2 | |
| 1632 | | | | CMP |
| 7-JUN-96 | S-28 | U/S MANHOLE ON N/WEST SIDE 579 | 1 | |
| 1804 | | | | CMP |
| 8-JUN-96 | S-21 | RPR 4" SEWER LINE | 1 | |
| 2140 | | | | CMP |
| 1-JUL-96 | S-21 | 3826 U/S SEWER MAINS | 1 | |
| 2401 | | | | CMP |
| 2-JUL-96 | MR BUMPERS | SEWER LIFT 51400 IN ALARM | 1 | |

LEASE HIT <CR> TO CONTINUE
D NO SHORT REMARKS CWS

| ECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 2710 | | | | CMP |
| 5-JUL-96 | J/J MANT | RPR/CK ALARM FOR 51400 | 1 | |
| 2745 | | | | CMP |
| 6-JUL-96 | JESSIE BUMPERS | 51400 SEWER ALARM GOING OFF AT | 1 | |
| 2416 | | | | CM |
| 7-JUL-96 | MR ADAMS | CK RPR GAS LEAK IN LAUNDRY RO | 1 | |
| 3358 | | | | CMP |
| 9-JUL-96 | Z-23 | RPR SWR CLEAN OUT, BROKEN BY T | 2 | |
| 3546 | | | | CMP |
| 9-JUL-96 | ORANGE 76X | U/S SEWER MAIN 91065 A | 1 | |
| 3844 | | | | CMP |
| 0-JUL-96 | P-13 | U/S OUTSIDE SEWER, N/SIDE,518 | 1 | |

LEASE HIT <CR> TO CONTINUE
O NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 4208 | | | | CMP |
| 1-JUL-96 | S-21 | BLOW OUT SEWER LINE IN MESS HA | 2 | |
| 4217 | | | | SHP |
| 11-JUL-96 | S-20 | SUCK GREAS FROM WET WELL, 4851 | 1 | |
| 4230 | | | | CMP |
| 11-JUL-96 | MS MORALES | 52024 CHECK SEWER MAIN CUST | 1 | |
| 4292 | | | | C |
| 12-JUL-96 | S-25 | ASSIST WITH SEWER LINE OUTSIDE | 2 | |
| 4502 | | | | CMP |
| 13-JUL-96 | SGT BALLARD | CK RPR SODA ASH PUMP BLOWING | 1 | |
| 4550 | | | | CMP |
| 14-JUL-96 | SGT BALLARD | CK RPR CLOG IN LINE OF SODA AS | 1 | |

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 54551 | | | | CMF |
| JUL-96 | S-26 | CK RPR OPN 8 INCH MAIN LINE V | 2 | |
| 54562 | | | | CMF |
| 15-JUL-96 | MR LANG | U/S MANHOLE OVER FLOWING IN FR | 1 | |
| 55099 | | | | CMF |
| 16-JUL-96 | S-25 | RPR 2 MANHOLES ON S/WEST SIDE | 2 | |
| 55100 | | | | CMF |
| 16-JUL-96 | S-25 | RPR SUMP, 88025 | 2 | |
| U2492 | | | | CMF |
| 16-JUL-96 | S-26 | RPR SEWER MAIN 20149 | 1 | |
| 55288 | | | | SHF |
| 17-JUL-96 | S-25 | RPR MANHOLE ALONG SHORELINE NE | 2 | |

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 55453 | | | | CMF |
| 17-JUL-96 | S-22 | RPR SWR LINE BROKEN BY CONTRAC | 1 | |
| 5 98 | | | | CMF |
| JUL-96 | S-25 | RPR MANHOLE NEAR JOGGING TRACK | 2 | |
| 56990 | | | | CAN |
| 25-JUL-96 | MRS. HAVLIK | CK/RPR PUMP STATION RED LIGHT | 1 | |
| 57533 | | | | CMF |
| 26-JUL-96 | MR. BASS | RPR WATER LINE BEHIND BLDG | 1 | |
| 58403 | | | | SHI |
| 31-JUL-96 | S-25 | RPR CLEAN OUT BLDG 10041 | 2 | |
| 58485 | | | | CMI |
| 31-JUL-96 | S-26 | RPR SEWER MAIN HIT BY CONTRACT | 1 | |

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 58591 | | | | CMI |
| 01-AUG-96 | MR. BASS | BLOW OUT SHOWER DRAINS AT SIER | 2 | |
| 58622 | | | | CM |
| 01-AUG-96 | R-1 | CLEAN OUT SEWER LINE ON EAST S | 2 | |
| 59 | | | | CM |
| 1-AUG-96 | DIN 16 | ASSIST TO U/S OUTSIDE DRAIN | 1 | |
| 58829 | | | | SH |
| 02-AUG-96 | MR. BASS | U/S SHOWER DRAINS AT BLORA BLD | 1 | |
| 59018 | | | | CM |

59070 CMP
04-AUG-96 MS BURMINGHAM CK RPR RAW SEWAGE COMING FROM 1

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 59673 | | | | CMP |
| 06-AUG-96 | P-5 | U/S SEWER LINE WEST SIDE OF FE | 1 | |
| 59742 | | | | CMP |
| 06-AUG-96 | S-21 | U/S SEWER LINE | 2 | |
| 60035 | | | | CMP |
| 07-AUG-96 | TECOM ORP 35 | COMMANCHE I SEWER MAIN OVERFLO | 1 | |
| 61456 | | | | CMP |
| 13-AUG-96 | S-22 | CK RPR LIFT PUMPS TO BLDG 5140 | 1 | |
| 61551 | | | | CMP |
| 14-AUG-96 | S-25 | RPR MANHOLE ACROSS STREET BLDG | 2 | |
| 62072 | | | | CMP |
| 15-AUG-96 | S-22 | 1676 CHECK SEWER LINES | 1 | |

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 62196 | | | | |
| 16-AUG-96 | O-25 | 92072 RPR 4-EA SEPTIC TANK LIN | 2 | |
| 62345 | | | | SHP |
| 17-AUG-96 | Z-23 | 51400 SEWER LIFT STATION OVERF | 1 | |
| 62353 | | | | SHP |
| 17-AUG-96 | Z-23 | 51400 SEWER LIFT STN OVERFLOWI | 1 | |
| U2754 | | | | CMP |
| 17-AUG-96 | MR WOODELL | CK RPR SEWER LIFT 51400 HAS OV | 1 | |
| 62453 | | | | CMP |
| 19-AUG-96 | S-22 | RPR RUPTURED SEWER LINE SOUTHW | 1 | |
| U2769 | | | | CMP |
| 20-AUG-96 | S-25 | RPR/CK SEWER LIFT STATION | 1 | |

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 63164 | | | | CMP |
| 21-AUG-96 | M-51 | BLOW STORM DRAIN ON WASHRACK A | 2 | |
| 63460 | | | | |
| 22-AUG-96 | SGT HOTCHKISS | CK/RPR BAD SEWER ODOR COMING O | 1 | |
| 63782 | | | | CMP |
| 24-AUG-96 | MR DODD | RPR/CK SEWER ALARM GOING OFF, | 1 | |
| 65030 | | | | SHP |

65178
02-SEP-96 DIN 16 CHECK, BLOW OUT THE MANHOLE IN 2 CMP

65814
04-SEP-96 S-26 RPR 12" FORCE SEWER MAIN 1 CMP

PLEASE HIT <CR> TO CONTINUE
SO NO SHORT REMARKS.
CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 65890 05-SEP-96 | S-25 | BLDG 4001 RPR/RPL BLOW OFF VAL | 2 | CMP |
| 66145 06-SEP-96 | P-8 | NEED TO BLOW DOWN OUTSIDE DRAI | 1 | CMP |
| 66712 09-SEP-96 | S-26 | RPR/CK BLOW OUT 12" MAIN ON SE | 2 | CMP |
| 67189 11-SEP-96 | P -5 | U/S SEWER DRAIN OUTSIDE OF BLD | 1 | CMP |
| 67349 12-SEP-96 | NOTHING LEAVING FROM PIPE MR BUCHANAN | 7013 BROKEN SEWER CLEAN OUT/// | 2 | SHP |
| 67526 12-SEP-96 | V-5 | RPR/CK SEWER ALARM GOING OFF 5 | 1 | CMP |

PLEASE HIT <CR> TO CONTINUE
SO NO SHORT REMARKS.
CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| U3005 19-SEP-96 | P-5 | U/S OUTSIDE SWR, EASR SIDE BLD | 1 | CMP |
| 68406 19-SEP-96 | S-25 | BLDG 41 DIG UP AND REPAIR SEWE | 2 | SHP |
| 68574 20-SEP-96 | MR ZIELINIWICZ | CK/RPR SEWER LINE BACKING UP A | 1 | CMP |
| 68880 23-SEP-96 | P-17 | U/S GREASE TRAP 50001 | 1 | CMP |
| 68881 23-SEP-96 | BRAVO | RPR/CK SEWER LINE BROKEN BY CO | 2 | CMP |
| 69099 24-SEP-96 | MR MOLINA | CK/RPR SANITARY SEWER SYSTEM, | 2 | SHP |

PLEASE HIT <CR> TO CONTINUE
SO NO SHORT REMARKS.
CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 0 24-SEP-96 | S-30 | RPR 6" SEWER LINE | 1 | CMP |
| 67284 25-SEP-96 | S-28 | RPL MANHOLE COVER | 2 | SHP |
| 69469 | | | | SHP |

9566
6-SEP-96 SPC BARNES U/S SEWER DRAIN NORTHWEST SIDE 2 CMP

9681
6-SEP-96 MAYO RPR/CK ALARM GOING OFF AT SEWE 1 CMP

9870
8-SEP-96 S-21 TANK DESTROYER AND 78TH STREET 1 C

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 70053 30-SEP-96 | D-34 | CK/RPR SEWER LIFT STATION OVER | 1 | CMP |
| 70137 30-SEP-96 | S-22 | 4417 BROKEN SEWER LINE BY CONT | 1 | CMP |
| 00248 01-OCT-96 | O-25 | ASSIST 83X SHOP AT 87017, U/S | 1 | CMP |
| 00154 02-OCT-96 | NETWORK CONST | 67TH & TD RPR MAIN SEWER LINE | 1 | CMP |
| 00691 03-OCT-96 | S-26 | RPR/CK BROKEN WATER LINE 56012 | 2 | CMP |
| 01669 11-OCT-96 | MR. SPIRES | CLARK RD & LOGISTICS HAVE CUT | 1 | SHP |

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| U0193 14-OCT-96 | MP STATION | RPR/CK SEWAGE BACKING UP NEAR | 1 | CMP |
| 01873 15-OCT-96 | MR. BURNEY | BLOW OUT SEWER MAIN WITH HIGH | 2 | CMP |
| 02502 18-OCT-96 | P-8 | 12012 U/S SEWER MAIN ATT | 1 | CMP |
| 02510 18-OCT-96 | P-8 | 12012 RPR CLEAN-OUT ON NORTHSI | 2 | SHP |
| 02936 22-OCT-96 | P-13 | CK/RPR MANHOLE BACKED UP OUTSI | 1 | CMP |
| 03552 24-OCT-96 | 710F | RPR/CK SEWER ALARM GOING OFF 5 | 1 | CMP |

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 03561 24-OCT-96 | S-26 | ASSIST CONTRACTOR IN REPAIRING | 2 | CMP |
| 03773 | | CK/RPR CONTRACTOR BROKE INTO S | 1 | SHP |

29-OCT-96 S-26 RPR/CK BROKEN SEWER LINE BEHIN 2 SH

04343
29-OCT-96 G-6 ASSITS SHOP 92 WITH UNSTOPPING 1 CM

04380
[illegible] OCT-96 S-28 9211 NORTHSIDE : RPR/RP. 4-EA 2 CM

04699
31-OCT-96 P-26 RPR FORCE SEWER MAIN HIT BY CO 1 CM

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS

CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 05183 | | ELEC. CABLES ARE NOW BEING COVERED W/WTR. (ELEC. HAZZARD)7/11/96. | | |
| 04-NOV-96 | SGM WILLIAMS | CK/RPR SOUTH SIDE OUTSIDE FRON | 2 | CMP |
| 06267 | | | | |
| 12-NOV-96 | D-74 | CK/RPR MAIN SEWER STATION ABOU | 1 | CMP |
| 07054 | | | | |
| 16-NOV-96 | P-8 | 16008 U/S OUTSIDE DRAINS | 1 | CMP |
| 07110 | | | | |
| 17-NOV-96 | MR LEPPO | CK RPR SEWER LIFT STATION ALAR | 1 | CAN |
| 07173 | | | | |
| 18-NOV-96 | W01 NALEY | WATER PUMP TO OIL AND SAND INT | 2 | CMP |
| 07[illegible]38 | | | | |
| [illegible]-NOV-96 | TGT HALL | RPR/CK MANHOLE COVER PART OF C | 2 | SHP |

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS

CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 07757 | | | | |
| 20-NOV-96 | MR WOODELL | ASSIST CONTRACTOR AT 51400 BR | 1 | SHP |
| 08929 | | | | |
| 25-NOV-96 | S-26 | RPR SEWER MAIN THAT CONTRACTOR | 1 | SHP |
| U0475 | | | | |
| 26-NOV-96 | DELTA 29 | RPR/CK DISCHARGE VALVE AT 4851 | 1 | CMP |
| U0480 | | | | |
| 27-NOV-96 | MR BUMPERS | CK RPR ALARM SOUNDING AT LIFT | 1 | SHP |
| 09687 | | | | |
| 27-NOV-96 | MS DAIVSON | CK RPR SEWER OVERFLOWING BEHIN | 1 | CMP |
| 09798 | | | | |
| 29-NOV-96 | MS MITCHELL | SEWAGE COMING UP TO PARKING LO | 1 | SHP |

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS

CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 09848 | | | | |
| 01-DEC-96 | MR FAW | CHECK SEWER LIFT, 51400, IN AL | 1 | CMP |

| | | | |
|---|---|---|---|
| 10072<br>02-DEC-96 S-21 | U/S SEWER MAIN | 2 | SHP |
| 10541<br>04-DEC-96 P-13 | 15023 SEWER LINE STOPPED UP | 1 | SHP |

465 rows selected.

31-MAY-96 MAJ RUSSELL CK/RPR WATER BACKING UP AND OV 1 CMF

46214
31-MAY-96 MR DOLEY RPR/CK RED LIGHT ON SEWER LIFT 1 CMF

46743
JUN-96 MR. KIRKMAN CK RPR SEWAGE BACKED INTO SHOW 1 CMF

46632
05-JUN-96 O-26 CLEAN CULVERT PIPE ACROSS FROM 3 CMF

W0051
11-JUN-96 MS SILKWOOD CK/RPR WATER/SEWER SEEPING UP 2 SHF

U1947
07-JUN-96 S-25 RPL DISCHARGE GATE ON #1 VALVE 2 CMF

PLEASE HIT <CR> TO CONTINUE
SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| U1982 | | | | CMF |
| 08-JUN-96 | MRS VOLK | CHECK SWG BACK UP,7002, LINES | 1 | |
| U2101 | | | | SHF |
| 11-JUN-96 | P-9 | ASSIST 88 SHOP WITH WATER / SE | 1 | |
| U2106 | | | | CMF |
| 11-JUN-96 | S-26 | RPR/CK 6" SEWER LINE BROKEN BY | 1 | |
| 48 | | | | CMF |
| JUN-96 | Z-23 | RPR SEWER LINE 30025 | 2 | |
| U2171 | | | | CMF |
| 13-JUN-96 | MR. BASS | US SEWER BY THE WATERSLIDE | 1 | |
| 48414 | | | | CMF |
| 14-JUN-96 | P-8 | U/S GREASE TRAP OUTSIDE OF BLD | 1 | |

PLEASE HIT <CR> TO CONTINUE
SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 48875 | | | | CMF |
| 17-JUN-96 | WOODELL | 51400 SEWER LIFT STN///PUMPS N | 1 | |
| U2209 | | | | CMF |
| 17-JUN-96 | MR JOANIS | 70004 SEWER MANHOLE OVERFLOWIN | 1 | |
| U2211 | | | | CMF |
| 17-JUN-96 | S-28 | REMOVE FLEX HOSE FROM MANHOLE | 1 | |
| 49717 | | | | CMI |
| 20-JUN-96 | S-26 | CK RPR U/S SEWER BLD 9420 | 1 | |
| 88 | | | | CMI |
| 23-JUN-96 | MR TALLEY | CK RPR ALARM SOUNDED AT LIF | 1 | |
| 50300 | | | | CMI |
| 23-JUN-96 | MR LANE | CK RPR ALARM GOING OFF AT SEWE | 1 | |

PLEASE HIT <CR> TO CONTINUE

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 50973 | | | | CMP |
| 15-JUN-96 | MR BUCHANAN | CK/RPR SEWERAGE BACKING UP ABO | 1 | |
| 51620 | | | | CMP |
| 27-JUN-96 | S-21 | U/S SEWER MAIN 3608 | 2 | |
| 51632 | | | | CMP |
| 27-JUN-96 | S-28 | U/S MANHOLE ON N/WEST SIDE 579 | 1 | |
| 51804 | | | | CMP |
| 28-JUN-96 | S-21 | RPR 4" SEWER LINE | 1 | |
| 52140 | | | | CMP |
| 01-JUL-96 | S-21 | 3826 U/S SEWER MAINS | 1 | |
| U2401 | | | | CMP |
| 02-JUL-96 | MR BUMPERS | SEWER LIFT 51400 IN ALARM | 1 | |

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 52710 | | | | CMP |
| 05-JUL-96 | J/J MANT | RPR/CK ALARM FOR 51400 | 1 | |
| 52745 | | | | CMP |
| 06-JUL-96 | JESSIE BUMPERS | 51400 SEWER ALARM GOING OFF AT | 1 | |
| U2416 | | | | CMP |
| 07-JUL-96 | MR ADAMS | CK RPR GAS LEAK IN LAUNDRY RO | 1 | |
| 53358 | | | | CMP |
| 09-JUL-96 | Z-23 | RPR SWR CLEAN OUT, BROKEN BY T | 2 | |
| 53546 | | | | CMP |
| 09-JUL-96 | ORANGE 76X | U/S SEWER MAIN 91065 A | 1 | |
| 53844 | | | | CMP |
| 10-JUL-96 | P-13 | U/S OUTSIDE SEWER, N/SIDE,518 | 1 | |

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 54208 | | | | CMP |
| 11-JUL-96 | S-21 | BLOW OUT SEWER LINE IN MESS HA | 2 | |
| 54217 | | | | SHP |
| 11-JUL-96 | S-20 | SUCK GREAS FROM WET WELL, 4851 | 1 | |
| 54230 | | | | CMP |
| 11-JUL-96 | MS MORALES | 52024 CHECK SEWER MAIN CUST | 1 | |
| 54292 | | | | C[illegible] |
| 12-JUL-96 | S-25 | ASSIST WITH SEWER LINE OUTSIDE | 2 | |
| 54502 | | | | CMP |
| 13-JUL-96 | SGT BALLARD | CK RPR SODA ASH PUMP BLOWING | 1 | |
| 54550 | | | | CMP |
| 14-JUL-96 | SGT BALLARD | CK RPR CLOG IN LINE OF SODA AS | 1 | |

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 54551 | | | | CMF |
| JUL-96 | S-26 | CK RPR OPN 8 INCH MAIN LINE V | 2 | |
| 54562 | | | | CMF |
| 15-JUL-96 | MR LANG | U/S MANHOLE OVER FLOWING IN FR | 1 | |
| 55099 | | | | CMF |
| 16-JUL-96 | S-25 | RPR 2 MANHOLES ON S/WEST SIDE | 2 | |
| 55100 | | | | CMF |
| 16-JUL-96 | S-25 | RPR SUMP, 88025 | 2 | |
| U2492 | | | | CMF |
| 16-JUL-96 | S-26 | RPR SEWER MAIN 20149 | 1 | |
| 55288 | | | | SHF |
| 17-JUL-96 | S-25 | RPR MANHOLE ALONG SHORELINE NE | 2 | |

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 55453 | | | | CMF |
| 17-JUL-96 | S-22 | RPR SWR LINE BROKEN BY CONTRAC | 1 | |
| 5[illegible]498 | | | | CMF |
| JUL-96 | S-25 | RPR MANHOLE NEAR JOGGING TRACK | 2 | |
| 56990 | | | | CAN |
| 25-JUL-96 | MRS. HAVLIK | CK/RPR PUMP STATION RED LIGHT | 1 | |
| 57533 | | | | CMF |
| 26-JUL-96 | MR. BASS | RPR WATER LINE BEHIND BLDG | 1 | |
| 58403 | | | | SHF |
| 31-JUL-96 | S-25 | RPR CLEAN OUT BLDG 10041 | 2 | |
| 58485 | | | | CMF |
| 31-JUL-96 | S-26 | RPR SEWER MAIN HIT BY CONTRACT | 1 | |

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 58591 | | | | CMF |
| 01-AUG-96 | MR. BASS | BLOW OUT SHOWER DRAINS AT SIER | 2 | |
| 58622 | | | | CM |
| 01-AUG-96 | R-1 | CLEAN OUT SEWER LINE ON EAST S | 2 | |
| [illegible]759 | | | | CM |
| [illegible]-AUG-96 | DIN 16 | ASSIST TO U/S OUTSIDE DRAIN | 1 | |
| 58829 | | | | SH |
| [illegible]2-AUG-96 | MR. BASS | U/S SHOWER DRAINS AT BLORA BLD | 1 | |
| 59018 | | | | CM |

59070 CMP
04-AUG-96 MS BURMINGHAM CK RPR RAW SEWAGE COMING FROM 1

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 59673 | | | | CMP |
| 06-AUG-96 | P-5 | U/S SEWER LINE WEST SIDE OF FE | 1 | |
| 59742 | | | | CMP |
| 06-AUG-96 | S-21 | U/S SEWER LINE | 2 | |
| 60035 | | | | CMP |
| 07-AUG-96 | TECOM ORP 35 | COMMANCHE I SEWER MAIN OVERFLO | 1 | |
| 61456 | | | | CMP |
| 13-AUG-96 | S-22 | CK RPR LIFT PUMPS TO BLDG 5140 | 1 | |
| 61551 | | | | CMP |
| 14-AUG-96 | S-25 | RPR MANHOLE ACROSS STREET BLDG | 2 | |
| 62072 | | | | CMP |
| 15-AUG-96 | S-22 | 1676 CHECK SEWER LINES | 1 | |

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 62196 | | | | |
| 16-AUG-96 | O-25 | 92072 RPR 4-EA SEPTIC TANK LIN | 2 | |
| 62345 | | | | SHP |
| 17-AUG-96 | Z-23 | 51400 SEWER LIFT STATION OVERF | 1 | |
| 62353 | | | | SHP |
| 17-AUG-96 | Z-23 | 51400 SEWER LIFT STN OVERFLOWI | 1 | |
| U2754 | | | | CMP |
| 17-AUG-96 | MR WOODELL | CK RPR SEWER LIFT 51400 HAS OV | 1 | |
| 62453 | | | | CMP |
| 19-AUG-96 | S-22 | RPR RUPTURED SEWER LINE SOUTHW | 1 | |
| U2769 | | | | CMP |
| 20-AUG-96 | S-25 | RPR/CK SEWER LIFT STATION | 1 | |

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 63164 | | | | CMP |
| 21-AUG-96 | M-51 | BLOW STORM DRAIN ON WASHRACK A | 2 | |
| 63460 | | | | |
| 22-AUG-96 | SGT HOTCHKISS | CK/RPR BAD SEWER ODOR COMING O | 1 | |
| 63782 | | | | CMP |
| 24-AUG-96 | MR DODD | RPR/CK SEWER ALARM GOING OFF, | 1 | |
| 65030 | | | | SHP |

65178
02-SEP-96 DIN 16 CHECK,BLOW OUT THE MANHOLE IN 2 CMP

65814
04-SEP-96 S-26 RPR 12" FORCE SEWER MAIN 1 CMP

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARK. CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 65890 05-SEP-96 | S-25 | BLDG 4001 RPR/RPL BLOW OFF VAL | 2 | CMP |
| 66145 06-SEP-96 | P-8 | NEED TO BLOW DOWN OUTSIDE DRAI | 1 | CMP |
| 66712 09-SEP-96 | S-26 | RPR/CK BLOW OUT 12" MAIN ON SE | 2 | CMP |
| 67189 11-SEP-96 | P -5 | U/S SEWER DRAIN OUTSIDE OF BLD | 1 | CMP |
| 67349 12-SEP-96 | NOTHING LEAVING FROM PIPE MR BULLIGAN | 7013 BROKEN SEWER CLEAN OUT/// | 2 | SHP |
| 67526 12-SEP-96 | V-5 | RPR/CK SEWER ALARM GOING OFF 5 | 1 | CMP |

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARK. CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| U3005 19-SEP-96 | P-5 | U/S OUTSIDE SWR, EASR SIDE BLD | 1 | CMP |
| 68406 19-SEP-96 | S-25 | BLDG 41 DIG UP AND REPAIR SEWE | 2 | SHP |
| 68574 20-SEP-96 | MR ZIELINWICZ | CK/RPR SEWER LINE BACKING UP A | 1 | CMP |
| 68880 23-SEP-96 | P-17 | U/S GREASE TRAP 50001 | 1 | CMP |
| 68881 23-SEP-96 | BRAVO | RPR/CK SEWER LINE BROKEN BY CO | 2 | CMP |
| 69099 24-SEP-96 | MR MOLINA | CK/RPR SANITARY SEWER SYSTEM, | 2 | SHP |

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARK. CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 0 24-SEP-96 | S-30 | RPR 6" SEWER LINE | 1 | CMP |
| 69384 25-SEP-96 | S-28 | RPL MANHOLE COVER | 2 | SHP |
| 69469 | | | | SHP |

.9566 CMP
6-SEP-96 SPC BARNES U/S SEWER DRAIN NORTHWEST SIDE 2

.9681 CMP
6-SEP-96 MAYO RPR/CK ALARM GOING OFF AT SEWE 1

.9870 C
8-SEP-96 S-21 TANK DESTROYER AND 78TH STREET 1

PLEASE HIT <CR> TO CONTINUE
SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 70053 30-SEP-96 | D-34 | CK/RPR SEWER LIFT STATION OVER | 1 | CMP |
| 70137 30-SEP-96 | S-22 | 4417 BROKEN SEWER LINE BY CONT | 1 | CMP |
| 00248 01-OCT-96 | O-25 | ASSIST 83X SHOP AT 87017, U/S | 1 | CMP |
| 00154 02-OCT-96 | NETWORK CONST | 67TH & TD RPR MAIN SEWER LINE | 1 | CMP |
| 00691 03-OCT-96 | S-26 | RPR/CK BROKEN WATER LINE 56012 | 2 | CMP |
| 01669 11-OCT-96 | MR. SPIRES | CLARK RD & LOGISTICS HAVE CUT | 1 | SHP |

PLEASE HIT <CR> TO CONTINUE
SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| U0193 14-OCT-96 | MP STATION | RPR/CK SEWAGE BACKING UP NEAR | 1 | CMP |
| 01873 15-OCT-96 | MR. BURNEY | BLOW OUT SEWER MAIN WITH HIGH | 2 | CMP |
| 02502 18-OCT-96 | P-8 | 12012 U/S SEWER MAIN ATT | 1 | CMP |
| 02510 18-OCT-96 | P-8 | 12012 RPR CLEAN-OUT ON NORTHSI | 2 | SHP |
| 02936 22-OCT-96 | P-13 | CK/RPR MANHOLE BACKED UP OUTSI | 1 | CMP |
| 03552 24-OCT-96 | 710F | RPR/CK SEWER ALARM GOING OFF 5 | 1 | CMP |

PLEASE HIT <CR> TO CONTINUE
SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 03561 24-OCT-96 | S-26 | ASSIST CONTRACTOR IN REPAIRING | 2 | CMP |
| 03773 | | CK/RPR CONTRACTOR BROKE INTO S | 1 | SHP |

| | | | | |
|---|---|---|---|---|
| 29-OCT-96 S-26 | | RPR/CK BROKEN SEWER LINE BEHIN | 2 | SH |
| 04345<br>29-OCT-96 G-6 | | ASSITS SHOP S2 WITH UNSTOPPING | 1 | CM |
| 780<br>-OCT-96 S-28 | | 9211 NORTHSIDE : RPR/RP. 4-EA | 2 | CM |
| 04699<br>31-OCT-96 P-26 | | RPR FORCE SEWER MAIN HIT BY CO | 1 | CM |

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS

CW

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 05183 ELEC. CABLES ARE NOW BEING COVERED W/WTR. (ELEC. HAZZARD)7/11/96. | | | | |
| 04-NOV-96 | SGM WILLIAMS | CK/RPR SOUTH SIDE OUTSIDE FRON | 2 | CMP |
| 06267<br>12-NOV-96 | S-26 | CK/RPR MAIN SEWER STATION ABOU | 1 | CMP |
| 07084<br>16-NOV-96 | P-8 | 16008 U/S OUTSIDE DRAINS | 1 | CMP |
| 07110<br>17-NOV-96 | MR LEPPO | CK RPR SEWER LIFT STATION ALAR | 1 | CAN |
| 07173<br>18-NOV-96 | WD1 NALEY | WATER PUMP TO OIL AND SAND INT | 2 | CMP |
| 78<br>-NOV-96 | H HALL | RPR/CK MANHOLE COVER PART OF C | 2 | SHP |

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS

CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 07757<br>20-NOV-96 | MR WOODELL | ASSIST CONTRACTOR AT 51400 BR | 1 | SHP |
| 08929<br>25-NOV-96 | S-26 | RPR SEWER MAIN THAT CONTRACTOR | 1 | SHP |
| U0475<br>26-NOV-96 | DELTA 29 | RPR/CK DISCHARGE VALVE AT 4851 | 1 | CMP |
| U0480<br>27-NOV-96 | MR BUMPERS | CK RPR ALARM SOUNDING AT LIFT | 1 | SHP |
| 09687<br>27-NOV-96 | MS DAIVSON | CK RPR SEWER OVERFLOWING BEHIN | 1 | CMP |
| 09798<br>29-NOV-96 | MS MITCHELL | SEWAGE COMING UP TO PARKING LO | 1 | SHP |

SE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS

CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 09848<br>01-DEC-96 | MR FAW | CHECK SEWER LIFT, 51400, IN AL | 1 | CMP |

| | | | |
|---|---|---|---|
| 10072<br>02-DEC-96 S-21 | U/S SEWER MAIN | 2 | SHP |
| 10561<br>04-DEC-96 P-13 | 15023 SEWER LINE STOPPED UP | 1 | SHP |

465 rows selected.

# Appendix G

# Procedures Manual - "III Corps & FH Regulation 420-2" (1 May 1993)

# Appendix G

## Procedures Manual - "III Corps & FH Regulation 420-2" (1 May 1993)

The Procedures Manual was obtained from the Directorate of Public Works and was included in this document because it has specific procedures for handling of hazardous materials on Fort Hood. The handling of hazardous materials with relation to the sanitary sewer system is germaine to this project.

III CORPS & FH REG 420-2

FACILITIES ENGINEERING

# ENVIRONMENT AND NATURAL RESOURCES

SOLDIERS GIVE A HOOT!

MOBILE ARMORED CORPS
PHANTOM

HEADQUARTERS
III CORPS AND FORT HOOD

1 May 1993

DEPARTMENT OF THE ARMY
HEADQUARTERS III CORPS AND FORT HOOD
Fort Hood, Texas 76544-5057
1 MAY 1993

*III CORPS & FH REG 420-2

Facilities Engineering

# ENVIRONMENT AND NATURAL RESOURCES

**SUMMARY.** This regulation prescribes policies, assigns responsibilities, and establishes procedures for protection of the environment, preservation of natural resources, and hazardous material (HAZMAT)/hazardous waste (HAZWASTE) management.

**APPLICABILITY.** This regulation applies to units and activities assigned, attached, or conducting training, or residing on Fort Hood as tenants; contractor activities and leases located within the limits of the Fort Hood Military Reservation; persons residing, visiting, or working within the limits of the Fort Hood Military Reservation; and members of family housing. During mobilization, this regulation remains in effect.

**SUPPLEMENTATION.** Local supplementation of this regulation is prohibited without approval of Directorate of Engineering and Housing (DEH).

**INTERIM CHANGES.** Changes to this regulation are not official unless authenticated by the Directorate of Information Management (DOIM). Changes are issued when regulation or policy changes dictate. Users will destroy interim changes on their expiration dates unless sooner superseded or rescinded.

**SUGGESTED IMPROVEMENTS.** The proponent of this regulation is the Director of Engineering and Housing (DEH). Users are invited to send comments and suggested improvements to the Commander, III Corps and Fort Hood, ATTN: AFZF-DE.

**REQUIREMENTS IMPACTING ON UNIT COMMANDERS.** The requirements impacting on unit commanders are found in chapters 2, 9, and 10, paragraphs 1-4, 1-5, 1-6, 4-2, 4-3, 4-4, 5-2c, 5-5a(2), 5-5b, 5-6c, 5-8b, 6-3b, 6-4, 6-7, 6-8, 6-10, 6-11, 7-3c, 8-2a, tables 1-1 and 5-1, and appendix C.

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*This regulation supersedes FH Regulation 420-2, 31 October 1986.

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# CHAPTER 1
# GENERAL

**1-1. PURPOSE.** This regulation prescribes policies, assigns responsibilities, and establishes procedures for protection of the environment, preservation of natural resources, and HAZMAT/HAZWASTE management.

**1-2. REFERENCES.** References are listed in appendix A.

**1-3. ABBREVIATIONS AND TERMS.** Explanations of abbreviations and terms are in the glossary.

**1-4. RESPONSIBILITIES.**

a. Post commander or designated representative:

(1) Establishes an organizational structure to plan, execute, and monitor environmental programs.

(2) Plans and executes an environmental program, based on AR 200-1, AR 200-2, and this regulation to achieve the Army's environmental objectives.

(3) Cooperates with State and local authorities in the planning and execution of projects and activities required of Fort Hood for compliance with applicable Federal, State, and regional pollution control standards.

(4) Integrates environmental protection activities and programs to the fullest extent possible, into the planning and execution of the command basic mission.

(5) Reports, as required, to major commanders on the progress and effectiveness of environmental projects and activities to detect, quantify, and correct pollution sources according to public laws (see table 1-1 for a summary of laws).

b. DEH.

(1) DEH is the designated representative of the post commander in matters relating to the environment.

(2) DEH reviews administrative matters pertaining to this regulation.

c. Commander, Medical Department Activity (MEDDAC), funds and administers infectious waste disposal contracts.

d. Others are assigned responsibilities in several chapters of this regulation.

**1-5. STANDING OPERATING PROCEDURES (SOP).** SOPs required throughout this regulation may be combined to form a singular document under one title or may be incorporated to organization's SOP as an appendix.

**1-6. PUNITIVE PROVISIONS.** Paragraphs 4-3, 4-6, 4-7a, 5-2b, 5-2c, 5-5b, 5-15, 7-2a, and 10-1 of this regulation provide the basis for disciplinary action under Article 92, Uniform Code of Military Justice (UCMJ) (Violation of a Lawful General Regulation), for personnel subject to the UCMJ.

**1-7. EXCLUSIONS.** This regulation does not affect policies and procedures applicable to:

a. Nuclear accidents and incidents outlined in AR 360-5, chapter 10; AR 50-6, chapter 5; AR 40-13, chapter 3; or the III Corps and Fort Hood Nuclear Chemical Accident Incident Control Plan.

b. Chemical agent accidents and incidents as outlined in AR 385-40, chapter 7, or the III Corps and Fort Hood Nuclear Chemical Accident Incident Control Plan.

c. Radioactive accidents and incidents described in TM 3-261, chapter 10.

Table 1-1. Summary of laws

| NAME OF LAW | PL NUMBER | VIOLATION | PENALTY |
|---|---|---|---|
| Federal Water Pollution Control Act Amendments of 1972 (includes NPDES Permits) | 92-500 | Willful or negligent violations of sections 301 (Effluent Limitation), 302 (Water Quality Related Effluent Limitations), 306 (National Standards of Performance) and 307 (Toxic and Pretreatment Effluent Standards). | A fine of not less than $2,500 nor more than $25,000 per day of violations or by imprisonment for not more than 1 year or both for 1st offense and up to $50,000 per day of violation and 2 years in prison for subsequent violation. |
| Section 311 - Clean Water Act, Oil and Hazardous Substance Liability | 92-500 Sec 311 | Failure to notify of a discharge. | Up to $10,000, 1 year prison or both. |
| | | Discharge by willful negligence or willful misconduct. | Up to $250,000. |
| Resource Conservation and Recovery Act of 1976 (RCRA) | 94-580 | Hazardous Waste Subsection - Knowingly transport, treat, store, or dispose of hazardous waste, without permit. | Normal fine up to $25,000 per day of violation, imprisonment not to exceed 1 year, or both. |
| Clean Air Amendments of 1977 | 91-604 | Enforcement is normally through states and enforcement orders. | Up to $25,000 per day of violation, imprisonment for not more than 1 year, or both. |
| Safe Drinking Water Act | 93-523 | Willful violation of standards. | Up to $5,000 for each day of violation. |
| Federal Environmental, Pesticide Control Act of 1972 | 92-516 | Any provision of the Act. | Up to $25,000 fine, 1 year imprisonment. |
| Endangered Species Act | 93-205 | Any violation of the Act | Up to $10,000 fine. |
| Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) (Super Fund) | 96-510 | Failure to comply with notice. | Up to $10,000 for each day of violation, imprisonment for not more than 1 year, or both. |
| Texas Clean Air Act: Vernon's Texas Codes Annotated | Article 4477-5 | Emission of air contaminant. | $50 to $1,000 for each day of violation. |
| Texas Water Quality Act: Vernon's Texas Codes Annotated, Water Code | Section 26.001 | Unauthorized discharges. | Up to $10,000. |
| | | Discharge of oil. | $50 to $1,000. |
| Uniform Code of Military Justice | Article 92 | Violation of this regulation. | Maximum: 2 years confinement, reduction to Private, forfeiture of all pay and allowances, dishonorable discharge. |

NOTE: Complete copies of these laws and statutes are available for review at DEH, 287-8754.

# CHAPTER 2
# ENVIRONMENTAL DOCUMENTATION

**2-1. SUMMARY.** This chapter establishes responsibilities and local procedures for preparation, review, and approval of environmental impact statement (EIS), environmental assessment (EA) and record of environmental consideration (REC). Consult AR 200-2 for technical information and to understand applicability of:

a. National Environmental Policy Act (NEPA).

b. Requirements for environmental records and documents.

c. Categorical exclusions.

d. Actions and conditions that require environmental documentation.

e. Public involvement.

## 2-2. RESPONSIBILITIES.

a. The Post Commander is the approving authority for EISs.

b. The Chief of Staff is the approving authority for EAs of actions implemented off post.

c. The Garrison Commander is the approving authority for Eas of actions implemented on post.

d. Staff Judge Advocate (SJA) reviews proposed environmental documentation.

e. DEH:

(1) Executes RECs.

(2) Assists the proponent in the preparation of and reviews environmental documentation.

(3) Maintains record copies of environmental documentation.

f. The proponent (commander, principal staff leader, director, contractor, civilian supervisor, or leader of tenant organization):

(1) Prepares environmental documentation as required. Provides necessary information to develop environmentally compatible concepts of implementation and practicable alternatives to the proposed action.

(2) Considers early, during planning, each environmental value that can be positively or negatively affected through implementation of the proposed action.

## 2-3. PROCEDURES.

a. Prepare environmental documentation early enough so that it can contribute to the decision making process. See AR 200-2 for listings of actions that require environmental documentation. Do not use EA to rationalize decisions already made or actions already taken.

b. Proponent organizations planning actions requiring environmental documentation meet with DEH, Environmental Management Office, building 4468, as early as the planning process may permit, but not less than 3 months prior to the date of decision.

c. DEH will draft environmental documentation for the proponent using the proponent's input. The proponent wil sign the document before submittal to the approving authority, as shown in figure 2-1.

DEPARTMENT OF THE ARMY
HEADQUARTERS III CORPS AND FORT HOOD

ENVIRONMENTAL ASSESSMENT
FOR THE
(PROPOSED ACTION)
FORT HOOD, TEXAS
(DATE PREPARED)

PREPARED BY:

(Signature block)

TECHNICAL REVIEW BY:

(Signature block)

PROPONENT:

(Signature block)

LEGAL REVIEW BY:

(Signature block)

APPROVED BY:

(Signature block)

Figure 2-1. Format for the cover page of an EA

d. EAs are approved or disapproved at least 45 days prior to the date in which the final decision must be made. This period is intended to allow announcement and consideration of public comment.

# CHAPTER 3
# AIR QUALITY

**3-1. SUMMARY.** This chapter provides local restrictions and procedures necessary for control of air emissions. These procedures do not exempt individuals and organizations from compliance with fire, health, and safety regulations.

**3-2. OPEN BURNING.** Coordinate outdoor fires with DEH, using DA Form 4283 (Facilities Engineering Work Request), at least 30 days before proposed burns. Obtain concurrence, guidance, and required support from DEH before the burn. This requirement is not applicable to fires used for noncommercial food preparation.

a. Do not burn oils, asphaltic materials, natural or synthetic rubber, automotive tires, or other materials which may produce high concentrations and volumes of smoke. Excess propellant charges left over from artillery firing may be burned at the firing points.

b. Incinerate infectious waste at permitted incinerators. This requirement applies to hospital, clinics, aid stations, and temporary or field medical facilities. If permitted incinerators are not available, MEDDAC will contract disposal services.

c. Dispose of solid wastes according to chapters 6 and 7. Do not burn common wastes, such as trash, rubbish, lumber, vegetation clippings, leaves, and tree prunings. This prohibition does not apply to the sanitation contractor for operation of disposal facilities which are permitted or coordinated through State agencies.

d. Incinerate vinyl acetate and other plastics containing classified information. Headquarters Command, S2, 287-7427, operates a State-permitted incinerator at building 4659 for destruction of classified waste. Burning of plastics is not authorized, except as provided in this regulation.

**3-3. SPRAY PAINTING.** The requirements of this paragraph are applicable to spray painting where the nominal size of paint containers is 1 gallon or larger. Do not use this container size stipulation to circumvent the intent of this paragraph.

a. Spraying of chemical agent resistant coating (CARC) is authorized in permitted booths where emissions are processed through waterfall or dry filter systems having an efficiency of at least 90 percent.

b. To ensure compliance with State air quality standards, request certification of spray painting operations on a case-by-case basis. Address the requests to DEH, Environmental Management Branch, and include at least the following:

(1) Facility. Give building number, room number, or other specific descriptions that explain the exact location of the proposed spray painting operation. Describe the structure or area.

(2) Proposed inventory. List national stock number (NSN) and nomenclature of every fluid substance (paints, primers, thinners, solvents, and cleaners) intended for use in the proposed painting operation. Include paint/reducer mixing ratios, plus type and amount of thinner recommended by manufacturer. Generally, this information is given in the product label and the material safety data sheet (MSDS).

(3) Methods of application. State each method of application to be used, number of spray guns, and furnish original user manual or other document stating their performance specifications. Since Federal and State air quality regulations require employment of the best available technology, paint booths will only use high volume low pressure (HVLP) spray guns.

(4) Rate of application. For each paint, define the optimum quantity to be sprayed per hour, per day, per week, per year, and where applicable, give the schedule. For example, "8010-01-229-PINK is sprayed Tuesday and Friday during the 0700-1600 shift for 3 consecutive hours at a rate of .20 gal/hr."

(5) Personnel. Explain the composition of each painting crew, number of hours per shift, number of shifts per week, and the tentative schedule.

(6) Disposal plan. Delineate procedures for HAZWASTE disposal per paragraphs 6-5, 6-6, 6-7, 6-8, and 6-12.

(7) Production. Quantify the projected pieces to be painted per day and define the optimum quantity of each paint to be sprayed per piece.

(8) Exhaust filters data. Give source of supply, frequency of replacement, and performance documentation.

NOTE: Request includes original documents (user manuals, MSDS, filters data , and so forth), which DEH will return to requester. Coordinate safety and health requirements through G1, 287-3725.

c. DEH issues certificates in which specific parameters are established based on calculations of volatile organic compound (VOC) and particulate matter emissions and evaluation of conditions enumerated above.

(1) Organizations granted certification to spray paint should prominently display the certificate in the painting facility.

(2) Personnel working or supervising certified painting facilities shall become familiar with the parameters stipulated in their respective certification document.

(3) Painting operations shall comply with parameters stipulated in their respective certification document.

(4) Documents certifying a specific painting operation are not transferable.

(5) Changes in methods, paint materials, or location will void certification. Organizations shall coordinate with DEH, 287-8754, to amend their painting operation certificates as needed.

**3-4. STRATOSPHERIC OZONE PROTECTION.** Chlorofluorocarbons (CFCs) such as halons and freons are ozone depleting pollutants. Willful release of these controlled substances into the atmosphere is unlawful. Violators not subject to UCMJ are prosecuted for release of CFCs in violation of 18 USC 13 (Assimilative Crimes Act) and Vernon's Texas Codes Annotated, Article 4477-5.

a. Personnel in military occupational specialty (MOS) 52C and others whose duties include routine maintenance and repair of automotive and aircraft air conditioning systems are trained and certified per 40 CFR 82.40. Training and certification are available through the local community college or similar accredited institutions.

b. CFCs are recovered using refrigerant recovery/recycle system NSN 4130-01-338-2707 or equal equipment which is manufactured according to standards in 40 CFR 82.36.

c. Reuse recovered CFCs whenever possible. If reuse is not feasible at the source, DEH, 288-7627, assists to make lawful disposition of recovered CFCs.

# CHAPTER 4
# ENVIRONMENTAL CONSTRAINTS ON TRAINING, AND OTHER ACTIONS

**4-1. SUMMARY.** This chapter prescribes environmental quality considerations applicable to field training exercises, field testing, and other actions. Fort Hood pursues a program of conservation directed toward preserving and enhancing the quality of the natural environment. Consequently, field training, tactical exercises, and testing shall be conducted in a manner that least endangers the environment while completing training objectives.

**4-2. LAUNDRY, SHOWER, AND WATER SUPPLY POINTS.** Plan and coordinate with DEH, Fish and Wildlife Branch, 287-2885, tactical operations that demand large volumes of water. Coordinate before issuing operation order (OPORD) or tasking. When tactical training includes operation of field laundry, shower, or water supply points, the training mission/objective shall be accomplished without significant damage to the environment.

a. Water level in lakes is crucial to fish and wildlife habitats. Low water diminishes space for aquatic life movement. This condition increases suspended solids and affects biological oxygen demand. Insufficient water makes it difficult for aquatic life to breathe and wild animals to obtain adequate quality and quantity of drinking water. Operation of field laundry, shower, or water supply points in certain water sources may cause fish kills and fatal health hazards to wild animals. This is a constant concern, with a critical period from late spring to early fall.

b. DEH, Fish and Wildlife, Branch, 287-2885, manages the fish impoundments listed in table 4-1.

Table 4-1. Fish impoundments off-limits to tactical training

| LAKES | COORDINATE | PONDS | COORDINATE |
|---|---|---|---|
| *Airfield Lake | PK238460 | Cantonment A | PK197465 |
| Bratcher Lake | PK125356 | Cantonment B | PK204465 |
| Copperas Cove #3 | PK083460 | 12C | PK296491 |
| Crossville Lake | PK123404 | 22A | PK083416 |
| Eister Lake | PK128603 | 25A | PK102347 |
| Engineer Lake | PK275476 | 30A | PK113440 |
| Gray Lake | PK125362 | 31C | PK068456 |
| Heiner Lake | PK326450 | 36G | PK109547 |
| *Larned Lake | PK318477 | 43D | PK118611 |
| *Nolan Lake | PK366446 | 44E | PK170617 |
| Starnes #1 | PK070514 | 44G | PK139595 |
| * The outfall of Airfield, Larned, and Nolan lakes may be used as a water source during training. | | 52A | PK181716 |
| | | 53A | PK149681 |
| | | 53G | PK193703 |
| | | 90A | PK143493 |

c. Do not allow the sludge generated at water purification points to enter the water source. Locate water purification points on sites that allow for drying of sludge on level ground. Since retention pits shall not be excavated, deposit and abandon sludge on flat natural ground surface.

d. Do not operate or position vehicles and motorized equipment on dams or dikes.

**4-3. PLANTS AND ANIMALS.** Do not destroy plants and animals in violation of game and wildlife laws. Trees, whether alive or dead, shall not be cut without approval of DEH, Work Services Branch, 287-2113. Do not completely clear underbrush in command posts, bivouac, or field dining areas. This is detrimental to the natural environment, depletes wildlife foods, disrupts natural wildlife habitat, nesting, breeding, and foraging, and contributes to soil erosion and siltation. Hunters and fishermen shall consult local fish and game laws and III Corps & FH Reg 210-25.

## 4-4. SOIL EROSION AND STREAM SILTATION.

a. Operate vehicles on existing roads and trails to the maximum extent possible. Avoid arbitrary off-road short cuts and limit cross-country travel to that necessary for accomplishment of planned mission essential task list (METL) training. Establish new trails only when coordinated with DEH, using FHT Form 420-X10 (Coordination for Land Excavation) per chapter 11.

b. Do not wash vehicles and equipment at ponds or streams. Wash vehicles at established vehicle washracks and tank wash facilities only. Cross sizeable streams at authorized bridges or fording sites. Field washing of vehicles and random crossing of streams stirs up silt and detrimentally affect aquatic life.

## 4-5. LATRINES.

a. Permanent chemical latrines are located to support the frequently used training areas.

b. Temporary chemical latrine services are procured through Directorate of Contracting (DOC) as local purchase requests. Obtain funding authorization from G3/DPTM, Resource Management. If permanent latrines are not available and temporary facilities have not been authorized, use field expedient latrines according to FM 21-10, appendix A.

**4-6. AREA POLICE AND DISPOSAL OF SOLID WASTE.** Users police training and maneuver areas, including billets, food service, maintenance, and headquarters areas. Do not abandon or bury garbage, rubbish, and other solid waste. Collect solid wastes in the organization's area and transport it for disposal through dumpsters in the cantonment area or directly to the Fort Hood Sanitary Landfill at coordinate PK115475.

## 4-7. FUELS, OILS, AND OTHER LIQUIDS.

a. Intentional spillage of fuels, used oil, or other pollutants is prohibited. Personnel not subject to the UCMJ are prosecuted for unauthorized discharges in violation of 18 USC 13 (Assimilative Crimes Act) and Texas Water Quality Act. Leaders emphasize safe handling of petroleum, oils, and lubricants (POL) during transport, refueling, and maintenance operations.

b. Disposal of liquids in a manner such as dumping POL on the ground to control dust or pouring it into ditches or sewer systems is prohibited.

c. Collect and transport used oil, off-specifications fuel, hazardous waste, and salvable materials generated during field training for disposition as prescribed in chapters 5 and 6.

**4-8. LIQUID WASTES.** Discharging liquid wastes from field laundries, field showers, and field kitchens into stream beds or drainage ditches is prohibited. Dispose of liquid waste in soakage pits constructed, maintained, and closed according to field sanitation standards in FM 21-10, appendix A.

## 4-9. PIPELINES.

a. Crude Oil Pipeline. A crude oil pipeline traverses Fort Hood as it enters the reservation at coordinate PK357578 and lays in a straight line toward coordinate PK105676. The pipeline was constructed in 1929 and lies within an average of 3 feet below the surface. As a result of an accident in 1967, reinforcing sleeves were placed around the pipe at several points. The pipeline is "off-limits" to vehicles, except for crossing at established roads and tank trails. It is a safety hazard to violate this provision since the underground line operates at high pressure and carries a flammable material. The pipeline is marked every 100 meters with a sign warning against unauthorized crossing and directions to the nearest crossing sites. Crossing sites are clearly marked. Authorized crossing points according to the Training Area Maps, stock numbers V782SFHMIM1, 2, 3, and 4 are listed in table 4-2.

Table 4-2. Authorized pipeline crossing points

| WEST OF RANGE AREA | IN RANGE AREA | EAST OF RANGE AREA |
|---|---|---|
| PK105676 PK145661 | PK184645 PK233627 | PK257617 PK313595 |
| PK115672 PK153657 | PK199640 PK245622 | PK267613 PK319593 |
| PK121669 PK159655 | PK216633 PK246621 | PK274610 PK320593 |
| PK128667 PK161654 | PK225629 | PK287605 PK327589 |
| PK133665 PK179647 | | PK298601 PK335586 |
| PK135664 | | PK301599 PK348581 |
| | | PK306597 |

b. Natural Gas Pipeline. An underground natural gas pipeline enters at coordinate PK388420 and lays in and out of the south reservation boundary toward coordinate PK283438. It is off-limits to vehicles and there are no approved crossings.

**4-10. FIRES.** Fire has a tremendous impact on the environment. Leaders must ensure that precautions are taken to preclude fires and to promptly extinguish them. Fires should not be started intentionally without coordination with DEH according to paragraph 3-2. See III Corps & FH Reg 420-1, chapters 5 through 7, for guidance on fire prevention in the field and fire prevention involving field equipment.

# CHAPTER 5
# ENVIRONMENTAL PRESERVATION

## SECTION I
## INTRODUCTION

**5-1. SUMMARY.** This chapter contains policy and procedures to prevent, control, and clean up accidental or intentional spills of petroleum-base products or hazardous substances.

**5-2. GENERAL.**

a. This chapter supports the State of Texas Oil and Hazardous Substances Spill Contingency Plan, Environmental Protection Agency (EPA) Region VI Contingency Plan, and AR 200-1, chapter 8.

b. Willful discharge of petroleum products or hazardous substances onto the ground or into surface waters is punishable under provisions of State and Federal Laws and the UCMJ (see table 1-1).

c. Any person in charge of a facility or function, and with knowledge of any oil discharge or hazardous substance into navigable waters of the U.S. in violation of Title 33, U.S. Code, Section 1321(b)(3), shall immediately notify the appropriate agency of the U.S. Government of such discharge. Personnel not subject to the UCMJ are prosecuted under 33 USC 1321(b)(5). The maximum penalty for the Federal offense is a fine of $10,000 and imprisonment for 1 year.

d. This chapter and supporting plans are reviewed and evaluated at least once every 3 years, when a facility discharges more than 1,000 U.S. gallons of oil into navigable waters in a single spill event, or when there have been 2 spill events within any 12-month period.

**-3. DISCHARGE CLASSIFICATION.** The following classifications are provided for guidance. They do not imply or connote associated degrees of hazard to the public health or welfare, or a measure of environmental damage. Regardless of quantity, the on-scene coordinator (OSC) may classify discharges that substantially threaten the public as major discharge.

a. Minor Discharge. An oil discharge of less than 1,000 gallons into navigable waters or a discharge of any substance in a quantity which does not threaten the public health or welfare or the environment.

b. Medium Discharge. An oil discharge of 1,000 to 10,000 gallons into navigable waters or discharge of any hazardous substance of any quantity which threatens the public health or welfare or the environment.

c. Major Discharge. An oil discharge of more than 10,000 gallons into navigable waters or a discharge of any hazardous substance that substantially threatens the public health or welfare or generates public interest.

## SECTION II
## INSTALLATION OIL AND HAZARDOUS SUBSTANCE SPILL CONTROL AND CONTINGENCY PLAN

**5-4. SPILL PREVENTION CONTROL AND COUNTERMEASURE PLAN (SPCCP).** III Corps & FH Reg 200-10 is available through normal publication channels.

**5-5. INSTALLATION SPILL CONTINGENCY PLAN (ISCP).**

a. Responsibilities.

(1) DEH or designated representative is the Fort Hood OSC and responsible for:

(a) General supervision of ISCP implementation and performance of Installation Response Team (IRT).

(b) Liaison between Fort Hood and State or Federal agencies.

(c) Tasking requests through ACofS, G3/DPTM (Operations) as provided in table 5-1.

Table 5-1. Personnel and equipment for IRT

**This table prescribes the basic composition of the IRT. The OSC in coordination with G3/DPTM may add or delete from this listing as the situation may demand. G3/DPTM coordinates tasking of tactical resources. The resources of military units are the prime capability of the IRT. DEH augments the IRT with DEH assets as needed.**

| RESOURCES | TACTICAL | | | DEH | NOTES |
|---|---|---|---|---|---|
| | MINOR SPILL | MEDIUM SPILL | MAJOR SPILL | | |
| NCO or DAC supervisor | 1 | NA | NA | 1 | 1 and 6 |
| Enlisted Soldier | 10 | NA | NA | NA | 1 and 6 |
| Engineer Platoon (Combat) | NA | 1 | 2 | NA | 2 and 6 |
| Dump Truck | 1 | 3 | 6 | 2 | 3 and 6 |
| Cargo Truck | 1 | 3 | 6 | NA | 3 and 6 |
| Backhoe | 1 | 1 | 1 | 1 | 3 and 6 |
| Grader | NA | 1 | 1 | 1 | 3 and 6 |
| Dozer | NA | 1 | 1 | 1 | 3, 4, and 6 |
| Crane | NA | 1 | 2 | 1 | 3, 4, 5, and 6 |
| Front Loader | 1 | 1 | 1 | 1 | 3 and 6 |
| Gradeall | NA | NA | NA | 1 | 3 |
| Boat | 1 | 1 | 2 | NA | 3, 4, 5, and 6 |
| Vacuum Pump | NA | NA | NA | 1 | 3 |
| Vac-All | NA | NA | NA | 1 | 3 |
| Fuel Tanker (empty) | 1 | 1 | 2 | NA | 2, 3, 5, and 6 |
| Helicopter | 1 | 1 | 1 | NA | 2, 3, 5, and 6 |
| Floating Skimmer | NA | NA | NA | 2 | 3 and 4 |
| Firefighter's Truck | NA | NA | NA | As Needed | 3 |
| Miscellaneous Materials | NA | NA | NA | As Needed | 4 |

**NOTES:** 1. MOS immaterial 2. No weapons or NBC equipment. 3. With full crew. 4. Delivered to spill site. 5. OSC prescribes type and capacity. 6. Rations and drinking water for soldiers provided by their respective units.

(d) Coordination and supervision of annual IRT contingency training.

(e) Task assignment to the IRT.

(f) Procurement, maintenance, and distribution of specialized materials per III Corps & FH Reg 200-10, appendix C.

(2) MSC commanders provide soldiers and equipment as the OSC requests through the ACofS, G3/DPTM (Operations) (see table 5-1).

(3) Commander, MEDDAC, provides personnel to survey the potential impact of the discharge on human health. Renders staff advice and assistance to neutralize, control, an clean up ignitable, corrosive, reactive, or toxic substances.

(4) The SJA provides legal advice and assistance pertaining to spill events.

(5) The ACofS, G3/DPTM, Corps Operation Center, coordinates intercommand assistance to include acting as the installation response operation center.

(6) The Provost Marshal (PM) provides security and traffic control at spill sites.

(7) The 47th Explosive Ordnance Detachment handles explosive materials.

b. Response Procedures. Response to spill events is generally organized in five phases. Elements of more than one phase may take place concurrently.

(1) Phase I. Discovery and Notification.

(a) Persons discovering a discharge incident or immediate threat for a spill event shall judge the situation according to the criteria in figure 5-1 or FH Poster 420-3 (In Case of A Spill). Notify the Fort Hood fire department of spills defined as reportable, using the speediest means. Notification continues according to plan in figure 5-2 and progresses to the lowest organizational level with assets to control the situation. Notify as a minimum the fire department, DEH, Environmental Management Branch, and the organization responsible for the spill. The fire department maintains an on-call roster for notification after duty hours.

| Reporting is required when one or more of the following conditions exist. |
|---|
| ON-POST |
| 1. 25 gallons of petroleum products. |
| 2. Any hazardous substance. |
| 3. Spills covering a 100-square-foot area. |
| 4. Any spill judged to be harmful or that potentially threatens the public health and welfare. |
| OFF-POST |
| 1. Any spill causing a visible sheen on water. |
| 2. Same criteria as on post. |

Figure 5-1. Spill reporting criteria

(b) DEH performs on-site investigation of spill events and determines corrective action. Upon determination, DEH provides technical assistance to the organization responsible for the source of spill. When necessary, the IRT is activated as prescribed in figure 5-2 and table 5-1. Cleanup operations are done at the lowest possible level of organization, taking precautions to ensure expeditious and effective handling of the emergency. A spill event is treated as an emergency situation. If the discharger is unknown or unavailable, the OSC coordinates and proceeds with cleanup operations. MEDDAC, Preventive Medicine Service, is notified of spills which enter surface waters or occur within 100 meters of a well or water point.

(c) If the pollutant flows off post, into critical water areas, or has the potential to do so, the OSC notifies HQ United States Army Forces Command (FORSCOM) and the EPA Regional Response Team immediately (figure 5-2). The EPA Regional Response Team must concur with any water-pollution control actions taken involving the critical water areas.

(2) Phase II. Containment and Countermeasures. These are defensive actions initiated as soon as possible after discovery of a discharge.

(a) Table 5-1 lists tactical resources available to the OSC.

(b) ACofS, G3/DPTM, tasks tactical resources to avoid the possibility of conflict with other operations.

(c) The OSC directs construction of necessary berms, dams, fences, or other barriers to contain the flow of pollutants.

(3) Phase III. Cleanup and Disposal. This includes removal or chemical treatment of pollutants and biological remediation as appropriate.

(a) The organization or contractor accountable for the source of spillage is responsible for cleanup under the direction of the OSC.

(b) Begin cleanup as soon as possible after discovery and containment.

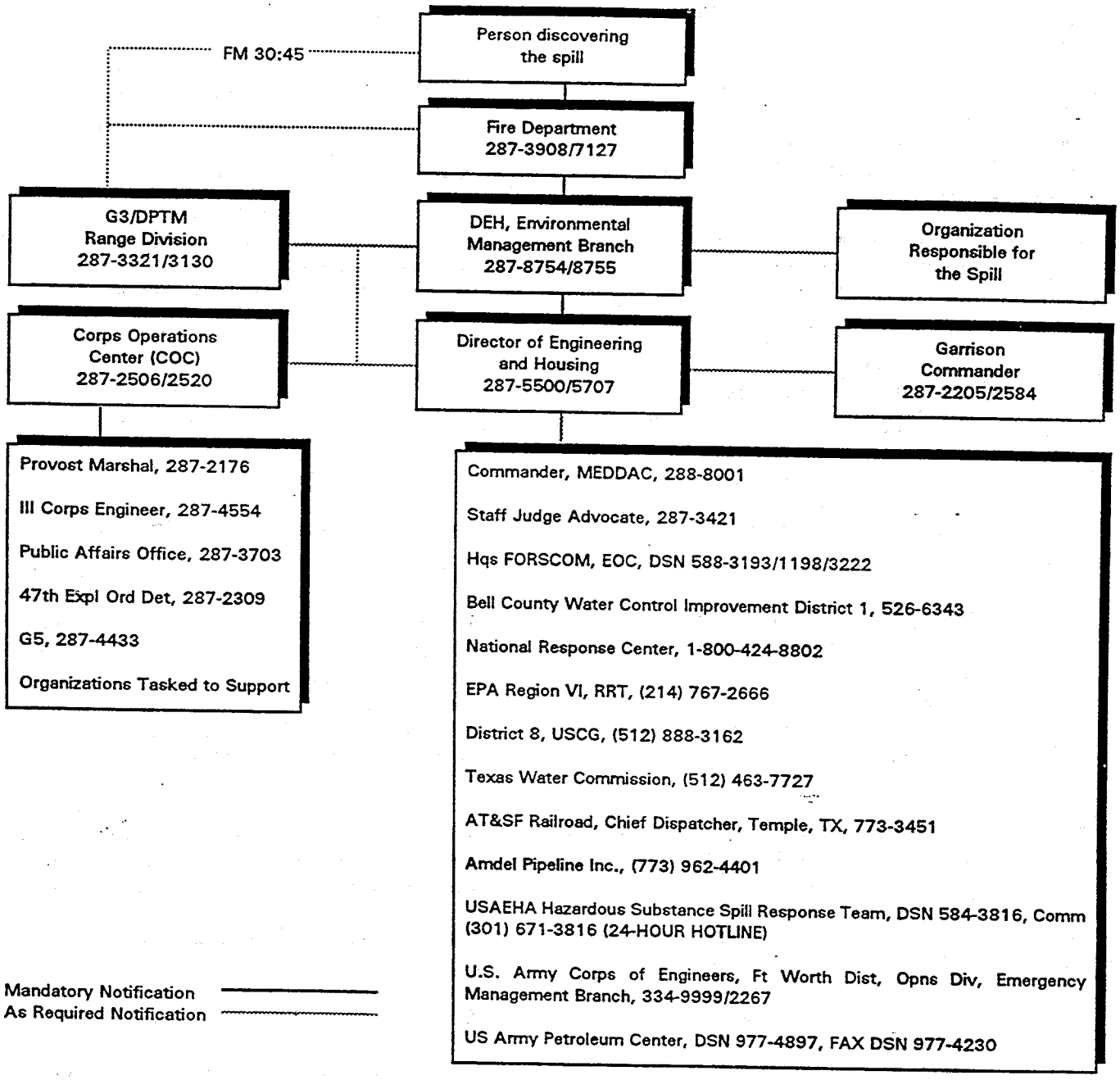


Figure 5-2. Communication and notification plan

(c) Extract or treat pollutants until the affected area is free of pollution.

(d) Pollutants shall not be washed into drainage systems.

(e) Dispersing or sinking pollutants is prohibited unless the EPA or Texas authorities concur.

(f) Dispose of recovered pollutants per OSC's directions. Filter or otherwise restore for use the recovered pollutants whenever possible. The OSC directs the disposal of contaminated soil and absorbents.

(4) Phase IV. Restoration. Assess damages and restore spill site to predischarge conditions. Restoration is a responsibility assigned to the organization or contractor who spilled and it is complete when the OSC approves.

(5) Phase V. Recovery of Damages and Enforcement. The actions taken depend on the circumstances and conditions of each spill event. DEH provides adequate information, photographs, samples, and technical advice to the SJA in support of the Fort Hood legal position in matters related to spills or other environmental incidents. When soldiers violate this regulation or related laws, commanders may take action according to AR 600-20 or UCMJ, as applicable. Civilian violators are referred to Federal Magistrates, Federal Courts, State or local authorities, as appropriate and according to the applicable laws and Federal regulations.

c. Reports (RCS exempt: 335-15, para 5-21). The OSC makes the following reports:

(1) Telephonically report to FORSCOM EOC spills with the potential to cause hazards to the public, considerable damage to the environment, or possibly generate public interest. This report alerts FORSCOM to the possibility of their involvement and forestalls alarmist reports from unofficial sources.

(2) Reporting requirements for spills of more than 1,000 gallons of oil or in harmful quantities as defined in 40 CFR 110 are delineated in AR 200-1, paragraph 8-3, and 40 CFR 112.4.

(3) Report to the National Response Center, telephonically, the release of hazardous substances to the environment if released in the reportable quantities defined in CERCLA. The EPA determines the need for written reports.

d. Training. DEH conducts an annual training exercise to test the ISCP effectiveness and responsiveness.

## Section III
## OIL RECLAMATION

### 5-6. GENERAL.

a. This chapter prescribes the authorized methods for collection of used oil. The economic success of recycling oil depends on the quality of the liquid. Segregate oils of radically different sources or properties, thus keeping each batch homogeneous. Do not dispose of used oil in an unauthorized manner, such as dumping it on the ground, ditches or sewer systems. Units performing maintenance away from their normal maintenance facilities collect and dispose of used oil according to this regulation.

b. Individuals assigned to Fort Hood who reside in Government quarters, barracks, or off post are encouraged to bring their used oil to the recycle center, building 4621; the Automotive Craft Shops, buildings 3202 and 9138; or the main Army and Air Force Exchange Service (AAFES) service station, building 224.

c. Commanders construct and maintain used oil reclamation points per minimum standards shown in figure 5-3.

### 5-7. PROCEDURES.

a. Construction (see figure 5-3).

(1) Locate reclamation points away from asphalt pavements if feasible. Consider user convenience and that the pod must be accessible to a tanker truck.

(2) Obtain assistance for design and construction of oil reclamation points from DEH, 287-8754/288-7627.

(3) Oil reclamation points shall meet fire prevention standards per III Corps & FH Reg 420-1, paragraph 2-30.

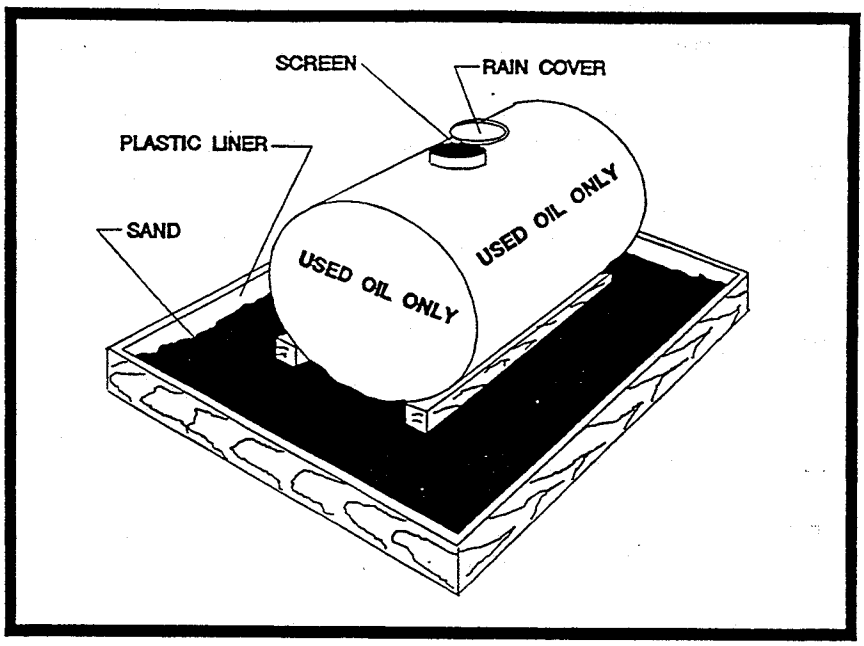


Figure 5-3. Typical used oil reclamation point

(4) Install a sand catch basin with a plastic film liner to prevent oil seepage into adjacent areas. The pod should be large enough to hold the quantity of used oil generated monthly. Suitable pods may be obtained from the Directorate of Logistics (DOL) cannibalization point or Defense Reutilization and Marketing Office (DRMO). The fill opening on the pod should be large enough to receive oil without spilling over the sides and fitted with a rain cover and removable screen to prevent extraneous matter from entering the pod. Steps or ramps may be installed to facilitate access to the fill opening.

b. Operation.

(1) Oil reclamation points provide for collection of used lubricating oil and hydraulic fluid. Segregate antifreeze, fuels, grease, solvents, and hazardous substances each in a separate container. Clearly label pods and other containers used for accumulation of waste substances according to paragraph 6-6.

(2) Keep extraneous materials such as rags, oil filters, trash, soil, vehicle parts, and water out of reclamation pods.

(3) Locking devices to preclude or control the use of oil reclamation pods are prohibited. The inconvenience of locks usually provokes improper disposal of used oil.

(4) Storage of oil in open containers is prohibited.

c. Maintenance.

(1) The using organization periodically inspects their oil reclamation points to ensure constant serviceability of components and to curb improper use.

(2) The sand basin provides absorption for spillage. When sand becomes highly saturated with oil, remove and replace with clean sand to preclude oil seepage into adjacent areas. Coordinate disposal of saturated soil with DEH, 288-7627/287-8754. Contaminated soil may be replaced with clean soil generated at washracks or clean sand obtained through DEH, Pavements Section, building 4489, 0730 on duty days. Users provide transportation for soil removal or replacement.

(3) Remove sediments from oil reclamation pods only if such removal can be done without any damage to the environment. Prior to removing those sediments request support and guidance from DEH, 287-8754.

(4) Contact DEH, 287-2113, to arrange for pickup when oil reclamation pods are three-quarters full. If DEH refuses to pick up oil because of extraneous materials, the user removes extraneous materials from the pod and arranges for pickup again. If the using organization cannot rectify the situation, contact DEH, 287-8754 for help.

d. Oil pick up. DEH picks up oil only. Turn in HAZWASTE and fuels to DEH, 288-7627, per paragraph 6-12.

## SECTION IV
## POLLUTION ABATEMENT

### 5-8. RESPONSIBILITIES.

a. DEH:

(1) Identifies potential pollution sources (see appendix B, and III Corps & FH Reg 200-10, appendix B) within Fort Hood, and provides guidance, training, or assistance to prevent pollution incidents.

(2) Conducts routine inspections of potential sources of pollution. Estimates their compliance with this regulation and requests appropriate corrective action. DEH visits each facility at least annually. Visits are coordinated and scheduled in advance to curtail conflicts with other operations. Undesirable results from water analysis, spills, discharges, environmentally unsafe practices, or conditions potentially harmful to the environment may warrant unscheduled DEH visits for determinations and assistance. Visits are performed according to this regulation and applicable Federal or Texas regulations. During visits, if a condition outlined in figure 5-1 is noted, a synopsis of the event is recorded on FH Form 2146 (Pollution Incident Report) and appropriate action implemented as prescribed in section II of this chapter.

(3) Assists organizations in procuring and obtaining specialized services, supplies, and equipment required to prevent or clean up spills and other pollution.

(4) Provides environmental training and technical assistance visits to assist organizations in maintaining a competent level of environmental compliance knowledge.

b. Commanders and activity chiefs:

(1) Appoint an environmental coordinator (EC) and as many assistants as necessary to administer an effective environmental program in their organization. EC shall be certified through completion of the environmental management course (EMC) (see appendix C). The EC reports directly to the commander and has sufficient rank and authority to direct environmental actions of subordinate organizations. The best candidates for EC are executive officers at each level of organization.

(2) Inspect and direct subordinates to inspect areas where pollution is a potential factor. Document inspections according to paragraph 5-8c(9) and 6-7.

(3) Provide environmental awareness and HAZWASTE management training for their personnel according to paragraph 6-10 and appendix C.

(4) Request assistance from DEH, 287-8754/8755, in matters pertaining to this regulation and other environmental compliance issues.

(5) Procure adequate pollution abatement equipment and supplies in sufficient quantities and timeliness (lack of resources does not justify noncompliance).

c. Environmental coordinators and their assistants:

(1) Administer the organization's environmental program.

(2) Manage HAZMAT/HAZWASTE operations.

(3) Advise their commander on matters related to environmental compliance and implementation of this regulation.

(4) Periodically inspect potential pollution sources according to this regulation and other related publications. Request, coordinate, program, or direct corrective action rapidly.

(5) Monitor fuel and oil storage facilities for compliance with established spill prevention procedures per this regulation and III Corps & FH Reg 200-10.

(6) Provide environmental/HAZWASTE training for their organizations according to appendix C.

(7) Maintain reference publications on environmental technical information.

(8) Publicize policies and procedures to ensure an effective environmental program.

(9) Document environmental/HAZMAT/HAZWASTE inspections and training per paragraphs 6-7 and 6-10.

(10) Inventory HAZMAT, HAZWASTE, and POL. Include NSN, nomenclature, unit of issue, quantity on hand, quantity used monthly, quantity of waste on hand, waste disposal method, and indicate if the MSDS is on hand or not. Deliver a complete inventory update to DEH, building 4468, quarterly (RCS exempt: 335-15, para 5-2b(2)).

## 5-9. PROCEDURES.

a. Operate and maintain oil reclamation points according to section III of this chapter.

b. Implement the following guidance for use of oil-sand interceptors and washracks.

(1) Oil-sand interceptors (figure 5-4) provide a safe containment for oils and sediments. Inspect interceptors weekly. Take appropriate corrective action as needed. To inspect an interceptor: insert a long rod into the oil to a depth of approximately 12 inches and observe for water while briskly agitating the rod from side to side. If no water becomes visible, an excessive amount of oil is present. Insert the rod vertically into the fluids until sediments are felt. If sediments are encountered within 3 feet from the fluid level, the interceptor is overloaded. Check the baffle for leaks. Request skimming, sediment removal, and repairs from DEH, 287-2113.

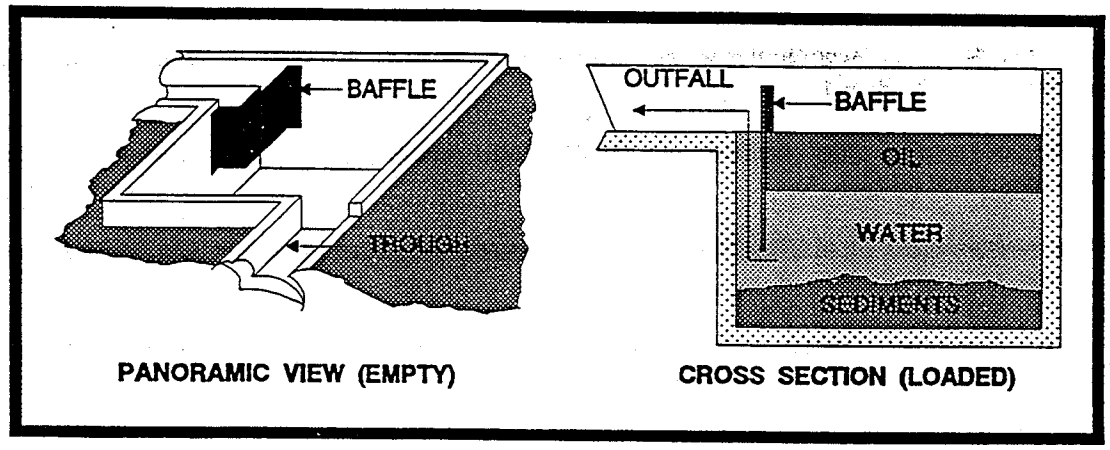


Figure 5-4. Typical oil-sand interceptor

(2) Do not allow soil and other solids to flow into the oil-sand interceptors. Stockpile soil at a convenient location or later disposal or use. Soils not oil-saturated, may be used as fill, topsoil, or absorbent material to clean spills. Avoid piles of soil against fences, as this practice causes damage to fences and landscape. Minimize quantities of soil generated at washracks, through use of prewash facilities (Birdbath) located at South Range Road and 37th Street, PK184470, 288-3004, and Turkey Run Road, PK147473, 287-2697.

(3) Use, acquisition, and demonstrations of cleaning compounds.

(a) Use of chemicals, detergents, and solvents at vehicle washracks is not authorized unless the product is specifically authorized through local regulations or written authorization is obtained through DEH, Environmental Management Branch. Before a cleaning agent is used or approved, consider the environmental consequences of its use, and disposal requirements.

(b) Since no single compound provides generic applicability which is practical to our total cleaning needs, consider the recommendations in the Expendable Supplies and Materials List in the specific equipment's technical manual. After making product selection, coordinate with DEH, 287-8754, to ensure use of the proposed product will not generate an environmental incident. If specific disposal procedures are required, make adequate provisions for waste accumulation and disposal before using the product.

(c) Use cleaning compounds when absolutely necessary and only for their specific intended purposes. Follow precautions and instructions given in MSDS and product label. When instructions are not available, contact DEH, 287-8754, to obtain guidance. If detergents must be employed at washracks, use small amounts of general purpose detergent, NSN 7930-00-526-2919 or NSN 7930-00-527-1207. Do not apply these detergents in heavy concentrations unless the rinsate outfalls into the sanitary sewer. Accumulations of detergents can dissolve oils in oil-sand interceptors and cause discharges. Generally, steam cleaning will do adequate degreasing without the use of hazardous chemicals and without causing environmental incidents.

(d) MSCs coordinate product demonstrations with G3, G4, DOC, and DEH. "Free" demonstrations of cleaning compounds are allowed when a standard vendor agreement has been processed through DOC. Product demonstrations are not allowed below division or separate brigade level.

(4) Report to DEH, 288-7627/287-8754 whenever fuels enter oil-sand interceptors.

(5) Contact DEH, 287-2113, to request repairs for oil-sand interceptors and washracks.

c. Do not operate steam cleaners in areas where an oil-sand interceptor is not provided.

d. General housekeeping at motor pools includes but is not limited to cleaning of spills promptly. Do not leave spills unattended, especially when rain is expected.

e. Conspicuously post FH Poster 420-3 in facilities adjacent to fixed or mobile fuel dispensing equipment, and wherever spills can be expected (motor pool, POL storage, battery shop, HAZMAT storage, and so forth). Include FH Poster 420-3 in the equipment dispatch book when mobile equipment is used for transporting fuels, POL, or HAZMAT.

f. Make disposition of HAZWASTE and off-specifications fuel as provided in paragraph 6-12. Collect liquid waste other than used oil in compatible containers suitable for accumulation and turn-in of specific waste. Coordinate HAZWASTE accumulation according to paragraph 6-6. Source segregate HAZWASTE and avoid mixtures. Disposal of HAZWASTE mixtures is dangerous and expensive.

g. Disposal of automotive oil filters through the sanitary landfill is prohibited. Drain and collect used filters. Accumulate drained filters in a closable container to prevent rain saturation. Obtain open head drums from DEH, 288-7627, where DEH will receive the filters for crushing and recycling once the drum is full.

h. Coordinate disposal of contaminated soils with DEH, 288-7627/287-8754.

i. Triple rinse (see glossary) POL containers at vehicle washracks except when using solvents. Containers are acceptable for turn in if after triple rinsing there is no dripping oil or visible grease residue in the container, although a very light oily coat or stain may remain. This may be done using water pressure, detergent solution, steam cleaning, or stoddard solvent, whichever appropriate. Turn in rinsed 55-gallon drums to DEH, 288-7627, undocumented. Turn in rinsed containers smaller than 55-gallon drums as recyclable material to DRMO, 287-2723, using DD Form 1348-1 (DOD Single Line Time Release/Receipt Document) per III Corps & FH Reg 420-6, appendix A and proceed according to III Corps & FH Reg 755-725, appendixes F and M. Coordinate with DEH, 288-7627, for guidance and assistance for turn in of HAZMAT empty containers.

**5-10. BULK STORAGE TANKS.** This paragraph applies to permanent and temporary tank facilities, mobile or portable tank equipment, and includes tactical and nontactical operations.

a. Deploy portable and collapsible drums or tanks, and other dismounted tanks always with a secondary containment. Do not use a tank for storage of a substance unless the material, construction, and condition of the tank are compatible with the substance.

b. Operational deployment of tanks includes arrangement of secondary containments. Earth berms alone are generally not acceptable secondary containment, especially when the berm is uncompacted earth. They provide little or no spill containment and usually leave the water table unprotected. For that reason protective liners are placed under tanks and extend to overlap the top of berms. Adequate secondary containment is unpenetrable and capable of containing at least the entire capacity plus 20 percent of the largest tank. Impervious berms, curbs, and pits are often used for this purpose. Where these methods are not appropriate, other alternatives may be applied. Secondary containment may consist of an impermeable ditch, trench, or trough routed to terminate spillage through confining or safely channeling fluids into a tight holding basin. Secondary containment systems must provide the means for controlled drainage of rain water. When pollutants are present in rain accumulations, remove or neutralize them before draining the containment. Always request assistance from DEH, 287-8754, before attempting to remove or neutralize pollutants.

c. During tactical operation of mobile tanks, the need for construction of secondary containments is decided through a prudent evaluation of applicable mission requirements, resources available, and the potential for surface waters pollution from accidental spills. Because a tanker truck is expected to move frequently, construction of a secondary containment may not always be reasonable. Nevertheless, take precautions to prevent contamination of surface and ground waters. One method to implement spill countermeasure is to position mobile tanks on advantageous terrain features. These terrain features include depressions, large flat areas away from bodies of water, and areas not subject to flash floods or washouts.

**5-11. PROCEDURES FOR DRAINING AND PURGING FUEL TANKS.** There are several methods to eliminate explosive fumes from fuel tanks. The primary method is through use of a purging chemical. Chemical purge saves time, labor, and material. It reduces the possibility of a combustible vapor buildup after the purging procedure has been completed and after vapor test readings show a safe level. Alternate methods which will not be described here include steam, forced air, and oil purge. Regardless of method, make adequate provisions for waste disposal before the start of purging operations.

a. Safety.

(1) Discontinue operations if an electrical storm is threatening or in progress. Open flames or other sources of ignition such as welding and cutting torches and ordinary electrical equipment should not be introduced in areas where flammable vapor may be present. Tanks must be statically grounded prior to and during purging operations.

(2) Discharge all static from the body by grasping the static ground wire before climbing onto the fuel tank.

(3) Do not wear wool, nylon, silk, rayon, or other clothing material likely to generate static electricity. Wear clean cotton clothing with no metal buttons, zippers, or fasteners. Remove contents from pockets.

(4) Wear rubber boots and rubber gloves.

(5) Should an emergency arise requiring entry into a tank which is not vapor-free, or which has an oxygen content less than 19.5 percent, personnel who enter the tank must have an attached lifeline and wear protective respiratory equipment in the form of self-contained breathing apparatus or a full facepiece mask with a pressure supply of respirable air. Another person, also wearing similar protective equipment, is stationed at the tank opening and remains there with full ability to watch personnel in the tank and summon assistance in the event a rescue operation becomes necessary. Personnel will not enter a tank which is in the explosive range.

(6) Use cotton rags for cleaning purposes. Other material may generate static electricity.

(7) Personnel exposed to hydrocarbon or toxic vapors who exhibit weakness, nausea, coughing, intoxication, nosebleed, cramps, or any other unusual conditions need immediate medical attention. Have someone available who is qualified to administer artificial respiration and simple first aid throughout the entire purging operation.

(8) Unless adequate mechanical ventilation is provided indoors and sources of ignition are eliminated, vapor-freeing work through any method must be carried on outdoors, remote from vehicles and other known sources of ignition. Park or station tank where flammable vapors will not blow or drift indoors.

(9) Test for explosive vapor as prescribed in FM 10-20, paragraph 4-14e. Do not conclude vapor testing during steam cleaning because excess moisture or lack of oxygen may cause false readings.

b. Draining Tank. Drain fuel from compartments and connecting piping systems into suitable containers for reuse or disposal as appropriate. Prevent generation of fuel waste if possible.

(1) Select a level area at least 100 feet from nearest building, source of ignition, or sewer system. Position equipment so that the tank sump is in the lowest position possible.

(2) Have sufficient fire extinguisher available 50 feet upwind, manned by qualified individuals.

(3) Static ground the tank to an approved (earth) ground.

(4) Place conductive metal or galvanized containers under drain points. Bond containers to the grounded tank. Make grounding and bonding connections at clean, unpainted surfaces.

(5) Completely drain each fuel tank compartment including piping, pumps, meters, filters, and segregators. Remove accessories, such as gages and floats, which might entrap fuel. Drain the equipment that has been removed. Wipe dry connections and wash rags or mops in soapy water, dry and store for reuse or dispose of safely. Always consult the equipment's organizational maintenance technical manual and applicable technical bulletins.

(6) Containerize and dispose of off-specification fuels per paragraphs 5-9f and 6-12.

(7) Coordinate disposal of fuel-saturated filters, absorbents, and soil with DEH, 288-7627.

c. Materials Required for Chemical Purge.

(1) Source of nonpotable water with a large diameter hose such as tank wash facilities (Birdbath).

(2) Compressed air source and air hose of sufficient length to reach the entire bottom of fuel tank.

(3) Purging chemical No. 913 available from Product-Sol Inc., 2010 Cole Avenue, Birmingham, Michigan 48008; or RC 605 from Research Chemicals, Inc., 5717 Hart Street, Fort Worth, TX 76112, are obtained through local purchase.

(4) Combustible gas indicator set, NSN 6665-00-664-4650 or NSN 6665-00-292-9945, which is a Common Table of Allowance (CTA) item listed in SB 700-20 and assigned line number E57351.

(5) Entry into a tank which is not vapor-free or has less than 19.5 percent oxygen content requires use of protective respiratory equipment, lifeline, explosion-proof extension light or flashlight, and steam or air-operated venture-type air mover or a fan-type blower with an air duct (see paragraph 5-11a).

d. Purging--Chemical Method.

(1) Close or seal drains after draining fuel as described in 5-11b above.

(2) Fill and overflow tank with cold nonpotable water for 5 minutes or until visible traces of flammable material are removed. Simultaneously circulate water through piping system to displace fuel entrapped in piping. Fill the rear compartment first and continue to fill each compartment, filling the front compartment last. Reverse the procedure when emptying the tank. Drain fuel tank completely. NOTE: This procedure is accomplished at the tank wash facility (Birdbath).

(3) Close or seal drains again.

(4) Add to the empty fuel tank 44 fluid ounces (128 fluid ounces equals 1 gallon) of purging chemical for each 100-gallon capacity or as shown in table 5-2. Insufficient amount of chemical will cause incomplete purging. Once purging has begun, do not stop until process is complete.

Table 5-2. Purging chemical requirements

| TANK | CAPACITY (GAL) | PURGING CHEMICAL (GAL) |
|---|---|---|
| 600-Gal Pod | 600 | 2. |
| M49 Series Tanker | 1,200 | 4. |
| M978 Tanker | 2,500 | 8.5 |
| M559 Goer | 2,500 | 8.5 |
| M967, 969, and 970 Semi | 5,000 | 17. |
| M131 Series Semi | 5,000 | 17. |

(5) Fill fuel tank to top with nonpotable water. Do not overflow. NOTE: This procedure is accomplished at the tank wash facility (Birdbath).

(6) To dislodge solids, insert into fuel tank an air line with 3 to 5 pounds per square inch of air pressure for 40 minutes. Frequently move air hose around in tanks, covering as much area as possible, especially near the bottom and around baffles. Remove air line and drain solution into sanitary sewer manhole designated by DEH, 287-8754.

(7) Fill fuel tank with cool nonpotable water and overflow for 5 minutes or until water is clear. Simultaneously circulate water through the pipe system to displace purging solution in the pipes. Drain fuel tank completely. NOTE: This procedure is accomplished at the tank wash facility (Birdbath).

(8) Test for combustible vapor according to FM 10-20, paragraph 4-14e, to determine if fuel tank is safe to repair, clean, paint, store, change product, or ship. If not safe, repeat the procedure prescribed in subparagraph (7) above.

# CHAPTER 6
# HAZARDOUS MATERIAL AND HAZARDOUS WASTE MANAGEMENT

**6-1. SUMMARY.** This chapter assigns responsibilities, establishes policies, prescribes procedures, and provides a management system to control accumulation, collection, source separation, storage, transportation, processing, treatment, recovery, and disposal of HAZMAT and HAZWASTE. Provisions in this chapter consider the life cycle of HAZMAT from selection, procurement, storage, use, hazardous waste minimization (HAZMIN) to recycling or disposal of corresponding HAZWASTE.

**6-2. GENERAL.** This chapter incorporates current procedures and restrictions mandated through Federal and State laws for handling, accumulation, storage, transportation, and disposal of HAZWASTE.

**6-3. RESPONSIBILITIES.**

a. DEH:

(1) Assists organizations to develop environmentally safe procedures for the handling, treatment, and storage or accumulation of HAZMAT and HAZWASTE.

(2) Provides HAZMAT and HAZWASTE training courses according to appendix C, and assist commanders to obtain specialized training for personnel assigned to HAZMAT and HAZWASTE facilities.

b. Commanders, directors, and leaders:

(1) Coordinate with DEH to ensure compliance with this regulation.

(2) Conduct environmental and HAZWASTE training per paragraph 6-10, and inspect according to paragraph 6-7.

**6-4. POLICY.**

a. This command shall maintain records to enable tracking and tracing every HAZWASTE from generation to disposal.

b. Every level of command shall seek specialized training for their personnel who handle, transport, store, accumulate, treat, or dispose of HAZMAT or HAZWASTE. This training shall be reinforced through effective supervision.

c. HAZMAT resource conservation and HAZMIN shall be of prime concern to personnel in this command.

d. Store and handle HAZMAT and HAZWASTE in a manner that has no adverse effects on the public health and the environment.

e. Substitute nonhazardous materials for HAZMAT whenever practical.

**6-5. HAZWASTE ANALYSIS.** Obtain laboratory analysis through DEH, 288-7627, to characterize HAZWASTE or to identify materials suspected of being HAZWASTE. DEH personnel take samples and provide analysis as needed. Once the sample is taken, secure the container to prevent adding, mixing, or in any way changing the chemical composition of the sampled HAZWASTE. HAZWASTE analysis normally requires 2 weeks. After characterization is completed, DEH provides disposal guidance to the requesters.

**6-6. HAZWASTE ACCUMULATION.** Plan HAZWASTE accumulation so that users understand the safe and legal procedures to manage their specific HAZWASTE beforehand. Contact DEH, 288-7627, to establish accumulation sites. DEH provides containers, labels, and training as needed. DEH will label each HAZWASTE container according to example in figure 6-1. Adequate containers and arrangements for source segregation shall be in place before accumulation starts.

Proper D.O.T. SHIPPING NAME

# HAZARDOUS WASTE

**FEDERAL LAW PROHIBITS IMPROPER DISPOSAL**

IF FOUND, CONTACT THE NEAREST POLICE, OR PUBLIC SAFETY AUTHORITY, OR THE U.S. ENVIRONMENTAL PROTECTION AGENCY.

IN EVENT OF EMERGENCY CALL U.S. ARMY, FORT HOOD, TX. (817) 287-3908 (24 hours)

GENERATOR INFORMATION:

NAME: U.S. Army, HQ III Corps & Fort Hood

ADDRESS: Directorate of Engineering and Housing
Bldg 4468, 72nd and Warehouse Ave
Fort Hood, TX 76544-5057

EPA ID: TX8214020424 STATE ID: 66005

ACCUMULATION START DATE: _____ MANIFEST DOCUMENT NO: _____

TRANSFER START DATE: _____ TSDF STORAGE DATE: _____

**HANDLE WITH CARE!**

SAMPLE

Figure 6-1. HAZWASTE label

a. Organizations may accumulate 55 gallons of each HAZWASTE up to 90 days from date accumulation starts.

b. When accumulation ends, the 90-day limit expires, or the 55-gallon limit is reached, coordinate with DEH, 288-7627, to transfer HAZWASTE to a permitted storage facility.

**6-7. INSPECTIONS.** Inspect HAZWASTE accumulation or management facilities and potential sources of pollution listed in appendix B at least weakly. Search for malfunctions, deterioration of equipment, operation errors, spills, discharges, and conditions which may cause release of HAZWASTE into the environment or pose a threat to human health. Make these inspections often enough to identify and correct deficiencies before harm to human health or the environment occurs. Develop an inspection plan or SOP. Include the schedule or frequency of inspections and a detailed scope of procedures or, if appropriate, a checklist. Determine frequency of inspections on the basis of specific conditions at each facility or operation. Consider the specific probability of environmental or health hazard incidents. Inspect areas where frequent HAZWASTE incidents may occur, such as battery shops and storage areas, daily when in use.

a. Inspect each HAZWASTE accumulation area weekly. Check containers for:

(1) Damage such as corrosion, rust, leaks, and pressure bulging. These damages are prevented through protection of containers from the weather in a well ventilated, cool and dry area.

(2) Marking according to figure 6-1.

(3) Adequate outage allowing 5 inches for 55-gallon drums, 2 inches for 30-gallon drums and 1 inch for 5-gallon containers.

(4) Accumulation start date is less than 90 days before current date. If accumulation is ended, coordinate with DEH, 288-7627, for transfer to a permitted HAZWASTE storage facility.

(5) Compatible storage which prevents chemical reactions that may cause fires, heat, explosions, or toxic fumes in the event of spills.

(6) Fire protection, according to III Corps & FH Reg 420-1.

(7) Secondary containment according to paragraph 5-10b.

b. Inspect HAZMAT storage areas at least monthly. Check containers for:

(1) Damage such as corrosion, rust, leaks, and pressure bulging. These damages are prevented through protection of stock from weather in a well ventilated, cool and dry area.

(2) Labeling and marking. Keep product name, instructions, precautions, test or shelf-life expiration date, warning labels, and other pertinent information legible. Replace lost or unserviceable labels using DD Form 2521 (Hazardous Chemical Warning Label) or DD Form 2522 (Hazardous Chemical Warning Label).

(3) Validation of shelf-life. Request guidance from Base POL Laboratory, building 7046, to determine use or disposal of products affected by expiration or extension of shelf-life. Mark test dates or shelf-life extensions on each container affected. Individual containers in unbroken skids, pallets, or other multiple container packaging need no marking until the packaging is opened.

(4) Compatible storage. Store incompatible HAZMAT in a safely segregated area per product label and MSDS.

(5) Rotation of stock. Avoid shelf-life expiration and decay of containers through use of oldest product first. Arrange storage in a manner that encourages use of the oldest product first (old on top, old in front, and so forth).

(6) Excess. Identify HAZMAT excess and turn it in through supply channels per paragraph 6-12.

(7) Fire protection. See III Corps & FH Reg 420-1.

(8) Secondary containment. See paragraph 5-10b.

c. Correct deficiencies on the spot or program corrections. If an environmental or health hazard is imminent or has occurred, make immediate remediation. Lack of resources does not justify continued operation without fixing deficiencies.

d. Record HAZWASTE inspections on an inspection log. Maintain the log on file for 3 years after date of last entry. As a minimum, include: date and time of inspection, name and signature of inspector, organization to which the inspector is assigned, findings or observations, dates and explanations of repairs, or remedial actions generated through the inspection.

**6-8. HAZARDOUS WASTE MINIMIZATION (HAZMIN).** The objectives of HAZMIN are to eliminate or reduce volume or toxicity of HAZWASTE to the extent proven technologically and economically practical. Most HAZMIN techniques require no significant funding and generally yield monetary and labor savings. Successful HAZMIN requires individual training and proactive management. Minimizing volumes of specific HAZWASTE categories is the obvious technique to achieve HAZMIN, although other techniques are employed before reduction can be realized. For that reason, the Fort Hood HAZMIN effort includes the widest combination of the following HAZMIN techniques:

a. Selection and procurement of HAZMAT. Much HAZWASTE is the result of overstock or expired shelf-life. For example, excess paints that are stored too long will separate or cure, thus they become HAZWASTE. Avoid undue damage to container, deterioration, expiration, misuse, and pilferage of HAZMAT through wise selection and procurement practices.

(1) Procure HAZMAT in the smallest size and quantity that will satisfy the demonstrated need. Although larger containers are usually cheaper per unit of issue, always consider disposal cost for the unwanted leftovers or HAZMAT excess which ultimately becomes HAZWASTE.

(2) Maintain a sensible stock level. Select chemical compounds using equipment technical manuals and equipment density as the basis for stockage. Procure HAZMAT proportionate to established needs. Consider facts and circumstances. For example, an armored battalion should not procure "aircraft surface cleaning compound" since no equipment manual for ground armored equipment prescribes that product. Avoid acquisition of HAZMAT for ambiguous reasons like "In case we need it." Before final selection of a HAZMAT consider product substitution.

b. Hazardous material substitution. Give constant attention to substituting nonhazardous or less hazardous materials for HAZMAT. ECs use the HAZMAT/HAZWASTE inventory prescribed in paragraph 5-8c(10) for evaluation of HAZMAT in stock and corresponding HAZWASTE to determine if substitutions are advantageous and possible. Examples of advantageous substitutions are:

| | |
|---|---|
| nontoxic | for toxic |
| high flashpoint solvent | for low flashpoint solvent |
| 1,1,1-trichloroethane | for trichloroethylene |
| unleaded paint | for leaded paint |
| waterless hand cleaner | for paint brush cleaning solvents |

c. Reuse, recycle, or exchange HAZWASTE if practical. For example, solvents used for cleaning paint sprayers are suitable for thinning paint at the site of generation or in another painting operation. The same recyclable material can also be restored for its original purpose through passive recycling. Accumulate used solvent in an open head drum, close the container, and leave undisturbed for 1 or 2 days. After settlement of solids, siphon clean solvent from the top and use it to complete passive recycling. Certain expired products can be exchanged for fresh ones at a minimal cost. For example, most pharmaceutical manufacturers exchange expired medicines which otherwise would be managed as HAZWASTE. Make reasonable efforts as a HAZWASTE generator to devise safe and legal uses for recyclables before they are managed as HAZWASTE. Contact DEH, 288-7627, for specific guidance and assistance.

d. Source segregation. Avoid increasing the volume of HAZWASTE through unnecessary mixing of HAZWASTE with nonhazardous waste or with other types of HAZWASTE. Mixed HAZWASTE is often more dangerous for handling and always more expensive to be legally disposed of.

e. On-site treatment. If technology and resources are reasonably available, treat HAZWASTE on-site. The advantages are that no manifesting is required, the reporting quantity of HAZWASTE is reduced or eliminated, and potential liabilities associated with offsite shipping, treatment, and disposal are eliminated. Treat HAZWASTE safely and within the parameters of applicable laws, regulations, and permits. An example of on-site HAZWASTE treatment is the neutralization of sulfuric acid at battery shops.

f. Change the process that generates HAZWASTE. For example, cleaning paintbrushes using solvents, thinners or mineral spirits generates HAZWASTE. Instead, clean paintbrushes using waterless hand cleaner, NSN 7930-00-D02-5140, general purpose detergent, NSN 7930-00-526-2419, and warm water. Discharge the resulting waste into the sanitary sewer. (The foregone example applies to occasional use. Its intent shall not be construed as authorization for unlimited disposal of paints and paint wastes. See paragraph 6-12 for HAZWASTE turn-in.)

g. HAZMAT stock protection. Maintain HAZMAT storage according to standards provided in paragraph 6-7b. Protect HAZMAT from corrosion, damage, pilferage, and undue exposure to extreme weather conditions (rain, freezing, high temperature, and so forth). Preserve product labels so that the product name, NSN, safety requirements, and instructions are readable. Replace lost or unserviceable product labels using DD Form 2521 or DD Form 2522.

h. Issue guidance. Forced issue of HAZMAT is prohibited. Issue HAZMAT for their specific intended purposes, in support of demonstrated need, and always in the least possible amounts. Leaders of personnel issuing or receiving HAZMAT ensure that users receive the smallest package/container/quantity that suffices their specific need. Provide the appropriate MSDS and make the user understand the following information as applicable to specific HAZMAT before issue transactions are completed:

(1) Specific applications of the HAZMAT.

(2) How to use the HAZMAT safely and do the job spending the least amount.

(3) What to do with leftover HAZMAT in terms of resource conservation.

(4) What to do with the resulting HAZWASTE.

i. Containment of HAZWASTE. If a HAZMAT/HAZWASTE spill occurs, minimize the volume of spill residue and the extent of contamination through deployment of containment. Once contained, the spillage is recovered or collected along with cleanup materials for recycle, treatment, or disposal. Containment is an advantageous HAZMIN technique because the smaller the spill the less to clean up and dispose of.

j. Schedule and consolidate events that generate HAZWASTE. For example, spot painting vehicles and equipment requires use of HAZMAT and generates HAZWASTE. Less HAZMAT is used and less HAZWASTE generated per capita, if several pieces are spot painted in one operation instead of one piece at a time. Thus, consolidation in this case allows for HAZMAT economy, if the entire can of paint is consumed there is no HAZWASTE, and yields only one brush to clean.

## 6-9. RECORDS AND REPORTS.

a. Records. The following records are on file at DEH for not less than 3 years:

(1) The results of environmental staff visits to HAZMAT and HAZWASTE facilities.

(2) Summaries and reports generated during ISCP execution.

(3) HAZWASTE analysis results.

b. Reports (RCS exempt: 335-15, para 5-21).

(1) DEH submits the annual HAZWASTE report and monthly waste shipment summary to Texas regulatory authorities and keeps file copies for 3 years.

(2) MSCs ensure that subordinate organizations submit their consolidated HAZMAT/HAZWASTE/POL inventory to DEH quarterly.

(3) DRMO and DEH ensure that HAZWASTE is not transported from Fort Hood without a correctly prepared Uniform Hazardous Waste Manifest. DEH and DRMO each maintain a copy of the manifest for 3 years. DRMO or DEH as required initiate follow-up actions when the white copy of a manifest has not been returned within 45 days after shipment.

## 6-10. TRAINING.

a. Individuals managing or handling HAZWASTE complete a HAZWASTE training program within the first 6 months of assignment or employment. The scope of training required depends on the specific hazards, equipment, tasks, and other conditions of the site. Certified personnel conduct the HAZWASTE training and must include specific HAZWASTE management procedures. After completion of the HAZWASTE training, the individuals are able to respond to emergencies and to perform their duties in compliance with the standards established in this regulation. HAZWASTE training is done through a formal course or on-the-job training which includes but is not limited to:

(1) Safe operation of specific equipment in the respective HAZWASTE facility.

(2) Spill prevention and contingency plans.

(3) Response to emergencies through established procedures, emergency equipment, and systems.

(4) Procedures for using, inspecting, repairing, and replacing facility emergency and monitoring equipment.

(5) HAZWASTE accumulation, labeling, and marking.

(6) Communications and alarm systems.

(7) Response to fires or explosions.

(8) HAZMIN techniques.

(9) Operations shutdown.

(10) Specific HAZWASTE treatment procedures.

(11) Use and care of respirators and other personal protective equipment.

(12) Specific health and physical hazards associated to the job.

(13) Department of Defense Federal Hazard Communication Training Program.

(14) Personnel and equipment decontamination.

(15) Records and reports.

b. Personnel working in a HAZWASTE facility must not work unsupervised until they have completed the HAZWASTE training requirements.

c. HAZWASTE facilities commanders conduct or obtain HAZWASTE refresher training for their personnel to maintain and update their proficiency in HAZWASTE management annually.

d. HAZWASTE facility managers maintain the following documents and records:

(1) Job title for each position with names of persons filling each job (manning chart). Maintain job description which includes required skills, education, training, other qualifications, and duties assigned to each position.

(2) Records documenting that the training or job experience required in this paragraph has been complied with. Keep individual training records on file for at least 3 years from the date the individual last worked at the HAZWASTE facility. A copy of individual training records may accompany personnel transferred within Fort Hood.

**6-11. SECURITY.** HAZMAT or HAZWASTE activity leaders must prevent unauthorized entry of persons or livestock onto the active part of HAZMAT or HAZWASTE facilities. HAZMAT or HAZWASTE facilities must have an artificial or natural barrier surrounding its active portion and controlled entry through gates or entrances. Signs with the legend, "Danger - Unauthorized Personnel Keep Out," and "No Smoking" if flammables are present, must be posted at each entrance to the active portion of the facility and at locations in sufficient numbers to be seen from any approach to the facility. The text must be legible from as far as 25 feet, written in English and any other language predominant among workers in the facility.

**6-12. DISPOSITION PROCEDURES.** HAZWASTE is turned in through DEH, 288-7627. When HAZMAT is used, spent, or becomes unserviceable, defective, damaged, or shelf-life expired, and cannot be restored or recycled, it is classified and managed as HAZWASTE (see table 6-1). Containerize HAZWASTE so that no leaks will occur and the item can be safely handled, transported and stored. Transfer or overpack leakers into compatible containers as appropriate.

Table 6-1. Hazardous substance disposition protocol

| *HAZMAT | *HAZWASTE IF: |
|---|---|
| Acids | Spent |
| Adhesives and glues | Expired shelf-life |
| Asbestos bearing materials | Damaged or excess |
| Batteries (dry) | Spent or damaged |
| Chemical compounds | Expired shelf-life, off-specification, or waste |
| Decontaminating and impregnating agents | Unserviceable or spent |
| Filters of NBC protective masks | Wet or unserviceable |
| Fuels and packaged POL products | Unserviceable, off-specification, or expired shelf-life |
| Insecticides | Unserviceable or banned |
| Paints and related substances | Expired shelf-life, unserviceable, or cleanup waste |
| Photographic chemicals | Expired shelf-life, or spent |
| Solvents and other cleaners | Spent |

*Not all inclusive.
Certain shelf-life-expired products may be turned in to DOL as HAZMAT.
Unusable leftovers are generally treated as HAZWASTE.

| MATERIALS CONDITION | | POINTS OF COORDINATION |
|---|---|---|
| **HAZMAT** (for reissue as is) | **HAZMAT** (unusable as is) | 1. DEH, Environmental Management Branch, Classification Unit, building 1345, 288-7627<br>2. DOL, Supply Division, building 4126, Yard #37, 287-7595 |
| ■ Valid shelf-life | ■ Expired shelf-life | |
| ■ Unused material | ■ Unused material | |
| ■ Undamaged package | ■ Undamaged package | |
| ■ Unopened container | ■ Unopened container | |
| ■ Readable label | ■ Readable label | |
| **HAZWASTE** | | 1. DEH, Environmental Management Branch, Classification Unit, building 1345, 288-7627 |
| ■ Identified | | |
| ■ Containerized | | |
| ■ Documented | | |
| ■ Labeled | | |

a. Safe disposition of HAZMAT and HAZWASTE can be made only if the pertinent hazards and chemical composition are known. For HAZWASTE this information is generally developed when accumulation areas are established per paragraph 6-6. DEH, 288-7627, can assist to identify or characterize chemical compounds according to paragraph 6-5.

b. DOL, Base POL Laboratory, building 7046, 287-2504, analyzes POL products to determine their quality. The results on DA Form 2077 (Petroleum Product Laboratory Analysis Report) generally indicate that the product can be used for its intended purpose as is, may be restored to acceptable specifications standards, or that it must be disposed of.

c. To ensure safe accumulation, handling and transportation of HAZMAT/HAZWASTE, the package, repackage or overpackage must be compatible with the substance and meet the following qualities:

(1) Free of leaks.

(2) Clean and without considerable corrosion.

(3) Labeled and marked per paragraph 6-6.

(4) Serviceable bungs, plugs, lids, caps, or collars tightly in place.

(5) Without rust or damage (such as large dents on the seams) which may result in leaks.

(6) Dry batteries may be packaged in a cardboard box lined with a plastic bag.

(7) Whetlerite charcoal filters (from NBC masks) may be packaged in doubled transparent plastic bags.

d. Documents required for HAZMAT/HAZWASTE turn-in include one or more of the following:

(1) DD Form 1348-1 is required for turn-in transactions at DEH and DRMO.

(2) DA Form 2077 is required for POL turn-ins, except for outdated packaged products which are not listed in current Department of Defense Quality Status List as having shelf-life extended. If the product is not listed it is not usable for military operations as is (see table 6-1).

(3) Other laboratory reports are issued through DEH as required when mixtures and unknown substances are characterized or identified through chemical analysis per paragraph 6-5.

(4) Turn in serviceable HAZMAT through the supporting direct support unit (DSU) to DOL, Supply Division at Yard #37, building 4125, using DA Form 2765-1 (Request for Issue or Turn-In).

(5) MSDS are required for HAZMAT turn-in.

e. Other preparations for turn-in.

(1) Extract water from POL products (run fuels through filter separator) before sampling.

(2) Treat empty containers which previously contained a hazardous substance as if they were full of their original contents. When required, triple rinse empty containers per paragraph 5-9i. Contact DEH, 288-7627, for specific guidance relevant to turn-in of empty hazardous containers.

(3) Obtain shelf-life validation through DOL, POL Laboratory, building 7046, 287-2504, to determine use or disposal of products affected by expiration or extension of shelf-life.

**6-13. CALCIUM HYPOCHLORITE STORAGE.** Calcium hypochlorite, NSN 6810-00-255-0471 (also available under other NSNs) is extremely corrosive to ferrous metals. Calcium hypochlorite is incompatible with petroleum products, DS2 and several insecticides. Their proximity to calcium hypochlorite can result in fire and toxic fumes. Store calcium hypochlorite overpacked in a serviceable ammunition chest (ammo can), NSN 8140-00-828-2938 or equal. Paint the ammunition chest yellow and label it "CALCIUM HYPOCHLORITE CLASS III OXIDIZER."

**6-14. SULFURIC ACID (BATTERY ELECTROLYTE).**

a. When handling sulfuric acid wear face shield, rubber gloves, rubber apron, and work in a well ventilated area. Eye wash and deluge shower must be located within 25 feet of the working area. Potable water is piped to these devices in permanent facilities. At other facilities approved portable devices capable of delivering enough potable water to last at least 15 minutes shall be made available. Contact MEDDAC, Preventive Medicine Activity, 287-3974, for more guidance.

b. Palletize and store sulfuric acid containers in well ventilated storage areas, with an unpenetrable secondary containment in place for spill control. Electrolyte shall not be stored where it may leak or spill into drainage systems or water supply.

c. Turn in empty sulfuric acid containers (ensure acid residue is neutralized) to DRMO as recyclable material, using DD Form 1348-1 per III Corps & FH Reg 420-6, appendix A.

d. Specifically designed battery shops are the only facilities authorized to treat sulfuric acid waste. Only personnel qualified according to paragraph 6-10 are permitted to neutralize acid. Confirm neutralization (pH between 6 and 9) using pH paper or pH meter, then discharge the treated waste into the sanitary sewer. Other generating facilities must dilute their waste acid through addition of one part acid to two parts water and turn it in to their DSU for neutralization. Always pour acid into water; never pour water into acid. Place diluted electrolyte into Department of Transportation containers specification 37M or 37P, or fiberglass pods.

**6-15. HAZARDOUS BATTERIES.** Several common dry batteries have one or more hazardous characteristic. Hazards remain even after batteries are depleted. To determine if a battery is hazardous, check the special control item (SCI) code for the corresponding NSN listed in the monthly Army master data file (AMDF). Batteries given SCI code 7 are HAZMAT and become HAZWASTE when unserviceable. Figure 6-2 provides characteristics of batteries by type number.

| BATTERY TYPE NUMBER | COMPOSITION | HAZARD CATEGORY |
|---|---|---|
| BA-1 through BA-471/U (except BA-245/U, BA-259/U and BA-380/U), BA-500 Series and BA-700 through BA-999/U | LeClanche/Zinc-Manganese Dioxide ($Zn\text{-}MnO_2$) | Nonhazardous |
| BA-1000 through BA-1999/U, including: Duracell (Mallory) RM400R, RM42RT, TR135R, TR164, TR234R, TR286, and W2 | Mercury (Hg) | Hazardous |
| BA-3000 through BA-3999/U | Alkaline | Nonhazardous |
| BA-4000 through BA-4999/U | Magnesium (Mg) | Hazardous |
| BA-5000 through BA-5999/U (except BA-5372/U) | Lithium-Sulfur Dioxide ($Li\text{-}SO_2$) | Hazardous |
| BB-XXXX | Lead-Acid | Hazardous |
| BB-XXXX | Nickel-Cadmium (NICAD) | Hazardous |

Figure 6-2. Characteristics of batteries

a. Upon receipt, inspect batteries for damage and leaks. Thereafter, inspect in storage weekly. Place damaged or leaking batteries in a plastic bag or suitable nonleaking container for turn-in per paragraph 6-12.

b. Turn in unserviceable batteries to DSU per applicable turn-in procedures or to DEH according to paragraph 6-12. Do not discard hazardous batteries into trash.

c. Wear rubber gloves, rubber apron, face shield, and shirt with long sleeves rolled down whenever handling damaged or leaky batteries.

**6-16. STANDARD ARMY DECONTAMINANT, DS2.** DS2 is a corrosive substance. Health and environmental hazards may result when mishandled. If stored in a compatible storage area, DS2 is not a fire hazard. When stored next to super tropical bleach (STB), acids, or oxidizers, there is a potential for fire and explosion.

a. Protect DS2 in storage from damage, rain, moisture, and rust. Store DS2 in a dry, cool place. Position crates and containers on pallets and avoid resting DS2 directly on the ground.

b. Inspect each DS2 container for serviceability at least monthly and maintain as needed.

(1) Turn in leakers and probable leakers according to paragraphs 6-12 and 6-16c.

(2) Restore rusty DS2 cans. Remove rust and spot paint the affected surface. Consider that the material of 1-1/3-quart cans and the cap on the 5-gallon can are very thin.

(3) Maintain markings and labels on DS2 containers or crates clearly readable.

c. Turn in leaking, severely corroded, or badly damaged DS2 per paragraph 6-12. Overpack leakers using open-head drums furnished through DEH, 288-7627.

(1) Do not transfer unserviceable DS2 from its original container to another.

(2) Use the smallest possible open-head drum for the specific quantity and contain as many unserviceable cans of DS2 as it may adequately accommodate. Every DS2 can in an overpack drum should be of the same size.

(3) Tightly seal and label overpack drums before transporting.

d. During unserviceable DS2 cans overpacking, leaders enforce safety precautions.

(1) Overpack DS2 at well ventilated areas which are accessible only to personnel engaged in overpacking.

(2) Have sodium bisulfate, NSN 6810-00-270-9984, and hot soapy water available to neutralize, clean up spills, and decontaminate equipment.

(3) Personnel engaged in or observing DS2 overpacking shall use the following protective equipment:

(a) Protective mask, NSN 4240-01-143-2017, or similar.

(b) Rubber gloves, NSN 8415-01-033-3517, or similar.

(c) Rubber apron, NSN 8415-00-281-7813, or similar.

(4) Severe respiratory tract, skin, or eye irritation may result from contact with DS2 or its fumes. Do not employ personnel who suffer medical conditions related to lungs, kidneys, skin, or nervous system to overpack unserviceable DS2.

e. Use of DS2 during field training is unauthorized.

**6-17. SUPER TROPICAL BLEACH.** STB is a general purpose decontaminant for standard chemical agents. Health and environmental hazards may result when mishandled. If stored in a compatible storage area, STB is not a fire hazard. When stored next to POL, disinfectants, acids, ammonia, or DS2, there is a potential for fire, explosion, and toxic fumes.

a. Protect STB stock from heat, rain, moisture, damage, and rust. Store STB in a dry, cool place and preserve markings on the container. Position containers on pallets and avoid resting STB directly on the ground.

b. Inspect STB for serviceability at least monthly and maintain containers as needed.

(1) Restore rusty STB containers. Remove rust and spot paint the affected surface.

(2) Maintain markings on STB containers clearly readable.

(3) Validate test date as explained in paragraph 6-7b(3).

c. Turn in leakers, badly damaged, or shelf-life expired STB per paragraph 6-12. Overpack leakers using open-head drums furnished through DEH, 288-7627. Do not dispose of STB through the sanitary sewer unless coordinated through DEH, 288-7627. Indiscriminately dumping STB into sewer systems will damage the sewage treatment plant.

(1) Do not transfer STB from its original container to another.

(2) Overpack drum should be the smallest possible for the specific quantity and contain as many unserviceable STB containers as it may adequately accommodate.

(3) Tightly seal overpack drums before transporting.

d. Use of STB during field training is unauthorized.

**6-18. PAINTS.** Most paints exhibit two hazardous characteristics - ignitability and toxicity. Painting operations shall not significantly contribute to personnel endangerment or environmental pollution.

a. Stockage of CARC paint in 1-gallon or larger cans is not authorized except for certified paint booths. Organizational maintenance may stock a 90-day supply of paint materials listed in figure 6-3, for spot painting.

| NOMENCLATURE AND SPECIFICATION | COLOR | SIZE | NSN |
|---|---|---|---|
| Primer (wash) pretreatment, DOD-P-15328 | na | 1 1/4 qt kit | 8030-00-850-7076 |
| Epoxy, Water reducible, MIL-P53030 | Reddish-brown | 1 1/4 qt kit | 8010-01-193-0519 |
| CARC Single Component, Topcoat, MIL-C-53039 | Green 383 | 1 qt can | 8010-01-229-7546 |
| CARC Single Component, Topcoat, MIL-C-53039 | Brown 383 | 1 qt can | 8010-01-229-7543 |
| CARC Single Component, Topcoat, MIL-C-53039 | Black | 1 qt can | 8010-01-229-7540 |
| CARC Single Component, Topcoat, MIL-C-53039 | Sand | 1 qt can | 8010-01-234-2934 |
| CARC Single Component, Topcoat, MIL-C-53039 | Aircraft Green | 1 qt can | 8010-01-246-0717 |
| Thinner, Type I (for polyurethane), MIL-T-81772 | na | 1 gal can | 8010-00-181-8080 |
| Thinner, Type II (for epoxy), MIL-T-81772 | na | 1 gal can | 8010-01-200-2637 |

Figure 6-3. Paint materials selection for spot painting

b. Implement the following guidance for repainting vehicles and equipment.

(1) Totally repainting vehicles and equipment solely for uniformity or other cosmetic reasons is prohibited. Unessential repainting generates unnecessary HAZWASTE and needlessly exposes personnel and the environment to hazards.

(2) Regardless of need and method of paint application, total repainting of vehicles and equipment at organizational maintenance is not authorized. Makeshift paint shops are not authorized.

(3) DOL determines which vehicles and equipment need total repainting. Coordinate with DOL, 287-5109, to obtain determinations.

(4) Repainting and spot painting alkyd paint over CARC is prohibited.

c. Spot painting of vehicles and equipment using brushes is authorized at all levels of maintenance.

d. Coordinate safety and health requirements through G1, 287-3725.

# CHAPTER 7
# POLICE AND MAINTENANCE OF GROUNDS

**7-1. SUMMARY.** This chapter delineates a general plan for police, maintenance of grounds, and sanitation.

**7-2. GENERAL.**

a. Dumping trash onto the ground or places other than trash receptacles is prohibited. Personnel not subject to the UCMJ are prosecuted for dumping trash in violation of 18 USC 13 and Vernon's Texas Codes Annotated, Article 4477-9a. Violators of the Texas statutes as assimilated into Federal law are subject to a maximum fine of $400.

b. Do not paint trees and rocks for ornamental purposes. Preserve the natural look.

**7-3. RESPONSIBILITIES.**

a. Garrison Commander. The Garrison Commander assigns police sectors to MSCs.

b. DEH:

(1) Provides overall staff supervision of police and maintenance of roads and grounds.

(2) Conducts frequent visits to Fort Hood areas to ensure acceptable standards of police, sanitation, and maintenance of grounds. Location of illegal dump sites or other discrepancies are reported to the Garrison Commander sergeant major.

(3) Mows and trims lawns adjacent to unoccupied family quarters.

(4) Mows open areas which are larger than 2 acres of continuous grass.

(5) When requested, DEH, 287-2113, provides the available resources and technical advice for maintenance of grounds beyond the capability of the organization or occupants.

c. Commanders:

(1) MSCs establish the "on-the-ground" limits of police sectors through direct coordination. Sectors of police responsibility are assigned through the Garrison Commander. Specific tasks of police responsibility include police, sanitation, maintenance of drainage, pruning trees and shrubs, fertilizing, watering, mowing, weed control, and trimming grass around drives, walks, utility poles and objects which obstruct the path of mowers.

(2) Organizations and activities located or operating within a police sector not assigned to their parent command are responsible for the police and grounds maintenance of the area they occupy or use. The host command shall not assign additional police areas to these organizations or activities. The final responsibility for these areas rests upon the command to which the police sector is assigned.

(3) Commanders are responsible for police and ground maintenance around recreation facilities, Fort Hood activities, athletic facilities, swimming pools, and vacant buildings within their respective sectors assigned through the Garrison Commander.

(4) Commanders are responsible for the police and grounds maintenance of common areas and large open areas within the family housing communities in their sponsored regions.

(5) Commanders are responsible for directing the legal disposition of Government or abandoned personal property recovered during police and maintenance of grounds.

(6) Commanders or their representatives are responsible for daily checks of trash containers to prevent usable or salvageable Government property from being discarded.

(7) Regardless of police sector assignment, the unit commander ensures range or training area used is policed and damaged grounds are reasonably restored. When a training area is found in an unsatisfactory state of police, the using unit reports the circumstances to: Range Division, 287-5519, for range areas; or DEH, 287-8754, for outside the range area.

(8) Airfield commander directs the police and maintenance of grounds within the airfields.

d. PM:

(1) Issues citations to soldiers and civilian personnel suspected of littering within Fort Hood.

(2) Reports illegal dump sites to DEH, 287-8754. In cooperation with DEH, establishes the identity of persons or organizations responsible for illegal dumping and issues citations or reports. Cases involving civilians are referred to the U.S. Magistrate Court through the SJA.

(3) Directs the disposition of abandoned vehicles.

e. Fort Hood activities:

(1) Organizations and agencies operating or occupying Fort Hood activities police and maintain the areas they use or occupy. This includes parking lots, half the distance between buildings, and 75 feet from facilities where boundaries are not physically defined. Where applicable, existing fences are the boundaries.

(2) The general manager of the Central Texas Area Exchange is responsible for police and grounds maintenance around AAFES facilities.

(a) AAFES manages its waste collection and disposal contracts independently.

(b) Contractors performing waste collection and disposal for AAFES are required to comply with this regulation.

(c) AAFES and its contractors may use the post landfill to dispose of municipal waste free of HAZWASTE.

f. Family Housing. Family housing responsibilities are assigned in publications issued through DEH, Housing Division, building 108.

g. Refuse Collection and Disposal Contractor. The contractor operates the post sanitary landfill according to contract specifications and applicable Federal and State laws and regulations.

## 7-4. PROCEDURES.

a. Where a road or street is the boundary between two police sectors, the limits of responsibility are the northern and western curb or shoulder-line except sectors bordering the range area, which include shoulders, ditches, and cleared areas on both sides of the range road.

b. Avoid company formations for the purpose of regular police call. Assign this task to small units or work details.

c. Report abandoned vehicles to the PM, Operations Division, 287-5407.

d. Report large dead animals to DEH, 287-1090/8754.

e. Report illegal dumping sites to DEH, 287-8754.

f. Make legal disposition of government property and abandoned personal property recovered during police. Deposit obvious trash in refuse containers or the sanitary landfill. Turn in scrap metal, usable lumber, field telephone wire, concertina wire, and empty containers to DRMO according to III Corps & FH Reg 755-725.

g. Use the following guidelines for lawn maintenance.

(1) Mowing should provide a finished appearance, free of ridges, ragged edges, or scalping. The frequency of mowing depends on weather conditions; however, it should be done as often as necessary to maintain a constant trim appearance. The ideal height of the cut is 1 1/2 to 2 inches. Adjust mower blade height while the mower is parked on a flat surface before mowing.

(2) Occupants are not authorized to apply chemicals for weed control. When necessary, chemical weeding is accomplished through certified DEH personnel. A well fertilized, properly mowed and watered lawn requires very little weed control. When hand weeding becomes necessary, the best time to do it is after a rain or watering.

(3) Occupants may obtain fertilizer from DEH, Self-Help Issue Point (SHIP), or DEH may do the fertilization through contracting when feasible. Prevent burning lawns when applying fertilizers. Never apply fertilizer to a wet lawn.

(4) Trim lawns along walks, driveways, curbs, buildings, utility poles, hydrants, and other spots where a neat appearance is necessary. Avoid ditching along paved surfaces.

(5) Lawns should be watered sufficiently to prevent drying, but not to waste water. Thorough watering each 3 to 4 days is normally adequate. A good rain may also be adequate watering. Do not leave lawn sprinklers unsupervised, or so long in one place as to cause excessive saturation or a wasteful overflow onto curbs, streets, drives, walks, and pavements. Do not wash away topsoil and fertilizer with excessive watering.

(6) Ruts and soil erosion along sidewalks, paved areas, structures, and similar areas should be filled, seeded, and fertilized to deter further erosion. Report extensive erosion beyond the occupant's repair capabilities to DEH, 287-2113.

h. Use the following guidelines for maintenance of ornamental vegetation.

(1) Trees and shrubs may be trimmed to form an ornamental shape if the particular species is suitable for that effect and the survival of the tree or shrub would not be threatened. DEH provides major pruning of trees and shrubs annually while occupants trim shrubs and hedges neatly in a manner that promotes their natural shape and growth pattern. Remove dead or broken parts of trees and shrubs. Obtain guidance for pruning and trimming shrubs or trees from DEH, 287-1090.

(2) Planting flowers to enhance the natural beauty of the surroundings is encouraged. Cultivate established flower beds, and keep them free of grass and weeds.

i. Remove dead vegetation and trash from paved areas, flower beds, lawns, and beneath shrubs or trees. Place the collected rubbish in suitable containers for disposal.

j. Do not use earth-moving capabilities of combat vehicles for restoration or modification of landscape. Exceptions are made for tactical operations in suitable training areas when excavation is coordinated prior to the exercise, according to chapter 11.

## 7-5. SANITATION.

a. The refuse collection contractor, 532-2256, makes special trash pickups upon request.

b. The post sanitary landfill is open from 0730 to 1700, Monday through Friday, and 0730 to 1300, Saturday. It is "off-limits" any other time. Users should coordinate with the attendant before unloading any refuse.

c. Scavenging of trash containers or the post sanitary landfill is prohibited.

d. Maintain well-fitted covers on garbage or trash containers and keep them closed as much as practical. Do not fill these receptacles beyond their capacity. When multiple refuse containers become 3/4 full, contact the refuse collection contractor, 532-2256, to ensure timely service. Keep the areas around waste containers free of spillage. Place bulky items alongside of waste containers, and maintain access to multiple refuse containers clear to permit the contractor to empty them. The only refuse containers to be painted are the multiple refuse containers. The contractor may refuse to empty containers having hazardous or salvageable materials. Using organization must remove such items.

# CHAPTER 8
# SPRING AND FALL CLEANUP PROGRAM

**8-1. SUMMARY.** This chapter establishes a cleanup program which emphasizes environmental maintenance biannually. The objectives are to enhance the environment at training areas, beautify appropriate areas, and police and repair range areas.

**8-2. RESPONSIBILITIES.**

a. Commanders:

(1) Police and repair range areas per assigned task.

(2) Appoint a project officer to delineate and coordinate a plan for implementing the cleanup and requesting DEH support as needed.

b. DEH:

(1) Coordinates the overall cleanup effort.

(2) Provides technical advice on planting and maintaining vegetation.

(3) Makes topsoil and equipment such as mowers and garden tools available.

(4) Distributes fertilizer and grass seeds during the spring.

c. G3/DPTM. G3/DPTM distributes schedules and tasking for the live-fire area and range facilities.

**8-3. PROCEDURES FOR MILITARY UNITS.**

a. MSCs consolidate their requests for topsoil, fertilizer, and grass seeds.

b. During each cleanup week, military organizations devote 1 day to beautify the cantonment area. Tasks may include, but are not limited to:

(1) Replacing turf through tilling or loosening the soil, filling ruts, covering exposed tree roots, seeding, fertilizing, and watering as necessary.

(2) Policing assigned sectors according to chapter 7. Special effort is given to training facilities, picnic sites, ponds and lakes, and areas of high public visibility. Make disposition of recyclable materials per III Corps & FH Reg 420-6.

c. Common areas and large open areas in family housing villages are policed and maintained per paragraph 7-3c(4).

**8-4. FAMILY HOUSING PARTICIPATION.** Occupants may support the cleanup and assist sponsor units in maintenance of common areas. Area cleanup and beautification includes ground adjacent to quarters, common and large open areas. Occupants may plant small trees, flowers, and shrubs at their own expense. Residents must coordinate with DEH, building 4228, 287-9735, using FHT Form 420-X10 before excavating. This is necessary because of the underground utility systems. Consider future plant growth in relation to conflict with sidewalks, drives, buildings, streets, and overhead utility lines. A listing of flowers, trees, and shrubs suitable to Central Texas is available from DEH, 287-1090, at building 4468.

# CHAPTER 9
# EXCAVATIONS

**9-1. SUMMARY.** This chapter delineates procedures to prevent damage or destruction of historical or archeological resources and underground utility lines. The restrictions and coordination requirements established through this regulation are designed to carry out provisions of applicable Federal laws and ensure safety of personnel.

## 9-2. EXCAVATIONS OUTSIDE CANTONMENTS.

a. Coordinate with DEH, 287-7965, building 4468, using FHT Form 420-X10, training or other actions associated with earth moving or excavations demanding use of machinery. The most common actions requiring coordination are berms, bunkers, crossing sites, defilade positions, fighting positions, fire breaks, general construction, land clearing, new trails or roads, ponds, tank traps, and trenches. Hand digging of foxholes and other small excavations may be accomplished without coordination, except in designated endangered species habitats, according to paragraph 10-2e.

b. Keep foxholes and field fortifications to a minimum consistent with training objectives. Fill foxholes and emplacements upon completion of training. Units conducting training shall not excavate areas for fill or as a training task without approval from the DEH. If a training area shows evidence of unauthorized excavations, report discrepancies to DEH, 287-7965.

c. Do not excavate within 100 meters of streams, ponds, or lakes, and never orientate the length of excavations up and down the inclination of slopes. Coordinate excavation requirements with DEH using FHT Form 420-X10. This coordination includes consideration of:

(1) When archeological survey of the area is incomplete, or the sites are located within high risk areas where archeological find is probable, DEH shall conduct a field inspection of the proposed sites. The field inspection results provide the deciding factors relevant to the proposed excavation. DEH monitors excavations within high risk areas.

(2) If archeological resources are discovered during excavation, prior coordinations become invalid. Therefore, excavation or disturbance of the site shall be interrupted until DEH evaluates the significance of the finding and issues new guidance.

(3) Excavation sites shall be restored upon termination of use, unless otherwise coordinated with DEH.

**9-3. EXCAVATIONS NEAR UNDERGROUND UTILITIES.** Excavation through underground utility lines may cause lethal hazards and catastrophic environmental consequences. Coordination of excavations, using FHT Form 420-X10, is imperative when utility lines are expected.

a. There are underground utilities at the following ranges:

| | |
|---|---|
| Black Gap | Crittenberger |
| Blackwell | Dalton Mountain |
| Brown's Creek | Henson Mountain |
| Clabber Creek | Jack Mountain |
| Clear Creek | Pilot Knob |
| Cowhouse Machinegun | Sugar Loaf Mountain |

b. There are underground utilities in training areas 1, 14, 15, 16, 17, 45, 51, 53, 54, 65, 66, 71, 73, and 74.

**9-4. EXCAVATIONS AT CANTONMENTS.** Coordinate proposed excavations in or near developed areas with DEH, 287-0768, building 4228, using FHT Form 420-X10.

# CHAPTER 10
# THREATENED AND ENDANGERED SPECIES

**10-1. SUMMARY.** This chapter provides parameters to prevent damage to habitats and reduce disturbance of mating and nesting activities. Endangered species such as the black-capped vireo and golden-cheeked warbler nest on Fort Hood from 1 March to 31 July. The bald eagle comes to spend the winter. One of the detriments to survival of endangered species is the loss of habitat. Fort Hood manages habitats in compliance with the Endangered Species Act. Personnel not subject to the UCMJ are prosecuted for disturbing or destroying endangered species or their habitat in violation of 18 USC 13.

**10-2. COEXISTENCE.** Known endangered species habitats are designated in the Training Area Maps, stock numbers V782SFHMIM1, 2, 3, and 4. Vehicular travel through these areas is not harmful if movement is confined to established tank trails. Other uses of the areas are subject to restrictions promulgated in this regulation.

a. Limit the time span of activity within a habit to less than 2 hours per day during the nesting period occurring from 1 March to 31 July. This limitation shall not be circumvented or defeated through rotation of subordinate elements, brief displacements, or yielding training areas to other organizations.

b. Drive vehicles on established tank trails. Do not create new roads and trails unless permitted through coordination with DEH as provided in chapter 9. Park vehicles in open areas if travel to and from does not include vehicular movement over trees or brush.

c. Prevent damage to vegetation. Cutting of brush or trees within habitat areas is not authorized.

d. Protect vegetation against fire. Take necessary precautions to prevent fires and promptly extinguish fires started accidentally.

(1) Outdoor fires are not authorized except as provided in paragraph 3-2.

(2) Avoid unnecessary use of pyrotechnics and incendiary munitions.

(3) Report fires to Range Division through frequency modulated (FM) 30:45. When FM radio is not available, send a messenger to building 56000 or nearest fire station.

e. Use existing tactical emplacements such as artillery firing points depicted on current topographic maps. Digging or construction of new emplacements within woodlands is not authorized.

f. Refrain from tampering or interfering with the bird traps located throughout habitats.

**10-3. OPERATIONAL CONFLICTS.** Coordinate with DEH, Fish and Wildlife Branch, 287-2885, if there is a conflict between mission and the requirements of this chapter.

# APPENDIX A
# REFERENCES

**A-1. REQUIRED PUBLICATIONS.** These publications are necessary at users level to comply with or to understand this regulation:

| | |
|---|---|
| AR 200-2 | Environmental Effects of Army Action (cited in paragraph 1-4a(2), and 2-1) |
| FM 10-20 | Organizational Maintenance of Military Petroleum Pipelines, Tanks, and Related Equipment (cited in paragraphs 5-11a(9), and 5-11d(8)) |
| FM 21-10 | Field Hygiene and Sanitation (cited in paragraphs 4-5b and 4-8) |
| III Corps & FH Reg 200-10 | Spill Prevention Control and Countermeasure Plan (SPCCP) (cited in paragraphs 5-4, 5-5a(1)(f), 5-8a(1), and 5-8c(5)) |
| III Corps & FH Reg 420-1 | Fire Regulations (cited in paragraphs 4-10, 5-7a(3), 6-7d(6), and 6-7e(7)) |
| III Corps & FH Reg 420-6 | Recycle Program (cited in paragraphs 5-9i, 6-14c, and 8-3b(2)) |
| Not Numbered | ARMS Monthly AMDF (cited in paragraph 6-15) |
| SB 700-20 | Army Adopted and Other Items Selected for Authorization/List of Reportable Items (cited in paragraph 5-11c(4)) |

**A-2. RELATED PUBLICATIONS.** These publications are a source of additional information. Isolated need for these publications occur and considering that the majority of them are not reasonably available to users, DEH maintains the related publications on file. Users may coordinate with DEH, 287-8754, to gain access to the following publications.

| | |
|---|---|
| AR 40-5 | Preventive Medicine |
| AR 40-13 | Medical Support - Nuclear/Chemical Accidents and Incidents |
| AR 50-6 | Chemical Surety Program |
| AR 190-5 | Motor Vehicle Traffic Supervision |
| AR 190-29 | Misdemeanors and Uniform Violations Notices Referred to U.S. Magistrate or District Courts |
| AR 200-1 | Environmental Protection and Enhancement (cited in paragraphs 1-4a(2), 5-2a, and 5-5c(2)) |
| AR 210-20 | Master Planning for Army Installations |
| AR 385-10 | Army Safety Program (cited in paragraph C-1) |
| AR 420-47 | Solid and Hazardous Waste Management |
| AR 420-74 | Natural Resources; Land, Forest, and Wildlife Management |
| AR 500-60 | Disaster Relief |

| | |
|---|---|
| AR 600-20 | Army Command Policy and Procedures (cited in paragraph 5-5b(5)) |
| FM 10-69 | Petroleum Supply Point Equipment and Operations |
| III Corps & FH Reg 190-5 | Motor Vehicle Traffic Supervision |
| III Corps & FH Reg 210-25 | Hunting, Fishing, and Natural Resources Conservation Regulations (cited in paragraph 4-3) |
| III Corps & FH Reg 350-12 | Tasking III Corps and Fort Hood |
| III Corps & FH Reg 420-27 | Care, Maintenance, and Alterations of Facilities |
| III Corps & FH Reg 600-20 | Community Life Program |
| III Corps & FH Reg 755-725 | Procedures for Turn-In to and Withdrawal From Defense Reutilization and Marketing Office (DRMO) (cited in paragraphs 5-9i, and 7-4f) |
| TM 3-261 | Handling and Disposal of Unwanted Radioactive Material |
| Not Numbered | Vernon's Texas Codes Annotated |
| 18 USC 13 | Assimilative Crimes Act |
| 29 CFR | Labor-Occupational Safety and Health Administration, Department of Labor |
| 40 CFR | Protection of Environment |
| 49 CFR | Transportation-Research and Special Program Administration, Department of Transportation |

A-3. FORMS.

| | |
|---|---|
| DA Form 2077 | Petroleum Product Laboratory Analysis Report |
| DA Form 2765-1 | Request for Issue or Turn-In |
| DA Form 4283 | Facilities Engineering Work Request |
| DD Form 1348-1 | DOD Single Line Time Release/Receipt Document |
| DD Form 2521 | Hazardous Chemical Warning Label |
| DD Form 2522 | Hazardous Chemical Warning Label |
| FH Form 2146 | Pollution Incident Report |
| FHT Form 420-X10 | Coordination for Land Excavation |
| FH Poster 420-3 | In Case of A Spill |

# APPENDIX B
# POTENTIAL SOURCES OF POLLUTION

Table B-1. Potential sources of pollution.

| SOURCE | POTENTIAL POLLUTANTS |
|---|---|
| Motor pools, automotive, or aircraft maintenance shops. | Used oil and hazardous substances. |
| Printing shops. | Solvents and the waste generated from their use. |
| Laboratories (research, analytical, hospital, and production). | Chemical substances listed in 40 CFR 261.33, and waste generated from their use. |
| Film processing shops. | Photographic waste, hospital X-ray waste. |
| Paint operations. | Paint waste, VOCs and particulate pollutants. |
| Pesticides storage facilities. | Pesticides, herbicides, rodenticides, (conforming or not conforming to specifications); and any residue, contaminated soil, water, or other waste resulting from the cleanup of a spill or use of such substances. |
| Hospitals and clinics. | Infectious waste, chemical substances, and drugs. |
| Trade shops (carpentry, electrical, plumbing, metal working, and so forth). | Chemical substances, used oil, and miscellaneous HAZWASTE. |
| Transformers and capacitors containing polychlorinated biphenyls(PCBs) | PCBs and PCB materials. |
| Chemical storage areas including warehouses. | Chemical substances conforming or not conforming to specifications, chemical residue, contaminated soil, water, or other waste resulting from cleanup of spills. |
| Industrial waste treatment facilities. | Sludges exhibiting characteristics of HAZWASTE. |
| Incinerators. | Ash, scrubber, and baghouse waste that exhibit characteristics of HAZWASTE. |
| Battery shops. | Sulfuric acid and lead. |
| Fuel storage and transporters. | Petroleum fuels. |
| Laundry | Solvents and waste generated from their use. |

# APPENDIX C
# ENVIRONMENTAL TRAINING

**C-1. ENVIRONMENTAL MANAGEMENT COURSE.** DEH and G1 present the Environmental Management Course quarterly. This 2-day training provides working knowledge of responsibilities, techniques, records, resources, Federal and State laws, and procedures applicable to additional duties according to paragraph 5-8b(1). The course also includes Hazard Communication training to enable students to give Hazard Communication training and perform additional duties per FH Supplement 1 to AR 385-10. MSCs coordinate with DEH, 287-8755, to obtain allocations for the EMC. The EMC is designed for ECs, however, Sergeants First Class and above whose duties include commanding or leading potential spill sites listed in III Corps & FH Reg 200-10, appendix B may attend. The EMC agenda includes classes on:

a. Pollution abatement.

b. HAZWASTE management, disposition, and HAZMIN.

c. Selection, acquisition, and management of HAZMAT.

d. Spill prevention and contingency plans.

e. Recycling.

f. Conservation and environmental preservation during field training excersises (FTX).

g. Department of Defense Federal Hazard Communication Training Program.

h. Environmental liabilities (administrative and criminal).

i. ECs responsibilities.

**C-2. COMMANDERS' ENVIRONMENTAL ORIENTATION.** DEH provides a 3-hour executive summary of the EMC for brigade, group, battalion, company, and detachment commanders, at least semiannually.

**C-3. TROOP SCHOOL.** DEH provides environmental training in support of the Commanders/First Sergeants Course, Maintenance Officers Course, Motor Sergeants Course, and other courses, as coordinated (287-8755). The topics of this training include pollution abatement, recycling, HAZWASTE management, and HAZMAT management.

**C-4. SPILL PREVENTION BRIEFING.** Commanders or activity chiefs conduct a monthly briefing to ensure understanding of spill prevention procedures applicable to their facilities or operations. The recommended outline in figure C-1 provides a concept for presentation of a 15-minute briefing to assist commanders in their compliance with 40 CFR 112, RCRA, and paragraph 6-10.* Organizations should modify the recommended outline as needed to satisfy the specific spill prevention training needs of their personnel. Certified ECs should present the monthly spill prevention briefing.

**C-5. ORGANIZATIONAL ENVIRONMENTAL TRAINING.** Commanders and activity chiefs conduct environmental training at least quarterly. Unusual circumstances may require additional one-time environmental classes to satisfy specific mission or FTX requirements. Unit commanders determine frequency of supplemental environmental training. The training outline in figure C-2 provides a concept for presentation of a 2-hour environmental awareness class. Organizations should modify this concept to satisfy the specific needs of their personnel. A certified EC should present environmental training. Obtain assistance and guidance for the trainer, graphic aids, artwork for overhead transparencies, and other support from DEH, 287-8755, at building 4468.

**C-6. LEADERS' ENVIRONMENTAL ORIENTATION.** Organizations may coordinate through DEH, 287-8755, to obtain environmental orientations for their officers, warrant officers, and noncommissioned officers. These orientations last 1 or 2 hours and are presented at facilities provided by the requesting organization. Requesting organizations determine the

agenda, or DEH may provide recommendations for the organization to consider. The organization's EC also can provide this training.

MONTHLY SPILL PREVENTION BRIEFING

TYPE: Information Briefing

TIME: 15 minutes

REFERENCES: III Corps & FH Regs 200-10, 420-2, 755-725 and organization's HAZWASTE inspection/training log.

WHO SHOULD ATTEND: Leaders and operators of potential spill sites.

TRAINING AIDS: To be established and procured to meet the needs.

1. INTRODUCTION

a. Greeting.

b. Purpose. To maintain understanding of spill prevention procedures applicable to (name of facility, operation or organization).

c. Procedure. Explanation of how briefing is organized.

2. EXPLANATION

a. Assumptions (if any were made).

b. Summary of inspections received from external sources.

c. Summary of inspections made internally.

d. Potential sources of spillage within organization's areas.

e. Spill prevention procedures applicable to the organization's storage of HAZMAT, HAZWASTE accumulation, use of HAZMAT, fuel transfer and storage, oil reclamation, transportation of HAZMAT/HAZWASTE and POL, disposal procedures, maintenance, etc.

f. Spill Contingency Plan including reportable quantities, reporting procedures, cleanup, resources available, and sources of assistance.

g. Training Plan including who, what, when, where, and how to rectify training deficiencies related to pollution abatement, spill response, and Hazardous Communication Program.

h. Responsibilities clarification, reassignment, and guidance.

3. CLOSE

a. Solicitation for questions.

b. Closing statement.

Figure C-1. Briefing outline

ORGANIZATIONAL ENVIRONMENTAL TRAINING

TYPE: Conference

TIME: 2-hour (may be condensed to 1-hour)

REFERENCES: III Corps & FH Regs 200-10, 420-2 and organization's HAZWASTE inspection/training log

WHO SHOULD ATTEND: All

TRAINING AIDS: To be established by trainer as needed

1. INTRODUCTION

a. Greeting.

b. Reasons for training. Our operations have the potential to cause pollution incidents (give examples). Pollution abatement and environmental preservation cannot be left to chance. A clean and safe environment is an idea that makes sense and is also mandated in State and Federal laws.

c. Objectives of training. To maintain a "how-to" understanding of pollution abatement and HAZWASTE management.

2. POLLUTION ABATEMENT (1st Period)

a. How do we generate pollution?

b. What can we do about pollution?

(1) Recognize potentials for pollution

(2) Understand and employ what is required to protect the environment

(3) Program and procure resources and assistance

(4) Reduce waste of natural resources

(5) Consider the environment when performing mission or changing operations

c. National Pollutant Discharge Elimination System

(1) Effluent standards

(2) Use of washrack and steam cleaning

Figure C-2. Training outline, page 1 of 2

d. Facilities, resources and procedures

(1) Oil reclamation

(2) Oil-sand interceptor

(3) POL and HAZMAT storage

(4) HAZWASTE accumulation site and procedures

(5) Recycling and disposition procedures

(a) Oil and off-specification fuels

(b) HAZWASTE and excess HAZMAT

(c) Empty containers

(d) Contaminated soil

(e) Recyclable materials

(6) Spill prevention, reporting and cleanup

NOTE: Recapitulate and allow a 10-minute break.

3. HAZWASTE MANAGEMENT (2nd period)

NOTES: Briefly introduce and capitulate the following main topics.
Good place to show TVT 20-949, Every Little Bit Hurts (available at TASC).

a. Laws and regulations

b. Punitive provisions

c. Hazardous recognition and characteristics - Ignitable, corrosive, reactive and toxic

d. HAZWASTE accumulation

e. HAZMAT selection, substitution and procurement

f. Hazards and cost of HAZWASTE mismanagement

g. HAZMIN procedures - conservation and recovery

4. CLOSE Solicit questions, summarize main ideas, concluding statement

Figure C-2. Training outline, page 2 of 2

# GLOSSARY

## ABBREVIATIONS.

AAFES - Army and Air Force Exchange System

AMDF - Army master data file

AR - Army Regulation

AT&SF - Atchison Topica and Santa Fe

CARC - chemical agent resistant coating

CFC - chlorofluorocarbons

CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act of 1980

CFR - Code of Federal Regulations

COC - Corps Operations Center

CTA - Common Table of Allowances

DAC - Department of the Army civilian

DA - Department of the Army

DEH - Directorate of Engineering and Housing

DOC - Directorate of Contracting

DOD - Department of Defense

DOIM - Directorate of Information Management

DOL - Directorate of Logistics

DPTM - Directorate of Plans, Training, and Management

DRMO - Defense Reutilization and Marketing Office

DS - direct support

DSN - defense systems network

DSU - direct support unit

EA - environmental assessment

EC - Environmental Coordinator

EIS - environmental impact statement

EMC - Environmental Management Course

EOC - Emergency Operations Center

EPA - Environmental Protection Agency

FM - field manual; frequency modulated

FORSCOM - United States Army Forces Command

FTX - field training exercise

GC - Garrison Commander

HAZMAT - hazardous material

HAZMIN - hazardous waste minimization

HAZWASTE - hazardous waste

HVLP - high volume low pressure

IRT - Installation Response Team

ISCP - Installation Spill Contingency Plan

MEDDAC - Medical Department Activity

METL - Mission Essential Task List

MOS - military occupational specialty

MSC - major subordinate command (of III Corps)

MSDS - material safety data sheet

NBC - nuclear, biological, chemical

NEPA - National Environmental Policy Act

NIOSH - National Institute for Occupational Safety and Health

NSN - national stock number

NPDES - National Pollutant Discharge Elimination System

OPORD - operation order

OSC - on-scene coordinator

PL - public law

PM - Provost Marshal

POL - petroleum, oils, and lubricants

RCRA - Resource Conservation and Recovery Act of 1976, PL 94-580

REC - record of environmental consideration

SCI - special control item

SJA - Staff Judge Advocate

SHIP - Self-Help Issue Point

SOP - standing operating procedure

SPCCP - Spill Prevention Control and Countermeasure Plan

STB - super tropical bleach

TM - technical manual

USAEHA - United States Army Environmental Hygiene Agency

UCMJ - Uniform Code of Military Justice

USCG - United States Coast Guard

VOC - volatile organic compound

TERMS.

BAFFLE. As applicable to oil-sand interceptors; a deflector made of metal or concrete that allows the flow of water under the fluid surface, while arresting or deflecting the oil on the surface.

CONSERVATION. Preservation from decay, loss, or waste of surface and ground water, forest, other natural resources, and protection of historical or archeological sites.

CRITICAL WATER AREAS. Waters which may flow off the post to include the Leon River, Cowhouse Creek, Belton Lake, North Nolan Creek, South Nolan Creek, Reese Creek and North Reese Creek, and their tributaries.

DISCHARGE. Includes, but is not limited to, any spilling, leaking, pumping, pouring, emitting, emptying, or dumping of any petroleum-base or hazardous substances, whether accidental or intentional.

DISPOSAL OF HAZWASTE. Intentionally placing any HAZWASTE into or upon land or water so that such HAZWASTE or its constituents may enter the environment.

ENVIRONMENTAL PROTECTION AGENCY HAZWASTE NUMBERS. The number EPA assigns to each HAZWASTE listed in 40 CFR 261, subpart C and subpart D.

GENERATOR. Any person, organization, or activity whose act or process produces HAZWASTE.

HAZARDOUS MATERIAL AND HAZARDOUS WASTE. A substance that may cause or significantly contribute to serious illness or death or that poses a substantial threat to human health or the environment when improperly managed. Generally, these substances have one or more of the four hazardous characteristics; ignitable, corrosive, reactive, and toxic.

IMPERVIOUS. Not permitting passage or penetration. Impermeable. Unpenetrable.

INCOMPATIBLE WASTE. Material unsuitable for placement in a particular device or facility because it may cause corrosion or decay of containment materials; or its combination with another waste or material under uncontrolled conditions may produce heat, pressure, fire, explosion, violent reaction, toxic dusts, mists, fumes, or gases.

INSTALLATION. Fort Hood.

INSTALLATION RESPONSE TEAM. Those units, activities, and directorates within the post designated to respond or otherwise participate in the control, abatement, cleanup, and other procedures associated with spill events.

NAVIGABLE WATERS. All navigable waters of the U.S. and tributaries of such waters; intrastate lakes, rivers, and streams interstate travelers use for recreational or other purposes; and interstate lakes, rivers, and streams from which fish or shell fish are taken and sold in interstate commerce.

OFFICIAL USE. Use by an employee, agency, or designated representative of the Department of Defense or one of its contractors in the course of employment or agency representation.

OIL. Any form of oil including, but not limited to, petroleum, fuel oil, sludge, oil refuse, and motor oils. The terms "oil, petroleum, lubricants, and POL" are used interchangeably in this regulation.

OIL-SAND INTERCEPTOR. A structure designed to allow flow of water while segregating and containing oil and sediments.

ON-SCENE COORDINATOR. The person the post commander predesignates to coordinate and direct cleanup efforts at the scene of an oil or hazardous substances discharge on or adjacent to Fort Hood.

OUTAGE. Unoccupied space above the product in a storage tank or container. Adequate outage allows for expansion of the product.

OUTFALL. Permitted point-source of pollution discharge, or location where water exits from lakes.

POLLUTANT. Any substance, chemical, or waste material discharged into or upon water, land, or air in harmful quantities or conditions.

RECYCLE. The process in which materials that would otherwise be discarded as waste are transformed into usable products.

REUSABLE. An item that may be used repeatedly in its present form. Certain containers and cargo pallets are examples of reusable items.

SOURCE SEPARATION. The segregation of recyclable materials at their point of generation. Source separation is one of the most important procedures in the recycle process. It includes storage that prevents further damage or loss of the qualities that make a recyclable material marketable. For instance, if used oil and cleaning solvents are stored in the same container, the resulting mixture becomes a HAZWASTE which, to be legally disposed of, the Government may have to spend funds. However, if used oil and cleaning solvents are segregated and free of other contaminants, the Government is able to sell them separately as recyclable materials.

SPILL EVENT. A discharge of POL or hazardous substance on land or into or upon the navigable waters in a harmful quantity.

TACTICAL. Pertaining to military units.

TOXIC MATERIALS. Poisonous materials or materials having the characteristics to produce the effects of a poison.

TREATMENT. Any method, technique, or process such as neutralization, detonation, chemical or biological change in character, or composition of any HAZWASTE to render it nonhazardous or less hazardous.

TRIPLE RINSE. To remove hazards or clean polluting residue of last known content from empty containers. The term generalizes the numerous procedures or techniques which are specific to the characteristics of the last known content. Rinsing techniques include and are not limited to draining, washing with water or detergent solution, degreasing through steam cleaning or application of solvent, wiping with rags or towels, and chemical treatment or neutralization.

WASTE. Used or unused property, residue, by-products, sludges, and other materials which have no known uses and must be discarded.

The proponent of this regulation is DEH.

FOR THE COMMANDER:

LEON J. LAPORTE
Colonel, GS
Chief of Staff

WILLIAM E. PARKER
LTC, SC
DOIM

DISTRIBUTION:
IAW FH Form 1853, B
PLUS: DEH (2400)
PTM-T-AVMC (400)
IM-PUBS (400)
IM-AO (5)
IM-ARL (2)

# Appendix H

# Sewer Repair Records

# Appendix H

## Sewer Repair Records

The sanitary sewer repair records available from the computer database were obtained from the Directorate of Public Works Engineering Plans and Services Division. These documents are germaine to this report in that a source of contamination of the environment through the sanitary sewer lines is through broken or poorly maintained lines. These reports document problem lines which would indicate possible releases. To interpret the reports the reader should refer to the following abbreviations:

u/s = unstop
rpr/prl = repair or replace
plt = plant
utl = utility

Each call is recorded with the date, building number, caller, and the type of response.

Enter value for timeframe: 1-OCT-93' AND '5-DEC-96
Enter value for facility_number_in_caps: SSWR5
PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 00577 US SWR LINE BLDG 9422 | | | | CMP |
| 06-OCT-93 | MR SLAUGHTER | RPR/PRL UTL LINES | 1 | |
| V0441 BLOW OUT STORM DRAIN | | | | CMP |
| 19-OCT-93 | RICHARD | RPR/PRL UTL LINES | 3 | |
| 05991 U/S MANHOLE AT S/EAST CORNER 723 | | | | CMP |
| 03-NOV-93 | P-3 | RPR/PRL UTL LINES | 1 | |
| 10121 2319 U/S LATERAL LINE | | | | CMP |
| 30-NOV-93 | P-6 | RPR/PRL UTL LINES | 1 | |
| 48298 BLDG 9214, SEWERAGE COMING OUT OF GROUND OUTSIDE | | | | CMP |
| 08-AUG-94 | 1SG AYERS | CUST NO SHOW/TURN BK | 1 | |
| 50150 U/S SEWER DRAIN | | | | CMP |
| 17-AUG-94 | D-35 | CUST NO SHOW/TURN BK | 1 | |

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| [illegible]39 U/S SEWER LINE | | | | CAN |
| [illegible]-AUG-94 | P-13 | CUST NO SHOW/TURN BK | 1 | |
| 53218 U/S STORM DRAIN AT DARNALL LOOP AND 58TH ST | | | | CMP |
| 02-SEP-94 | S-22 | U/S STORM DRAIN AT DARNALL LOO | 3 | |
| 56064 RPR/RPL VALVE COVER TOP ON N/EAST SIDE OF BLDG 410 | | | | CMP |
| 20-SEP-94 | SSG FRANKLIN | RPR/PRL UTL LINES | 1 | |
| 56595 20122 REDLIGHT BLINKING AT SEWER LIFT STN | | | | CMP |
| 22-SEP-94 | DOYLE | SEWER PLT/SEWER LIFT | 1 | |
| 56853 RPR/CK LGHT ON AT LIFT STATION | | | | CMP |
| 25-SEP-94 | H-1 | SEWER PLT/SEWER LIFT | 1 | |
| 57266 RPR SEWERAGE BACKING UP FROM GROUND OUTSIDE BLDG 6950 | | | | CMP |
| 27-SEP-94 | SGT TORRES | RPR/PRL UTL LINES | 1 | |

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 57608 RPR REW SEWERAGE COMING UP OUT OF GROUND NEAR CAMP SITE 4950 | | | | CMP |
| 29-SEP-94 | MS KEMPP | RPR/PRL UTL LINES | 1 | |
| [illegible]50 U/S SEWER DRAIN ON EASTSIDE OF BLDG 9407 | | | | CMP |
| 30-SEP-94 | 710F | RPR/PRL UTL LINES | 1 | |
| 58003 PUMP STAION 20148 HAS RED LIGHT | | | | CMP |
| 30-SEP-94 | MR ARROYO | SEWER PLT/SEWER LIFT | 1 | |
| [illegible]0003 RPR/RPL 2 IMPELLERS | | | | CMP |

01-OCT-94 H-1 VARGAS SEWER PLT/SEWER LIFT 1 CI

01260 U/S SEWER LINE
11-OCT-94 PAPA 8 RPR/PRL UTL LINES 1 CI

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 02055 SEWAGE BACK UP | | | | |
| 17-OCT-94 | SGT HALL | RPR/PRL UTL LINES | 1 | CM |
| 02725 U/S SEWER MANHOLE SOUTHEAST CORNER OF BLDG | | | | |
| 19-OCT-94 | MIKE REGEL | RPR/PRL UTL LINES | 1 | CM |
| 03239 ASSIST S-22 AT SEWER LIFT STN 20104 BLORA | | | | |
| 22-OCT-94 | S-22 | RPR UTL SYS CTRLS | 1 | CM |
| 03461 RPR SEWER LINE | | | | |
| 24-OCT-94 | P-5 | RPR/PRL UTL LINES | 1 | CM |
| 03467 U/S SEWER LINE IN PLAYGROUND AREA | | | | |
| 24-OCT-94 | SHANNON | U/S SEWER LINE IN PLAYGROUND A | 1 | CM |
| 04299 RPR WATER COMING OUT OF MANHOLE ON SIDEWALK BLDG 12006 | | | | |
| 28-OCT-94 | SGT HEATH | RPR/PRL UTL LINES | 1 | CM |

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 05034 U/S SEWAGE MAIN 50004 | | | | |
| 02-NOV-94 | S-22 | RPR/PRL UTL LINES | 1 | CM |
| 05156 U/S SEWER LINE 14020 | | | | |
| 02-NOV-94 | P-13 | RPR/PRL UTL LINES | 1 | CM |
| U0177 20122 RED LIGHT BLINKING AT SEWER LIFT STN | | | | |
| 06-NOV-94 | MR ECHOFF | SEWER PLT/SEWER LIFT | 1 | CM |
| 05951 U/S SEWER LINES 40007 | | | | |
| 08-NOV-94 | S-22 | RPR/PRL UTL LINES | 1 | CM |
| U0275 U/S SEWER BLDG 16004 W/SIDE | | | | |
| 12-NOV-94 | E4 CASTILLEJA | RPR/PRL UTL LINES | 1 | CM |
| 07384 RPL PUMP CONTROL AND FLOAT | | | | |
| 17-NOV-94 | S-25 | RPR UTL SYS CTRLS | 1 | CM |

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 07385 RED LIGHT BLINKING AT LIFT STN | | | | |
| 17-NOV-94 | H-1 | SEWER PLT/SEWER LIFT | 1 | |
| 07889 SEWER STOPPED UP BTW ROSEBUD AND 16TH | | | | |
| 18-NOV-94 | SPC WHITE | RPR/PRL UTL LINES | 1 | CM |
| 07974 SEWER STOPPED UP BY 16004 | | | | |
| 21-NOV-94 | SPC HENLEY | RPR/PRL UTL LINES | 1 | CM |

08007 RPR SEWER LINE/SERV LINE CMF
21-NOV-94 S-23 RPR SERVICE LINE AND SEWER LIN 1

08146 RPR SEWER LINE/16004 CMF
21-NOV-94 S-25 RPR SEWER LINE 1

90 5764 U/S OUTSIDE SEWER LINE NEAR LOADING DOCK CMF
21-NOV-94 P-13 RPR/PRL UTL LINES 1

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P |
|---|---|---|---|
| 09758 DIG UP AND RPR SEWER LINE S/SIDE OF 90050 | | | CMF |
| 01-DEC-94 | RAY | DIG UP AND RPR SEWER LINE SOUT | 1 |
| 09771 ASSIST 76X WITH CLEANING OUT DRAINS AT BLDG 39052 | | | CMF |
| 01-DEC-94 | P-5 | R/R PLUMBING | 1 |
| U0399 52053 CLEAN OUT DRAINS WITH TRUCK | | | CMF |
| 06-DEC-94 | O-4/DYSON | 52053 CLEAN OUT DRAINS WITH TR | 2 |
| U0400 52051 CLEAN OUTSIDE DRAINS WITH TRUCK | | | CMF |
| 06-DEC-94 | O-4/DYSON | 52051 CLEAN OUTSIDE DRAINS WIT | 2 |
| 10813 U/S SEWER ON SOUTHWEST SIDE OF BLDG 16008 | | | CMF |
| 07-DEC-94 | SAM | RPR/PRL UTL LINES | 1 |
| 12105 5782 RPR BROKEN SEWER LINE | | | CMF |
| 13-DEC-94 | S-26 | 5782 RPR BROKEN SEWER LINE | 1 |

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P |
|---|---|---|---|
| 12147 U/S OUTSIDE SEWER LINE | | | CMF |
| 14-DEC-94 | P-13 | U/S OUTSIDE SEWER LINE | 1 |
| 12301 CLEAN OUT STOPPED UP SEWER LINE | | | CMF |
| 14-DEC-94 | P-8 | CLEAN OUT STOPPED UP SEWER LIN | 2 |
| 13015 U/S OUTSIDE SEWER LINE | | | CMF |
| 20-DEC-94 | P-8 | CK RPR U/S OUTSIDE SEWER LINE | 2 |
| 13103 U/S BACKED UP SEWER LINE IN FRONT OF BLDG 90050 | | | CMF |
| 21-DEC-94 | MR STARKEY | U/S BACKED UP SEWER LINE, 15 F | 1 |
| 13594 93008 U/S MANHOLE LOCATED 1/2 MILE NORTH OF BLDG | | | CMF |
| 27-DEC-94 | S-20 | 93008 U/S MANHOLE LOCATED 1/2 | 1 |
| 13596 21007 U/S LOADING DOCK DRAIN MESS HALL | | | CMF |
| 27-DEC-94 | MR ELLIS | 21007 U/S LOADING DOCK RAMP DR | 1 |

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P |
|---|---|---|---|
| 13751 37TH/CENTRAL U/S SEWER MAIN | | | CM |
| 28-DEC-94 | S-24 | 37TH/CENTRAL U/S SEWER MAIN | 1 |
| 14163 9211 U/S SEWER LINE | | | CM |

14174 9211 CLEAN OUT ON NORTHSIDE OF BLDG IS BURIED DEEP AND NEEDS RAISING CMP
01-JAN-95 P-7 9211 CLEAN OUT ON NORTHSIDE OF 2

14320 RE-SEAL AROUND MANHOLE RING NORTHEAST CORNER OF BLDG CMP
03-JAN-95 S-25 RE-SEAL AROUND MANHOLE RING NO 2

14414 CK RPR END CAP TO SEWER PIPE. SEWER IS PRESENTLY BACKING UP. 39013
03-JAN-95 CSSM SINGLETON CK RPR END CAP TO SEWER PIPE L 2

14607 U/S SEWER N/SIDE OF BLDG 14023 CMP
04-JAN-95 P-13 U/S SEWER NORTHSIDE OF BLDG 14 1

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P |
|---|---|---|---|
| 14633 RPR/CK SEWER OVER FLOWING NEAR BLDG 213 | | | CMP |
| 04-JAN-95 | TECOM OPER 25 | RPR/CK SEWER OVER FLOWING NEAR | 1 |
| 14966 14023 U/S O/S SEWER LINE ON NORTH CORNER | | | CMP |
| 05-JAN-95 | P-13 | 14023 U/S O/S SEWER LINE ON NO | 1 |
| 15578 205 U/S OUTSIDE SEWER LINE | | | CMP |
| 09-JAN-95 | P-13 | 205 U/S OUTSIDE SEWER LINE | 1 |
| 16680 205 DIG UP AND LOCATE SEWER LINE TO BLDG | | | CMP |
| 12-JAN-95 | P-13 | 205 DIG UP AND LOCATE SEWER LI | 1 |
| 16884 51400 ALARM GOING OFF AT SEWER LIFT STN | | | CMP |
| 16-JAN-95 | H-1 FRY | 51400 ALARM GOING OFF AT LIFT | 1 |
| 17139 CLN OUT MAIN SEWAGE SYST/31007 | | | |
| 17-JAN-95 | SSG BISHOP | CLEAN OUT MAIN SEWAGE SYSTEM T | 3 |

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P |
|---|---|---|---|
| 17430 90036 U/S OUTSIDE SEWER LINE | | | CMP |
| 18-JAN-95 | E-6 | 90036 U/S OUTSIDE SEWER LINE | 1 |
| 17476 RPR PUMP STATION EQUIPMENT NOT WORKING BLDG 20141, SIERRA BEACH BLORA | | | CMP |
| 18-JAN-95 | MR HALL | CK/RPR PUMP STATION EQUIPMENT | 1 |
| 18387 RPR SEWER BACKED UP AT SITE 38, WFH TRAVEL CAMP BLDG 70004 | | | CMP |
| 23-JAN-95 | MR KEMPT | CK/RPR SEWER BACKED UP AT SITE | 1 |
| 19604 BLORA/VIC 20130 MANHOLE OVERFLOWING | | | CMP |
| 28-JAN-95 | CAROL | BLORA/VIC 20130 MANHOLE OVERFL | 1 |
| 20224 CHECK/RPR MANHOLE ON S/SIDE 2103 | | | CMP |
| 31-JAN-95 | R-14 | CHECK/RPR AMNHOLE ON S/SIDE O | 1 |
| 20449 ASSIST E-6 IN U/S SEWER LINE BLDG 88039 | | | CMP |
| 01-FEB-95 | S-20 | ASSIST E-6 IN U/S SEWER LINE A | 1 |

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P |
|---|---|---|---|
| 20470 BLOW OUT AMIN SWR LINE FOR DOL | | | CMP |

20486 CHECK SWR LIFT 41012 CMF
01-FEB-95 RICHARD CHECK LIFT STATION 41012, IT I 1

20625 U/S SEWER MAIN BLDG 41007 CMF
02-FEB-95 S-22 U/S SEWER MAIN, ATT S-22 BLDG 2

[illegible]09 RPR 3 PUMP BLDG 41012 CMF
02-FEB-95 S-22 RPR 3EA PUMP, ATT S-22 2

U0797 SEWER BACK UP AT ROW 3, NEAR SITE 49 CMF
02-FEB-95 MARY KEMP CHECK SEWAGE BACKUP, NEAR SITE 1

21084 RPR CRACKED CONCRETE AROUND MANHOLE SITE 21 AND 22 WFH TRAVEL CAMP CMF
06-FEB-95 MRS KEMPT CK/RPR CRACKED CONCRETE AROUND 3

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P |
|---|---|---|---|
| 22149 CLEAN DEBRIS BLDG 8001 | | | CMF |
| 09-FEB-95 | S-25 | CLEAN WET WELL AND CLEAN DEBRI | 2 |
| 22150 RPR 1 PUMP CHK VALVE BOX, BLDG 8001 | | | CMF |
| 09-FEB-95 | S-25 | RPR/RPL #1 PUMP CHK VAL;VE BOX | 2 |
| 22151 RPL FITTING ON 1 1/4IN. LINE ON AMMMONIA BOOSTER PUMP BLDG 6898 | | | CMF |
| 09-FEB-95 | S-25 | RPL FITING ON 1 1/4 LINE ON AM | 2 |
| 22799 RAW SEWAGE ON GROUND,LK END CAP | | | CMF |
| 14-FEB-95 | SGT STANIER | CK RPR RAW SEWAGE AT SEWER P | 2 |
| 23357 U/S SEWER BLDG 16006 | | | CMF |
| 16-FEB-95 | P-13 | U/S SEWER BLDG 16006, PER P-13 | 1 |
| 23358 CK RPR END CAP. | | | CMF |
| 16-FEB-95 | SFC. PHILBRICK | CK RPR END CAP TO SEWAGE LINE. | 3 |

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS CW

| RECEIVED | NAME OF CALLER | DESCRIPTION | P |
|---|---|---|---|
| 23541 ASSIT 76X AT 41013 | | | CMI |
| 16-FEB-95 | S-25 | CHECK/RPR 12 INCH MAIN IN VICI | 1 |
| 23542 CHECK/RPR 12 INCH MAIN AT 41013 | | | CM |
| 16-FEB-95 | S-25 | CHECK/RPR 12 INCH MAIN IN VICI | 1 |
| 23843 U/S OUTSIDE SWR | | | CM |
| 21-FEB-95 | P-1 | U/S OUTSIDE SEWER AT CLEAN OUT | 1 |
| 24089 CLEAN OUT STORM DRAINS ON 58 STR | | | CM |
| 22-FEB-95 | P-25 | CLEAN OUT STORM DRAINS ON 58 S | 2 |
| 24303 U/S STORM DRAINS BY 88005/88007 | | | CM |
| [illegible]-FEB-95 | P-26 | U/S STORM DRAINS BY 88005/8800 | 3 |
| 24496 EMPTY DUMP STATION AT CEDAR PARK IS FULL BLORA | | | CM |
| 24-FEB-95 | MR JASON | EMPTY OUT DUMP STATION BY RV A | 1 |

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS CW

4555 16005 SEWAGE COMING UP FROM GROUND ON BACK DOCK CMP
5-FEB-95 SGT STOLTZ 16005 SEWAGE COMING UP FROM GR 1

1097 U/S OUTSIDE SEWER CMP
2-MAR-95 P-11 U/S OUTSIDE SEWER 1

1119 TOWER OVERFLOWING AT RAILHEAD C
2-MAR-95 S-24 RPR/CK RAILHEAD OVERFLOWING AT 1

4913 U/S MANHOLE BY 90061 CMP
6-MAR-95 S-26 U/S MANHOLE BY 90061 2

5048 U/S SWR MAIN,HAAF/KILLEEN BDRY LINE CMP
7-MAR-95 S-25 U/S SEWER MAIN, HAAF AND KILLE 1

5339 U/S SEWER AT STEWART ST CMP
7-MAR-95 S-25 U/S SEWER AT STEWART STREET AT 1

PLEASE HIT <CR> TO CONTINUE
SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 25710 | U/S OUTSIDE SWR MAIN | | | CMP |
| 09-MAR-95 | P-13 | U/S OUTSIDE SEWER MAIN | 1 | |
| 25772 | U/S SEWER AVE A NFH | | | CMP |
| 09-MAR-95 | MR BURNEY | CK RPR UNSTOP SEWER AT NORTH | 2 | |
| 25911 | CEDAR PK DUMP STATION NOPT FLOWING | | | CMP |
| 10-MAR-95 | MR BASS | CHECK CEDAR PK DUMP STATION, N | 1 | |
| 26022 | U/S OUTSIDE SEWER | | | C |
| 10-MAR-95 | P-8 | U/S OUTSIDE SEWER LINE | 1 | |
| 26083 | RPR/CK ALARM AT SEWER LIFT STATION | | | CMP |
| 12-MAR-95 | H-1 | RPR/CK ALARM AT SEWER LIFT STA | 1 | |
| 26141 | STOPPED UP SEWER WEST FT HOOD | | | CMP |
| 13-MAR-95 | MR MCBRIDE | CK RPR STOPPED UP SEWER AT WE | 2 | |

PLEASE HIT <CR> TO CONTINUE
SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 27114 | RPR MANHOLE N/SIDE 37007 | | | CMP |
| 17-MAR-95 | S-24 | RPR MANHOLE ON NORTHSIDE OF 37 | 1 | |
| 27115 | RPR MANHOLE E/SIDE 4501 | | | CMP |
| 17-MAR-95 | S-24 | RPR MANHOLE ON EAST/SIDE OF 45 | 1 | |
| 27743 | RPL MANHOLE 1/2 MILE NORTH OF BLDG 93008 | | | CMP |
| 21-MAR-95 | S-20 | RPL MANHOLE 1/2 MILE NORTH OF | 2 | |
| 27788 | 330 DENTAL CLINIC O/S SEWER LINE STOPPED UP | | | CMP |
| 21-MAR-95 | P-13 | 330 DENTAL CLINIC O/S SEWER | 1 | |
| 28251 | U/S SEWAGE LINE VIC 13030 | | | |
| 23-MAR-95 | MR MAREK | UNSTOP SEWAGE LINE (PROBABLY 8 | 1 | |
| 28266 | DIG UP AND RPR SEWER LINE 14020 | | | CMP |
| 23-MAR-95 | P-13 | DIG UP AND RPR SEWER LINE 1402 | 2 | |

PLEASE HIT <CR> TO CONTINUE

SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 28353 | ASSIST 82X UNSTOP SEWER LINE 14020 | | | CMI |
| 23-MAR-95 | P-13 | ASSIST 82X UNSTOP SEWER LINE 1 | 1 | |
| 10 5788 U/S SEWER LINE | | | | CMI |
| 24-MAR-95 | P7/31 | 5788 U/S SEWER LINE | 1 | |
| 29099 | 37008/37009 U/S SEWER LINE | | | CMI |
| 28-MAR-95 | S-25 | 37008/37009 U/S SEWER LINE | 1 | |
| 29399 | 91060 SEWAGE COMING UP FROM GROUND ON SOUTHSIDE OF BLDG | | | CMI |
| 29-MAR-95 | DIN 17 | 91060 SEWAGE COMING UP FROM GR | 1 | |
| 29643 | RPR FOUL SEWER ODOR IN REAR OF BLDG 4930 | | | CMI |
| 30-MAR-95 | MR WALKER | REAL FOUL SEWER ODOR BY PUMP S | 1 | |
| 30027 | U/S SEWER LINE NORTH CORNER OF BLDG 14020 | | | CMI |
| 03-APR-95 | P8 | U/S SEWER LINE NORTH CORNER OF | 1 | |

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 30202 | U/S SEWER LINE ON STEWARET STREET | | | CMI |
| 04-APR-95 | S-25 | U/S SEWER LINE ON STEWART STRE | 1 | |
| 30567 | U/S SEWER LINE STEWART ST | | | CMI |
| 05-APR-95 | G-20 | U/S SEWER LINE STEWART ST | 1 | |
| 30610 | RPR/CK ALARM AT SEWER LEFT STATION. | | | CMI |
| 05-APR-95 | O-1 | RPR/CK ALARM AT SEWER LEFT STA | 1 | |
| 30634 | REPLACE MAN HOLE COVER IN FRONT OF BLDG 56135 | | | CMI |
| 05-APR-95 | MS. HOOVER | REPLACE MAN HOLE COVER LOC: I | 1 | |
| 30657 | 56418 U/S MANHOLE NEAR BLDG | | | CMI |
| 05-APR-95 | S-22 | U/S MANHOLE NEAR BLDG 56418 | 1 | |
| 30955 | 20146 CK/RPR SEWER LIFT STATION PUMP AT BLORA | | | CMI |
| 07-APR-95 | S-21 | 20146 CK/RPR SEWER LIFT STATIO | 2 | |

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 31700 | U/S SEWER BATTERY SHOP OUTSIDE OF BLDG 92038 | | | CM |
| 12-APR-95 | P-9 | U/S SEWER BATTERY SHOP OUTSIDE | 1 | |
| 31740 | RPL 2EA HOSES ON WASHRACK | | | CM |
| 12-APR-95 | S-20 | RPL 2EA HOSE ON WASHRACK | 2 | |
| 32444 | 41007 CLEANOUT BACKING UP ON WESTEND OF MESSHALL | | | CM |
| APR-95 | P-11 | 41007 CLEANOUT BACKING UP ON W | 1 | |
| 32973 | 91065 U/S SEWER MAIN | | | CM |
| 19-APR-95 | MIKE 51 | 91065 U/S SEWER MAIN ATTN S | 1 | |
| 33451 | BLOW LINE ON MANHOLE BETWEEN 1912 AND 1913. | | | CM |
| 24-APR-95 | G-21 | BLOW LINE ON MANHOLE BETWEEN B | 2 | |

LEASE HIT (CR) TO CONTINUE
0 NO SHORT REMARKS

CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P |
|---|---|---|---|
| 3701 | 9214 U/S OUTSIDE SEWER LINE | | |
| 5-APR-95 | P-13 | 9214 U/S OUTSIDE SEWER LINE | 1 |
| 3751 | 9001 REMOVE CONCRETE COVER FROM MANHOLE NORTHEAST CORNER | | |
| 5-APR-95 | S-22 | 9001 REMOVE CONCRETE COVER FRO | 1 |
| 3753 | U/S SEWER MAIN--BLDG 9406 NORTHWEST CORNER | | |
| 5-APR-95 | S-22 | U/S SEWER MAIN BLDG 9406 NORTH | 1 |
| 34501 | ASSIST CONTRACTORS AT 31ST/TD | | |
| 7-APR-95 | MIKE KRIEGEL | ASSIST CONTRACTORS AT 31ST/TD | 1 |
| 35583 | WTR MAIN BREAK AT 18TH & PARK | | |
| 3-MAY-95 | MAREK | CK WATERMAIN BREAK N.F.H AT 18 | 1 |
| 36060 | RAW SEWERAGE BACKING UP SITES 47,48,49,50 WFH TRAVEL CAMP 70004 | | |
| 5-MAY-95 | MRS KEMPT | CK/RPR RAW SEWERAGE BACKING UP | 1 |

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS

CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P |
|---|---|---|---|
| 36069 | MANHOLE OVERFLOWING ON SOUTHSIDE OF BLDG | | |
| 5-MAY-95 | P-1 | 37008 MANHOLE OVERFLOWING ON S | 1 |
| U1598 | RPR PUMP #3 AT LIFT STN | | |
| 9-MAY-95 | DELTA 26 | CK/RPR #3 PUMP AT LIFT STATION | 1 |
| 37623 | U/S SEWER LINE BLDG 9213 | | |
| 5-MAY-95 | P-13 | U/S SEWER LINE, ATT S-22 | 1 |
| 37718 | U/S MANHOLE OVER FLOWING BEHIND BLDG 16001 | | |
| 5-MAY-95 | SFC MELAN | U/S MANHOLE OVER FLOWING BEHIN | 1 |
| 37927 | ASSIST CONTRACTOR OUTAGE SEWAGE LN/29013 | | |
| 6-MAY-95 | MR HOOKS | ASSIST CONTRACTOR IN TIE-IN AN | 2 |
| S0417 | U/S SEWER BACKING/SHOTTING WTR IN AIR PRKG LOT BLDG 70001 SHOPETTE | | |
| 5-MAY-95 | MS HARRISON | U/S SEWER BACKING/SHOOTING UP | 1 |

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS

CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P |
|---|---|---|---|
| 38054 | 14022 WTR BUBBLING FR GRND 75 NORTH OF BLDG SMELLS LIKE SEWER | | |
| 6-MAY-95 | SGT GAILLAID | CK/RPR WATER BUBBLING OUT OF G | 1 |
| 38883 | U/S SEWER LINE BACKUP IN FRONT OF BLDG | | |
| 0-MAY-95 | MS FREEMAN | U/S SEWER LINE BACKUP IN FRONT | 1 |
| 38918 | BETWEEN 56418 ND 56419 SEWER MANHOLE OVERFLOWING ON HQ AVE | | |
| 1-MAY-95 | SGT DODY | BETWEEN 56418 AND 56419 SEWER | 1 |
| 40115 | LIFT STATION BLDG 20131 BLORA OVERFLOWING | | |
| 5-MAY-95 | MS TUCKER | CK/RPR LIFT STATION OVERFLOWIN | 1 |

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40901 RPR 6IN SEWER MAIN BLDG 4404                                          CM
31-MAY-95 G-20              RPR 6" SEWER MAIN BLDG 4484     2

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS                                                         CW
------------------------------------------------------------------------------
RECEIVED  NAME OF CALLER  DESCRIPTION                          P
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41052 COTTAGE PARK RV. PAD #1 U/S SEWER LINE                                CM
01-JUN-95 BASS              COTTAGE PARK RV. PAD #1 U/S SE 2

41181 U/S RAW SEWERAGE BACKING UP BY COTTAGE 6 MANHOLE   BLORA              CM
01-JUN-95 MR FRYE           U/S SEWERAGE BACKING UP OUT OF 1

41339 U/S OUTSIDE DRAIN NEAR BLDG 70003                                     CM
05-JUN-95 E-6               U/S OUTSIDE DRAIN NEAR BLDG 70 1

41473 DUMP STATION #1 RV NEXT TO BLDG 20104 U/S                             CM
05-JUN-95 MR BASS           DUMP STATION #1 RV NEXT 20104  2

41488 DIG UP SEWER LINE NEAR BLDG 9213                                      CM
05-JUN-95 S-20              DIG UP SEWER LINE NEAR BLDG 92 1

41806 RPR RAW SEWERAGE COMING OUT OF PIPE ON OUTSIDE OF BLDG                CM
06-JUN-95 SGT LAMOTHE       CK/RPR RAW SEWERAGE COMING OUT 1

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS                                                         CW
------------------------------------------------------------------------------
RECEIVED  NAME OF CALLER  DESCRIPTION                          P
--------- --------------- ------------------------------------ -
41852 U/S DRAIN OUTSIDE OF 39016                                            CM
06-JUN-95 DIN 16            U/S DRAIN OUTSIDE OF BLDG 3901 1

43299 RPR STORM DRAIN LINE AT 4281                                          CM
12-JUN-95 S-23              RPR STORM DRAIN LINE           3

43392 PULL/RPR/RPL #1 PUMP MOTOR                                            CM
12-JUN-95 S-25              PULL/RPR/RPL #1 PUMP MOTOR     1

43471 39053 U/S SEWER LINE                                                  CM
12-JUN-95 P-5               39053 U/S SEWER LINE           1

43859 ALARM AT POWER STATION SOUNDING.                                      CM
14-JUN-95 SGT OSHAUGHNESY CK RPR SEWER LIFT STATION   AL 1

43893 U/S SWR LINE OUTSIDE 29011                                            CM
14-JUN-95 P-1               U/S SEWER LINE OUTSIDE 29011   1

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS                                                         CW
------------------------------------------------------------------------------
RECEIVED  NAME OF CALLER  DESCRIPTION                          P
--------- --------------- ------------------------------------ -
44684 193 CK O/S SEWER LINE MAY BE STOPPED UP                               CM
17-JUN-95 BRAVO             193 CK TO SEE IF O/S SEWER LIN 1

45397 CHK SWR LIFT,IN ALARM                                                 CM
21-JUN-95 DEL 37            CHECK SEWER LIFT STATION 41012 1

45434 PUMP SEWAGE FROM MANHOLE BY 7042                                      CM
21-JUN-95 MR WOODELL        PUMP SEWAGE FROM MANHOLE NEXT  2
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5774 U/S O/SIDE SEWER LINE CMP
2-JUN-95 P-31 U/S OUTSIDE SEWER LINE FROM MH 1

5848 U/S STORM DRAIN EAST OF 10045 CMP
2-JUN-95 MR HEIGES U/S STORM DRAIN EAST OF 10045 1

LEASE HIT (CR) TO CONTINUE
O NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 46787 SEWER LIFT BACKING UP, VICINITY 9535 | | | | CMP |
| 27-JUN-95 | R-5 | CHECK SEWER LIFT, SEWAGE BACKI | 1 | |
| 47583 U/S DRAIN AT FLOOR. | | | | CMP |
| 30-JUN-95 | RANDY | U/S FLOOR DRAIN | 2 | |
| 47707 RV PARKING/CAMPING RIGHT ON TOP OF HILL U/S MAIN SEWER LN (BLORA) | | | | CMP |
| 01-JUL-95 | BASS | RV PARKING/CAMPING RIGHT ON TO | 1 | |
| 47717 1002 U/S SEWER MAIN | | | | CMP |
| 01-JUL-95 | H-8 | 1002 U/S SEWER MAIN | 1 | |
| 47812 U/S DUMP STATION #2 | | | | CMP |
| 03-JUL-95 | MR HEIGES | U/S DUMP STATION #2, PER MR HE | 1 | |
| 47866 DIG UP,U/S, AND INSTALL CLEAN OUT,WEST END 21006 | | | | CMP |
| 05-JUL-95 | MR MCPHEARSON | DIG UP, U/S AND INSTALL CLEAN | 1 | |

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 32095 U/S SEWER LINE AT 21006 | | | | CMP |
| 04-JUL-95 | P-7 | U/S SEWER LINE AT 21006 | 1 | |
| 48149 RPR/CK ALARM GOING OFF AT SEWER LIFT STATION. | | | | CMP |
| 05-JUL-95 | 710F | RPR/CK ALARM GOING OFF AT SEWE | 1 | |
| 48423 ASSIST P-5 AT 2121 | | | | CMP |
| 06-JUL-95 | P-5 | ASSIST P-5 AT 2121 WITH SEWER | 3 | |
| 49221 REMOVE DIRT AND WATER FOR AREA SHOP WITH SEWER TRUCK. | | | | CMP |
| 11-JUL-95 | S-22 | REMOVE DIRT AND WATER FOR AREA | 1 | |
| 49413 9214 SEWAGE COMING UP FROM GROUND ON SOUTHSIDE OF BLDG | | | | CMP |
| 11-JUL-95 | SGT PHINNEY | 9214 SEWAGE COMING UP FROM GRO | 1 | |
| 49550 U/S SEWAGE LN VIC 29011 COURTYARD S/W CORNER | | | | CMP |
| 12-JUL-95 | MR MAREK | UNSTOP SEWAGE MANHOLE LOCATED | 1 | |

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 49663 SEWER BACKING UP BY LOADING DOCK | | | | |
| 12-JUL-95 | MR FRYER | CK RPR SEWER BACKING UP IN PA | 1 | |
| 49710 14023 ROD OUT SEWER LINE | | | | CMP |
| 12-JUL-95 | P-7 | 14023 ROD OUT SEWER LINE | 1 | |
| 49741 CK RPR LIFT STATION (RAW SEWAGE IS BACKING-UP.) | | | | CMP |

49848 DIG UP SEWER LINE OUTSIDE OF BLDG ON EASTSIDE CMP
13-JUL-95 O-2 DIG UP SEWER OUTSIDE OF BLDG 1 1

50089 CAP TO SEWER LINE BRK W.SIDE BLD CMP
14-JUL-95 MR JONES CK RPR CAP TO SEWER LINE BROK 2

50221 SWR LIFT 20143 IS ON RED FLASH CMP
15-JUL-95 MRS HAVLIK CHECK SEWER LIFT 20143, RED LI 1

PLEASE HIT <CR> TO CONTINUE
SO NO SHORT REMARKS CWS

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| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 50885 EVAC. THE SUMP | | | | CMP |
| 19-JUL-95 | MR BURNEY | EVACUATE THE SUMP AT 87017 | 1 | |
| 52344 RPR/CK SEWER LIFT STATION 51400 | | | | CMP |
| 26-JUL-95 | S-22 | RPR/CK SEWER LIFT STATION | 1 | |
| 52843 U/S OUTSIDE SEWER 41007 | | | | CMP |
| 27-JUL-95 | P-11 | U/S OUTSIDE SEWER 41007 | 1 | |
| 52992 U/S SEWER LINE S8030 | | | | CMP |
| 28-JUL-95 | S-25 | U/S SEWER LINE S8030 | 1 | |
| T0814 RPR SEWERAGE BACKING UP OUT GROUND 10 FT FR BLDG 9210 | | | | CMP |
| 27-JUL-95 | E4 METLEN | CK/RPR SEWERAGE COMING OUT OF | 1 | |
| 53459 U/S LAT LINE OUTSIDE OF BLDG 2804 | | | | CMP |
| [illegible]JL-95 | DIN 16 | U/S LAT LINE OUTSIDE OF BLDG 2 | 1 | |

PLEASE HIT <CR> TO CONTINUE
SO NO SHORT REMARKS CWS

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| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 53811 U/S OUTSIDE SWR LINE | | | | CMP |
| 02-AUG-95 | P-11 | U/S OUTSIDE SWR LINE TO MH | 1 | |
| 53812 DIG UP/RPR/RPL OUTSIDE SWR LINE AS NEEDED | | | | CMP |
| 02-AUG-95 | P-11 | DIG UP/RPR/RPL OUTSIDE SWR LIN | 1 | |
| 54080 U/S STORM DRAIN N/EAST CONRER OF BLDG 92060 | | | | CMP |
| 03-AUG-95 | S-22 | U/S STORM DRAIN NORTHEAST CORN | 1 | |
| 54800 U/S MANHOLE | | | | CMP |
| 07-AUG-95 | S-20 | U/S MANHOLE DPW | 2 | |
| 55395 U/S SEWER OUTSIDE OF BLDG 5784 | | | | CMP |
| 09-AUG-95 | MS CHAPIN | U/S SEWER OUTSIDE OF BLDG, 578 | 1 | |
| 55446 RPL SEWAGE LN BTWN 1148 AND 1149 | | | | CMP |
| 09-AUG-95 | MR HALL | REPLACE SEWAGE LINE BETWEEN BL | 2 | |

PLEASE HIT <CR> TO CONTINUE
SO NO SHORT REMARKS CWS

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| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 55484 5784 RPR SEWER LINE | | | | CMP |
| 09-AUG-95 | S-25 | 5784 RPR SEWER LINE | 2 | |

55815 U/S OUTSIDE LINES LIVE OAK.
11-AUG-95 BASS U/S OUTSIDE LINES LIVE OAK, BL 1 C

55918 U/S SWR FOR RV PAD #5
12-AUG-95 MR FRY U/S SWR DRAIN FOR RV PAD #5 2 CI

57096 U/S MANHOLE OVER FLOWING OUTSIDE OF BLDG 9421
18-AUG-95 G-13 U/S MANHOLE OVER FLOWING OUTSI 1 CI

U2457 20122 SEWER LIFT STATION RED LIGHT FLASHING
19-AUG-95 MR ARROYA 20122 SEWER LIFT STATION RED L 1 CI

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS
CW

| RECEIVED | NAME OF CALLER | DESCRIPTION | P |
|---|---|---|---|
| 57678 CK RPR AND REPLACE MANHOLE COVER AND RING.....( TOTAL 2 )..... | | | |
| 22-AUG-95 | MR. SEVERES | CK RPR AND REPLACE MANHOLE COV | 3 |
| 59613 U/S SEWAGE DRAINS 2EA OUTSIDE OF BLDG NORTHWEST CORNER OF BLDG 9213 | | | |
| 30-AUG-95 | P-13 | U/S SEWAGE DRAINS 2EA OUTSIDE | 1 |
| 60011 U/S SEWER LINE IN FRONT OF BLDG 3985 | | | |
| 01-SEP-95 | ROY | U/S SEWER LINE IN FRONT OF BLD | 1 |
| 60720 U/S STORM DRAIN BOX | | | |
| 06-SEP-95 | S-25 | U/S STORM DRAIN BOX DPW | 2 |
| 61110 CK RPR RAW SEWAGE IS BACKING INTO THE BLDG. | | | |
| 08-SEP-95 | MS. SCOTT | CK RPR RAW SEWAGE IS BACKING I | 1 |
| 61253 51400 SEWER LIFT STATION IN ALARM | | | |
| 09-SEP-95 | H-1 (ORANGE) | 51400 SEWER LIFT STATION IN AL | 1 |

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS
CW

| RECEIVED | NAME OF CALLER | DESCRIPTION | P |
|---|---|---|---|
| 62966 RPR MANHOLE NEXT TO BLDG 56505 | | | |
| 18-SEP-95 | MR DEATON | REPAIR MANHOLE NEXT TO BLDG 56 | 2 |
| 62969 RPR MANHOLE NEXT TO BLDG 56531 | | | |
| 18-SEP-95 | MR DEATON | REPAIR MANHOLE NEXT TO BLDG 56 | 2 |
| 62973 REPAIR MANHOLE BY BLDG 56508 | | | |
| 18-SEP-95 | MR DEATON | REPAIR MANHOLE BY BLDG 56508 | 2 |
| 64416 51400 LIFT STN IN ALARM | | | |
| 23-SEP-95 | H-1 FRY | 51400 LIFT STN IN ALARM | 1 |
| 64435 BEHIND 41015 ALARM RINGING (MIGHT BE SEWER LIFT STATION) | | | |
| 23-SEP-95 | FPD | BEHIND 41015 ALARM RINGING FI | 1 |
| 64780 BLDG 16001 SEWERAGE BACKING UP BY FENCE SCIF BLDG | | | |
| 26-SEP-95 | SPC QEEVIS | 16001, SEWERAGE BACKING UP FRO | 1 |

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS
CW

| RECEIVED | NAME OF CALLER | DESCRIPTION | P |
|---|---|---|---|
| 65008 RPR SEWER BREAK | | | |

65085 U/S GREASE TRAP OUTSIDE OF BLDG 9214 CMP
27-SEP-95 P-13 U/S GREASE TRAP OUTSIDE OF BLD 1

65446 51400 VIC//BROKEN SEWER LINE NEAR CLEAR CREEK GOLF COURSE CMP
28-SEP-95 S-22 51400 VICINITY//NEAR GOLF COUR 1

65716 RPR/CK ALARM GOING OFF IN SEWER PLANT CMP
29-SEP-95 BRAVO RPR/CK ALARM GOING OFF IN SEWE 1

00532 51400 ALARM KEEPS GOING OFF/ON CMP
03-OCT-95 H-1 VARGAS 51400 ALARM KEEPS GOING OFF/ON 1

00681 RPR 6 " WTR MAIN CMP
04-OCT-95 MR DEATON CK RPR 6" WATER MAIN DPW 3

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P |
|---|---|---|---|

01161 CHECK WATER COMEING FROM MANHOLE BEHIND MESSHALL 10003 CMP
10-OCT-95 SP LANUE CHECK WATER COMEING OUT OF MAN 1

01298 RISE MANHOLE ON DRAIN LEVEL CMP
10-OCT-95 S-26 RISE MANHOLE ON DRAIN LEVEL, B 2

01759 MAIN SEWAGE LINE BACKING UP BY LIVE OAK BELTON LAKE CMP
12-OCT-95 BLORA CK RPR MAIN SEWAGE LINE. BACK 1

01830 U/S SEWER MAIN BY BLD 16005 CMP
[illegible]CT-95 S-25 CK RPR UNSTOP SEWER MAIN BY BL 1

U0068 16001 WTR COMING UP FROM GROUND IN BACK OF BLDG (INSIDE FENCED AREA) CMP
13-OCT-95 SSG PRATT U/S SEWER DRAIN IN BACK OF BLD 1

02037 U/S OUT DOOR SEWAGE LINE. BACKING ON THE LAWN. CMP
13-OCT-95 SGT. BRATTEN U/S OUTDOOR SEWAGE DRAIN. SYS 1

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P |
|---|---|---|---|

03266 U/S SEWER BY BLD 90033 CMP
20-OCT-95 E-6 CK RPR U/S SEWER DPW 2

03457 ASSIST TO U/S SEWER LINE BLD 90036 CMP
23-OCT-95 E-6 CK RPR ASSIST TO UNSTOP SEWE 2

04167 CK/RPR SEWERAGE COMING OUT OF GROUND RIGHT NEXT TO REAR OF BLDG CMP
25-OCT-95 PFC ORTIZ CK/RPR SEWERAGE SPITTING UP AB 1

04200 9214 U/S SEWER MAIN ON SOUTHEND OF BLDG CMP
25-OCT-95 P-13 9214 U/S SEWER MAIN ON SOUTHEN 1

[illegible]92 7027 REMOVE GREASE BUILDUP CMP
[illegible]OV-95 S-28 7027 REMOVE GREASE BUILDUP 2

06000 CMP
03-NOV-95 MS JACOBSON CK/RPR MAIN SEWERAGE LINE BUST 1

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS CWS

| | | | | |
|---|---|---|---|---|
| 248 -NOV-95 | P-11 | CK RPR U/S SEWER | 2 | CMP |
| 236 -NOV-95 | SSS MOSCHILLI | RPR MANHOLE NEXT TO LATRINE | 3 | CMP |
| 561 -NOV-95 | S-22 | CK RPR SEWER MAIN AT BLORA D | 2 | CMP |
| 592 -NOV-95 | O-25 | CK RPR SEWER MAIN BY BLDG | 1 | CMP |
| 808 -NOV-95 | MR SMITH | RPR/CK ALARM GOING OFF AT SEWE | 1 | CMP |
| 871 -NOV-95 | OPER 40 | CK RPR BROKEN WATER MAIN VIC | 1 | CMP |

LEASE HIT (CR) TO CONTINUE
) NO SHORT REMARKS CWS

| CEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 3036 3-NOV-95 | MR. RARROYO | RPR/CK LIGHT COMING ON AT SEWE | 1 | SHP |
| 3039 9-NOV-95 | MR RARROYO | 20141 ALARM LIGHT IS ON AT SEW | 1 | CMP |
| 0269 9-NOV-95 | MR BUMPERS | 51400 SWR LIFT IN ALARM | 1 | CMP |
| 8295 0-NOV-95 | S-22 | CK RPR BROKEN SEWER LINE BLDG | 1 | CMP |
| 8975 2-NOV-95 | P-12 | CK RPR WATER MAIN BLOW OUT 19T | 2 | CMP |
| 9039 4-NOV-95 | S-25 | 20146 SEWER LIFT STN///RPL IMP | 2 | CMP |

LEASE HIT (CR) TO CONTINUE
O NO SHORT REMARKS CWS

| ECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 09089 26-NOV-95 | MR ARROYO | 20141 SEWER LIFT STATION ALARM | 1 | CMP |
| 09697 28-NOV-95 | P-13 | CK RPR SEWER MAIN | 2 | CMP |
| 10597 01-DEC-95 | P-8 | CK RPR U/S SEWER BY BLD 9215 | 1 | CMP |
| J0388 SEWER LINE BRK N/E 87017 04-DEC-95 | GUYCO CONST | CK RPR BROKEN SEWER LINE N/E O | 1 | CMP |
| 11127 06-DEC-95 | EPS MIKE | CK RPR BROKEN WATER MAIN | 1 | CMP |
| 11503 07-DEC-95 | G-6 | CK RPR U/S SEWER SOUTH SIDE OF | 1 | CMP |

SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| S0711 19-DEC-95 | MR. RACICOT | CK/RPR MANHOLE COVER OVER SEWE | 2 | CMF |
| U0309 18-DEC-95 | MS. KRIEDGER | CK RPR RAW SEWAGE THAT IS BACK | 1 | CMF |
| U0497 U/S SEWER BLD 9001 11-DEC-95 | O-25 | CK RPR U/S SEWER BLD 9001 | 1 | SHF |
| U0513 U/S MAN HOLE 11-DEC-95 | S-20 | CK RPR U/S MANHOLE WEST SIDE | 2 | CMF |
| U0549 12-DEC-95 | S-25 | CK RPR U/S SEWER MAIN WEST SID | 1 | CMF |
| 12169 20-DEC-95 | P-13 | CK RPR SEWER OVERFLOW NORTH SI | 1 | CMF |

PLEASE HIT <CR> TO CONTINUE

SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 12343 21-DEC-95 | S-25 | CK RPR CLEAN OUT CAPS N/SIDE | 2 | CMF |
| 12385 DEC-95 | E8 ESTRADA | CK/RPR RAW SAEWERAGE BACKING U | 1 | CMF |
| 12609 26-DEC-95 | MR BASS | CK RPR SEWER LIFT WARNING LIG | 2 | CMF |
| 12646 27-DEC-95 | MR MCPHEARSON | RPR PUMP 1&3 AT SEWER LIFT 523 | 1 | CMI |
| 12919 28-DEC-95 | S-22 | CK RPR SEWER MANHOLE COVER E/ | 2 | CMI |
| 13056 29-DEC-95 | MR BASS | CK RPR U/S SEWER LINE BETWEEN | 2 | CM |

PLEASE HIT <CR> TO CONTINUE

SO NO SHORT REMARKS CW

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 13366 02-JAN-96 | S-24 | CK RPR U/S SEWER LINE AT BLD | 1 | CM |
| 13380 02-JAN-96 | P-8 | CK RPR TO ASSIST WITH U/S OF S | 1 | CM |
| 928 -JAN-96 | MR BASS | CK RPR U/S SEWERLINE AT MANHOL | 1 | CM |
| 15167 09-JAN-9 | S-20 | RPR SEWER LINE. 52/BN | 1 | CM |
| U0956 11-JAN-9 | TAYLOR MOONEY | 51400 SEWER LIFT STN ALARM GOI | 1 | CM |

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P |
|---|---|---|---|
| 16496 16-JAN-96 | S-25 | CK RPR U/S SEWER BLD 56431 | 1 |
| 16815 17-JAN-96 | P-11 | U/S OUTSIDE SEWER LINE | 2 |
| 16920 17-JAN-96 | MR. ZIELKIEWITC | CK/RPR SEWER LINE ON NORTH SID | 1 |
| 17427 18-JAN-96 | DARNELL BOILERM | CK RPR LIFT STATION | 2 |
| 17952 21-JAN-96 | J/J MANT | RPR/CK SEWER ALARM GOING OFF | 1 |
| 18250 22-JAN-96 | S-28 | U/S SEWER MAIN BY 302 ON BN AV | 1 |

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P |
|---|---|---|---|
| 19315 26-JAN-96 | S-25 | CK RPR DIG UP WALL ON TREATMEN | 2 |
| 19878 29-JAN-96 | P-8 | CK RPR U/S OUTSIDE SEWER LINE | 1 |
| 20034 30-JAN-96 | P-13 | CK RPR U/S SEWER LINE S/END O | 1 |
| 20707 31-JAN-96 | MR BASS | CK RPR U/S SEWER AT BLD | 1 |
| 20758 31-JAN-96 | O-3 | U/S SEWER LINE 56422 | 1 |
| 21023 02-FEB-96 | S-25 | U/S SEWER MAIN NEAR BLDG 9004 | 1 |

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P |
|---|---|---|---|
| 21290 05-FEB-96 | MR BASS | CK RPR U/S SEWER LINE (DIG UP) | 1 |
| 21722 06-FEB-96 | S-29 | CK RPR COUNTER BALANCE BROKEN | 2 |
| 21785 06-FEB-96 | MR BASS | CK RPR LIFT STATION | 1 |
| 21881 07-FEB-96 | 1SG ESTRADA | 9213 RAW SEWAGE BACKING UP ON | 1 |

07-FEB-96 MR TALLEY CK RPR CHECK ALARM AT LIFT 689 1 C

21982
07-FEB-96 MR. ZIEGLER U/S SEWER LINE (OUTSIDE FROM S 1 CI

PLEASE HIT (CR) TO CONTINUE
NO SHORT REMARKS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 22102 | | | | |
| 08-FEB-96 | MRS HAVLIK | CHECK ON NOISE AT SEWER PLANT, | 1 | CM |
| 22340 | | | | |
| 08-FEB-96 | G-6 | CK RPR SEWAGE BACKING UP S/SID | 1 | CM |
| 22515 | | | | |
| 09-FEB-96 | DELTA 8 | 90110 SEWER LIFT OVERFLOWING / | 1 | CM |
| 22582 | | | | |
| 09-FEB-96 | S-25 | RPR BROKEN SEWER LINE AT 31ST | 1 | CM |
| 22774 | | | | |
| 12-FEB-96 | P-11 | CK RPR U/S SEWER BLD 41007 | 1 | CM |
| 23150 | | | | |
| 13-FEB-96 | MR JACKSON | CK/RPR BUSTED 4IN PIPE NORTH O | 1 | CM |

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 23766 | | | | |
| 15-FEB-96 | S-29 | CK RPR 2 EA PUMPS FOR BLD LI | 2 | CMI |
| 24360 | | | | |
| 20-FEB-96 | R-5 | U/S MANHOLE | 1 | CMF |
| 24394 | | | | |
| 20-FEB-96 | S-25 | RPR/CK SEWER LIFT STATION OVER | 1 | CMI |
| 24408 | | | | |
| 20-FEB-96 | S-29 | U/S SEWER LINE 9211 | 1 | CMF |
| 24962 | | | | |
| 22-FEB-96 | MR WESTLAKE | CK/RPR SEWER UNDER BLDG BACKIN | 1 | CMF |
| 25280 | | | | |
| 23-FEB-96 | S-25 | RAISE SEWER MAN-HOLE ON WILMER | 2 | SHF |

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 25356 | | | | |
| FEB-96 | BOILER RM DACH | CK RPR SEWER ALARM SOUNDING | 1 | CMF |
| 25993 | | | | |
| 27-FEB-96 | S-28 | 9214 U/S SEWER MAIN | 1 | CMF |
| 26892 | | | | |
| 01-MAR-96 | SST NINELIST | CK/RPR SEWER LINE SPRAYING WAT | 1 | CMF |

08-MAR-96 P-1 U/S MANHOLE OUTSIDE OF BLDG 11 1

27879 SHP
12-MAR-96 CW2. HODGE DRAIN MAN HOLE. LOCATED IN MA 2

28811 CMP
15-MAR-96 S-21 MAIN GATE//CONTRACTOR HIT SEWE 1

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 29035 | | | | CMP |
| 18-MAR-96 | G-20 | ROLL STAINLESS METAL,3X4 AND R | 1 | |
| 29247 | | | | CMP |
| 19-MAR-96 | P-13 | U/S OUTSIDE SWR BY MH 9211 | 1 | |
| 30055 | | | | CMP |
| 21-MAR-96 | SPC KENNEDY | CK/RPR SEWER WATER COMING OUT | 1 | |
| 30190 | | | | SHP |
| 22-MAR-96 | SPC. EGBERT | U/S STORM DRAIN. LOCATED WEST | 2 | |
| 30228 | | | | CMP |
| 22-MAR-96 | MR FAW | SEWER LIFT IN ALARM | 1 | |
| 30310 | | | | CMP |
| 22-MAR-96 | S-25 | 20101 U/S SEWER MAIN ATTN S | 1 | |

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 30475 | | | | CMF |
| 25-MAR-96 | MR BASS | SWR BACKING UP ON HILL, BY 201 | 1 | |
| 30575 | | | | CMF |
| 25-MAR-96 | S-20 | RPR SEWER MANHOLE BY 9563 | 2 | |
| 30786 | | | | CMF |
| 26-MAR-96 | M-7 | CHECK SEWER MANHOLE BACKING UP | 1 | |
| 32048 | | | | CMF |
| 30-MAR-96 | MR TAUGHRON | CK RPR SEWER LINE COVER MISSI | 2 | |
| 32183 | | | | SHI |
| 01-APR-96 | MR HOLMES | RPR/RPL MANHOLE COVER MISSING/ | 2 | |
| 32418 | | | | CMI |
| 02-APR-96 | DEL 37 | CHECK SWR LIFT 52380, IN ALARM | 1 | |

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS CW

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 32872 | | | | CM |
| 03-APR-96 | S-29 | RPR PUMP #2 AT 51400 | 2 | |
| 32998 | | | | CM |
| 04-APR-96 | MR ENDGLEDINGER | UNSTOP FLOOR DRAIN BACKING UP | 1 | |

04-APR-96 S-26 U/S SEWER MAIN EAST SIDE OF B 2 CMP

33672
08-APR-96 P-11 37007 RAW SEWAGE COMING UP FRO 1 CMP

[illegible]
[illegible]PR-96 P-11 41007 U/S OUTSIDE SEWER LINE 1 CMP

34002
10-APR-96 S-25 REMOVE GREASE FRIM WATER 4101 2 SHP

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 34217 X<br>11-APR-96 | CPT CASSIDY | CK/RPR SMELL OF RAW SEWERAGE O | 2 | CMP |
| 34323<br>11-APR-96 | DIN16 | U/S SEWER OUTSIDE 3967, NOT DR | 1 | CMP |
| 34442<br>11-APR-96 | S-25 | 90024 U/S SEWER MAIN ATT | 1 | CMP |
| 34715<br>15-APR-96 | P-11 | U/S SEWER OUTSIDE BLDG, 41007 | 1 | CMP |
| 34761<br>15-APR-96 | S-22 | 90024 RPR MANHOLE NEAR BLDG | 2 | CMP |
| [illegible]<br>[illegible]-APR-96 | S-25 | 56135 RPR MANHOLE APPROX. 200- | 2 | CMP |

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 36129<br>20-APR-96 | S-26 | U/S SEWER COMING FOM MANHOLE B | 1 | CMP |
| 36826<br>23-APR-96 | D-26 | 51400 RPL BELTS ON #2 PUMP | 2 | CMP |
| 37068<br>24-APR-96 | GHOLSON | 51400 RPL PUMP AT SEWER LIFT S | 1 | CMP |
| 37933<br>27-APR-96 | J.J. CONSTRUCTN | ALARM GOING OFF TO LIFT STATIO | 1 | CMP |
| 38252<br>29-APR-96 | DIN 16 | 36006 U/S OUTSIDE SEWER LINE | 1 | CMP |
| 38318<br>30-APR-96 | O - 25 | SUCK-OUT, FLUSH, AND SUCK-OUT | 2 | CMP |

[illegible]SE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 38602<br>01-MAY-96 | BASS - BLORA | U/S COTTAGE CAMPING - RV DUMP | 1 | CMP |

02-MAY-96 J/J MANT RPR/CK SEWER ALARM GOING OFF 5 1

39017 SHP
02-MAY-96 P-8 10003 ASSIST 82X - U/S OUTSIDE 1

39081 MP
02-MAY-96 P-8 10003 UNSTOP OUTSIDE SEWER LIN 1

39105 CHANGED SHOP FROM 88 TO 76 ..... CMP
02-MAY-96 S - 22 90034 RPR CLAY VALVE 2

40244 CMP
08-MAY-96 E6 JONES U/S SEWER BY 9543, COMING UO F 1

PLEASE HIT <CR> TO CONTINUE
SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P |
|---|---|---|---|
| 40406 | | | CMP |
| 08-MAY-96 | G-20 | 90031 CHECK SEWER LINE | 1 |
| 40947 | | | CMP |
| 09-MAY-96 | O-3 | CK RPR BLD 87017 DIG UP SEWER | 2 |
| 41230 | | | CMP |
| 11-MAY-96 | SGT WINTERS | U/S MANHOLE OVER FLOWING IN FR | 1 |
| 42203 | | | CMP |
| 15-MAY-96 | S-25 | U/S STORM DRAIN AT INTERSECTIO | 2 |
| 42716 | | | MP |
| 17-MAY-96 | MR BASS | CK RPR MANHOLE OVERFLOWING BLD | 1 |
| 42904 | | | CMP |
| 19-MAY-96 | MRS UNDERWOOD | U/S SEWAGE BACKING UP NEXT TO | 1 |

PLEASE HIT <CR> TO CONTINUE
SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P |
|---|---|---|---|
| 42935 | | | CMP |
| 20-MAY-96 | MR BASS | CK RPR U/S SEWER AT BLORA | 1 |
| 43264 | | | CMP |
| 20-MAY-96 | S-25 | CHECK SEWER LIFT STATION 51400 | 1 |
| 44166 | | | CMP |
| 23-MAY-96 | MR GLAZENER | UNSTOP SEWER LINE WHICH IS BAC | 1 |
| 44582 | | | CMP |
| 26-MAY-96 | MR TURNER | CK RPR U/S SEWER AT BLD 20141 | 1 |
| 44647 | | | CMP |
| 28-MAY-96 | MRS TUCKER | CK/RPR PUMP STATION LIGHTS ARE | 1 |
| 45525 | | | |
| 29-MAY-96 | 1SG ESTRADA | U/S SEWAGE BACKING UP ON NORTH | 1 |

PLEASE HIT <CR> TO CONTINUE
SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P |
|---|---|---|---|

| | | | | |
|---|---|---|---|---|
| [illegible] | | | | CMF |
| 31-MAY-96 | MAJ RUSSELL | CK/RPR WATER BACKING UP AND OV | 1 | |
| 46214 | | | | CMF |
| 31-MAY-96 | MR DOLEY | RPR/CK RED LIGHT ON SEWER LIFT | 1 | |
| 4[illegible]43 | | | | CMF |
| [illegible] JUN-96 | MR. KIRKMAN | CK RPR SEWAGE BACKED INTO SHOW | 1 | |
| 46632 | | | | CMF |
| 05-JUN-96 | O-26 | CLEAN CULVERT PIPE ACROSS FROM | 3 | |
| W0051 | | | | SHF |
| 11-JUN-96 | MS SILKWOOD | CK/RPR WATER/SEWER SEEPING UP | 2 | |
| U1947 | | | | CMF |
| 07-JUN-96 | S-25 | RPL DISCHARGE GATE ON #1 VALVE | 2 | |

PLEASE HIT <CR> TO CONTINUE
SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| U1982 | | | | CMF |
| 08-JUN-96 | MRS VOLK | CHECK SWG BACK UP,7002, LINES | 1 | |
| U2101 | | | | SHF |
| 11-JUN-96 | P-9 | ASSIST 88 SHOP WITH WATER / SE | 1 | |
| U2106 | | | | CMF |
| 11-JUN-96 | S-26 | RPR/CK 6" SEWER LINE BROKEN BY | 1 | |
| [illegible]18 | | | | CMF |
| [illegible] JUN-96 | Z-23 | RPR SEWER LINE 30025 | 2 | |
| U2171 | | | | CMF |
| 13-JUN-96 | MR. BASS | US SEWER BY THE WATERSLIDE | 1 | |
| 48414 | | | | CMF |
| 14-JUN-96 | P-8 | U/S GREASE TRAP OUTSIDE OF BLD | 1 | |

PLEASE HIT <CR> TO CONTINUE
SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 48875 | | | | CMF |
| 17-JUN-96 | WOODELL | 51400 SEWER LIFT STN///PUMPS N | 1 | |
| U2209 | | | | CMF |
| 17-JUN-96 | MR JOANIS | 70004 SEWER MANHOLE OVERFLOWIN | 1 | |
| U2211 | | | | CMF |
| 17-JUN-96 | S-28 | REMOVE FLEX HOSE FROM MANHOLE | 1 | |
| 49717 | | | | CMF |
| 20-JUN-96 | S-26 | CK RPR U/S SEWER BLD 9420 | 1 | |
| [illegible]88 | | | | CMF |
| 23-JUN-96 | MR TALLEY | CK RPR ALARM SOUNDED AT LIF | 1 | |
| 50300 | | | | CMF |
| 23-JUN-96 | MR LANE | CK RPR ALARM GOING OFF AT SEWE | 1 | |

PLEASE HIT <CR> TO CONTINUE

| ECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 0873 | | | | CMP |
| 5-JUN-96 | MR BUCHANAN | CK/RPR SEWERAGE BACKING UP ABO | 1 | |
| 1620 | | | | CMP |
| 7-JUN-96 | S-21 | U/S SEWER MAIN 3608 | 2 | |
| 1632 | | | | CMP |
| 7-JUN-96 | S-28 | U/S MANHOLE ON N/WEST SIDE 579 | 1 | |
| 1804 | | | | CMP |
| 8-JUN-96 | S-21 | RPR 4" SEWER LINE | 1 | |
| 2140 | | | | CMP |
| 1-JUL-96 | S-21 | 3826 U/S SEWER MAINS | 1 | |
| 2401 | | | | CMP |
| 2-JUL-96 | MR BUMPERS | SEWER LIFT 51400 IN ALARM | 1 | |

LEASE HIT <CR> TO CONTINUE
D NO SHORT REMARKS CWS

| ECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 2710 | | | | CMP |
| 5-JUL-96 | J/J MANT | RPR/CK ALARM FOR 51400 | 1 | |
| 2745 | | | | CMP |
| 6-JUL-96 | JESSIE BUMPERS | 51400 SEWER ALARM GOING OFF AT | 1 | |
| 2416 | | | | CM |
| 7-JUL-96 | MR ADAMS | CK RPR GAS LEAK IN LAUNDRY RO | 1 | |
| 3358 | | | | CMP |
| 9-JUL-96 | Z-23 | RPR SWR CLEAN OUT, BROKEN BY T | 2 | |
| 3546 | | | | CMP |
| 9-JUL-96 | ORANGE 76X | U/S SEWER MAIN 91065 A | 1 | |
| 3844 | | | | CMP |
| 0-JUL-96 | P-13 | U/S OUTSIDE SEWER, N/SIDE,518 | 1 | |

LEASE HIT <CR> TO CONTINUE
O NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 4208 | | | | CMP |
| 1-JUL-96 | S-21 | BLOW OUT SEWER LINE IN MESS HA | 2 | |
| 4217 | | | | SHP |
| 11-JUL-96 | S-20 | SUCK GREAS FROM WET WELL, 4851 | 1 | |
| 4230 | | | | CMP |
| 11-JUL-96 | MS MORALES | 52024 CHECK SEWER MAIN CUST | 1 | |
| 4292 | | | | C |
| 12-JUL-96 | S-25 | ASSIST WITH SEWER LINE OUTSIDE | 2 | |
| 4502 | | | | CMP |
| 13-JUL-96 | SGT BALLARD | CK RPR SODA ASH PUMP BLOWING | 1 | |
| 4550 | | | | CMP |
| 14-JUL-96 | SGT BALLARD | CK RPR CLOG IN LINE OF SODA AS | 1 | |

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 54551 | | | | CMF |
| JUL-96 | S-26 | CK RPR OPN 8 INCH MAIN LINE V | 2 | |
| 54562 | | | | CMF |
| 15-JUL-96 | MR LANG | U/S MANHOLE OVER FLOWING IN FR | 1 | |
| 55099 | | | | CMF |
| 16-JUL-96 | S-25 | RPR 2 MANHOLES ON S/WEST SIDE | 2 | |
| 55100 | | | | CMF |
| 16-JUL-96 | S-25 | RPR SUMP, 88025 | 2 | |
| U2492 | | | | CMF |
| 16-JUL-96 | S-26 | RPR SEWER MAIN 20149 | 1 | |
| 55288 | | | | SHF |
| 17-JUL-96 | S-25 | RPR MANHOLE ALONG SHORELINE NE | 2 | |

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 55453 | | | | CMF |
| 17-JUL-96 | S-22 | RPR SWR LINE BROKEN BY CONTRAC | 1 | |
| 5 98 | | | | CMF |
| JUL-96 | S-25 | RPR MANHOLE NEAR JOGGING TRACK | 2 | |
| 56990 | | | | CAN |
| 25-JUL-96 | MRS. HAVLIK | CK/RPR PUMP STATION RED LIGHT | 1 | |
| 57533 | | | | CMF |
| 26-JUL-96 | MR. BASS | RPR WATER LINE BEHIND BLDG | 1 | |
| 58403 | | | | SHI |
| 31-JUL-96 | S-25 | RPR CLEAN OUT BLDG 10041 | 2 | |
| 58485 | | | | CMI |
| 31-JUL-96 | S-26 | RPR SEWER MAIN HIT BY CONTRACT | 1 | |

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 58591 | | | | CMI |
| 01-AUG-96 | MR. BASS | BLOW OUT SHOWER DRAINS AT SIER | 2 | |
| 58622 | | | | CM |
| 01-AUG-96 | R-1 | CLEAN OUT SEWER LINE ON EAST S | 2 | |
| 59 | | | | CM |
| 1-AUG-96 | DIN 16 | ASSIST TO U/S OUTSIDE DRAIN | 1 | |
| 58829 | | | | SH |
| 02-AUG-96 | MR. BASS | U/S SHOWER DRAINS AT BLORA BLD | 1 | |
| 59018 | | | | CM |

59070 CMP
04-AUG-96 MS BURMINGHAM CK RPR RAW SEWAGE COMING FROM 1

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 59673 | | | | CMP |
| 06-AUG-96 | P-5 | U/S SEWER LINE WEST SIDE OF FE | 1 | |
| 59742 | | | | CMP |
| 06-AUG-96 | S-21 | U/S SEWER LINE | 2 | |
| 60035 | | | | CMP |
| 07-AUG-96 | TECOM ORP 35 | COMMANCHE I SEWER MAIN OVERFLO | 1 | |
| 61456 | | | | CMP |
| 13-AUG-96 | S-22 | CK RPR LIFT PUMPS TO BLDG 5140 | 1 | |
| 61551 | | | | CMP |
| 14-AUG-96 | S-25 | RPR MANHOLE ACROSS STREET BLDG | 2 | |
| 62072 | | | | CMP |
| 15-AUG-96 | S-22 | 1676 CHECK SEWER LINES | 1 | |

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 62196 | | | | |
| 16-AUG-96 | O-25 | 92072 RPR 4-EA SEPTIC TANK LIN | 2 | |
| 62345 | | | | SHP |
| 17-AUG-96 | Z-23 | 51400 SEWER LIFT STATION OVERF | 1 | |
| 62353 | | | | SHP |
| 17-AUG-96 | Z-23 | 51400 SEWER LIFT STN OVERFLOWI | 1 | |
| U2754 | | | | CMP |
| 17-AUG-96 | MR WOODELL | CK RPR SEWER LIFT 51400 HAS OV | 1 | |
| 62453 | | | | CMP |
| 19-AUG-96 | S-22 | RPR RUPTURED SEWER LINE SOUTHW | 1 | |
| U2769 | | | | CMP |
| 20-AUG-96 | S-25 | RPR/CK SEWER LIFT STATION | 1 | |

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 63164 | | | | CMP |
| 21-AUG-96 | M-51 | BLOW STORM DRAIN ON WASHRACK A | 2 | |
| 63460 | | | | |
| 22-AUG-96 | SGT HOTCHKISS | CK/RPR BAD SEWER ODOR COMING O | 1 | |
| 63782 | | | | CMP |
| 24-AUG-96 | MR DODD | RPR/CK SEWER ALARM GOING OFF, | 1 | |
| 65030 | | | | SHP |

65178
02-SEP-96 DIN 16 CHECK, BLOW OUT THE MANHOLE IN 2 CMP

65814
04-SEP-96 S-26 RPR 12" FORCE SEWER MAIN 1 CMP

PLEASE HIT <CR> TO CONTINUE
SO NO SHORT REMARKS.
CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 65890 05-SEP-96 | S-25 | BLDG 4001 RPR/RPL BLOW OFF VAL | 2 | CMP |
| 66145 06-SEP-96 | P-8 | NEED TO BLOW DOWN OUTSIDE DRAI | 1 | CMP |
| 66712 09-SEP-96 | S-26 | RPR/CK BLOW OUT 12" MAIN ON SE | 2 | CMP |
| 67189 11-SEP-96 | P -5 | U/S SEWER DRAIN OUTSIDE OF BLD | 1 | CMP |
| 67349 12-SEP-96 | NOTHING LEAVING FROM PIPE MR BUCHANAN | 7013 BROKEN SEWER CLEAN OUT/// | 2 | SHP |
| 67526 12-SEP-96 | V-5 | RPR/CK SEWER ALARM GOING OFF 5 | 1 | CMP |

PLEASE HIT <CR> TO CONTINUE
SO NO SHORT REMARKS.
CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| U3005 19-SEP-96 | P-5 | U/S OUTSIDE SWR, EASR SIDE BLD | 1 | CMP |
| 68406 19-SEP-96 | S-25 | BLDG 41 DIG UP AND REPAIR SEWE | 2 | SHP |
| 68574 20-SEP-96 | MR ZIELINIWICZ | CK/RPR SEWER LINE BACKING UP A | 1 | CMP |
| 68880 23-SEP-96 | P-17 | U/S GREASE TRAP 50001 | 1 | CMP |
| 68881 23-SEP-96 | BRAVO | RPR/CK SEWER LINE BROKEN BY CO | 2 | CMP |
| 69099 24-SEP-96 | MR MOLINA | CK/RPR SANITARY SEWER SYSTEM, | 2 | SHP |

PLEASE HIT <CR> TO CONTINUE
SO NO SHORT REMARKS.
CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 0 24-SEP-96 | S-30 | RPR 6" SEWER LINE | 1 | CMP |
| 67284 25-SEP-96 | S-28 | RPL MANHOLE COVER | 2 | SHP |
| 69469 | | | | SHP |

9566
6-SEP-96 SPC BARNES U/S SEWER DRAIN NORTHWEST SIDE 2 CMP

9681
6-SEP-96 MAYO RPR/CK ALARM GOING OFF AT SEWE 1 CMP

9870
8-SEP-96 S-21 TANK DESTROYER AND 78TH STREET 1 C

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 70053 30-SEP-96 | D-34 | CK/RPR SEWER LIFT STATION OVER | 1 | CMP |
| 70137 30-SEP-96 | S-22 | 4417 BROKEN SEWER LINE BY CONT | 1 | CMP |
| 00248 01-OCT-96 | O-25 | ASSIST 83X SHOP AT 87017, U/S | 1 | CMP |
| 00154 02-OCT-96 | NETWORK CONST | 67TH & TD RPR MAIN SEWER LINE | 1 | CMP |
| 00691 03-OCT-96 | S-26 | RPR/CK BROKEN WATER LINE 56012 | 2 | CMP |
| 01669 11-OCT-96 | MR. SPIRES | CLARK RD & LOGISTICS HAVE CUT | 1 | SHP |

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| U0193 14-OCT-96 | MP STATION | RPR/CK SEWAGE BACKING UP NEAR | 1 | CMP |
| 01873 15-OCT-96 | MR. BURNEY | BLOW OUT SEWER MAIN WITH HIGH | 2 | CMP |
| 02502 18-OCT-96 | P-8 | 12012 U/S SEWER MAIN ATT | 1 | CMP |
| 02510 18-OCT-96 | P-8 | 12012 RPR CLEAN-OUT ON NORTHSI | 2 | SHP |
| 02936 22-OCT-96 | P-13 | CK/RPR MANHOLE BACKED UP OUTSI | 1 | CMP |
| 03552 24-OCT-96 | 710F | RPR/CK SEWER ALARM GOING OFF 5 | 1 | CMP |

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 03561 24-OCT-96 | S-26 | ASSIST CONTRACTOR IN REPAIRING | 2 | CMP |
| 03773 | | CK/RPR CONTRACTOR BROKE INTO S | 1 | SHP |

29-OCT-96 S-26 RPR/CK BROKEN SEWER LINE BEHIN 2 SH

04343
29-OCT-96 G-6 ASSITS SHOP 92 WITH UNSTOPPING 1 CM

04380
[illegible] OCT-96 S-28 9211 NORTHSIDE : RPR/RP. 4-EA 2 CM

04699
31-OCT-96 P-26 RPR FORCE SEWER MAIN HIT BY CO 1 CM

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS

CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 05183 | | ELEC. CABLES ARE NOW BEING COVERED W/WTR. (ELEC. HAZZARD)7/11/96. | | |
| 04-NOV-96 | SGM WILLIAMS | CK/RPR SOUTH SIDE OUTSIDE FRON | 2 | CMP |
| 06267 | | | | |
| 12-NOV-96 | D-74 | CK/RPR MAIN SEWER STATION ABOU | 1 | CMP |
| 07054 | | | | |
| 16-NOV-96 | P-8 | 16008 U/S OUTSIDE DRAINS | 1 | CMP |
| 07110 | | | | |
| 17-NOV-96 | MR LEPPO | CK RPR SEWER LIFT STATION ALAR | 1 | CAN |
| 07173 | | | | |
| 18-NOV-96 | W01 NALEY | WATER PUMP TO OIL AND SAND INT | 2 | CMP |
| 07[illegible]38 | | | | |
| [illegible]-NOV-96 | TGT HALL | RPR/CK MANHOLE COVER PART OF C | 2 | SHP |

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS

CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 07757 | | | | |
| 20-NOV-96 | MR WOODELL | ASSIST CONTRACTOR AT 51400 BR | 1 | SHP |
| 08929 | | | | |
| 25-NOV-96 | S-26 | RPR SEWER MAIN THAT CONTRACTOR | 1 | SHP |
| U0475 | | | | |
| 26-NOV-96 | DELTA 29 | RPR/CK DISCHARGE VALVE AT 4851 | 1 | CMP |
| U0480 | | | | |
| 27-NOV-96 | MR BUMPERS | CK RPR ALARM SOUNDING AT LIFT | 1 | SHP |
| 09687 | | | | |
| 27-NOV-96 | MS DAIVSON | CK RPR SEWER OVERFLOWING BEHIN | 1 | CMP |
| 09798 | | | | |
| 29-NOV-96 | MS MITCHELL | SEWAGE COMING UP TO PARKING LO | 1 | SHP |

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS

CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 09848 | | | | |
| 01-DEC-96 | MR FAW | CHECK SEWER LIFT, 51400, IN AL | 1 | CMP |

| | | | |
|---|---|---|---|
| 10072<br>02-DEC-96 S-21 | U/S SEWER MAIN | 2 | SHP |
| 10541<br>04-DEC-96 P-13 | 15023 SEWER LINE STOPPED UP | 1 | SHP |

465 rows selected.

31-MAY-96 MAJ RUSSELL CK/RPR WATER BACKING UP AND OV 1 CMF

46214
31-MAY-96 MR DOLEY RPR/CK RED LIGHT ON SEWER LIFT 1 CMF

46743
JUN-96 MR. KIRKMAN CK RPR SEWAGE BACKED INTO SHOW 1 CMF

46632
05-JUN-96 O-26 CLEAN CULVERT PIPE ACROSS FROM 3 CMF

W0051
11-JUN-96 MS SILKWOOD CK/RPR WATER/SEWER SEEPING UP 2 SHF

U1947
07-JUN-96 S-25 RPL DISCHARGE GATE ON #1 VALVE 2 CMF

PLEASE HIT <CR> TO CONTINUE
SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| U1982 | | | | CMF |
| 08-JUN-96 | MRS VOLK | CHECK SWG BACK UP,7002, LINES | 1 | |
| U2101 | | | | SHF |
| 11-JUN-96 | P-9 | ASSIST 88 SHOP WITH WATER / SE | 1 | |
| U2106 | | | | CMF |
| 11-JUN-96 | S-26 | RPR/CK 6" SEWER LINE BROKEN BY | 1 | |
| 48 | | | | CMF |
| JUN-96 | Z-23 | RPR SEWER LINE 30025 | 2 | |
| U2171 | | | | CMF |
| 13-JUN-96 | MR. BASS | US SEWER BY THE WATERSLIDE | 1 | |
| 48414 | | | | CMF |
| 14-JUN-96 | P-8 | U/S GREASE TRAP OUTSIDE OF BLD | 1 | |

PLEASE HIT <CR> TO CONTINUE
SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 48875 | | | | CMF |
| 17-JUN-96 | WOODELL | 51400 SEWER LIFT STN///PUMPS N | 1 | |
| U2209 | | | | CMF |
| 17-JUN-96 | MR JOANIS | 70004 SEWER MANHOLE OVERFLOWIN | 1 | |
| U2211 | | | | CMF |
| 17-JUN-96 | S-28 | REMOVE FLEX HOSE FROM MANHOLE | 1 | |
| 49717 | | | | CMI |
| 20-JUN-96 | S-26 | CK RPR U/S SEWER BLD 9420 | 1 | |
| 88 | | | | CMI |
| 23-JUN-96 | MR TALLEY | CK RPR ALARM SOUNDED AT LIF | 1 | |
| 50300 | | | | CMI |
| 23-JUN-96 | MR LANE | CK RPR ALARM GOING OFF AT SEWE | 1 | |

PLEASE HIT <CR> TO CONTINUE

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 50973 | | | | CMP |
| 15-JUN-96 | MR BUCHANAN | CK/RPR SEWERAGE BACKING UP ABO | 1 | |
| 51620 | | | | CMP |
| 27-JUN-96 | S-21 | U/S SEWER MAIN 3608 | 2 | |
| 51632 | | | | CMP |
| 27-JUN-96 | S-28 | U/S MANHOLE ON N/WEST SIDE 579 | 1 | |
| 51804 | | | | CMP |
| 28-JUN-96 | S-21 | RPR 4" SEWER LINE | 1 | |
| 52140 | | | | CMP |
| 01-JUL-96 | S-21 | 3826 U/S SEWER MAINS | 1 | |
| U2401 | | | | CMP |
| 02-JUL-96 | MR BUMPERS | SEWER LIFT 51400 IN ALARM | 1 | |

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 52710 | | | | CMP |
| 05-JUL-96 | J/J MANT | RPR/CK ALARM FOR 51400 | 1 | |
| 52745 | | | | CMP |
| 06-JUL-96 | JESSIE BUMPERS | 51400 SEWER ALARM GOING OFF AT | 1 | |
| U2416 | | | | CMP |
| 07-JUL-96 | MR ADAMS | CK RPR GAS LEAK IN LAUNDRY RO | 1 | |
| 53358 | | | | CMP |
| 09-JUL-96 | Z-23 | RPR SWR CLEAN OUT, BROKEN BY T | 2 | |
| 53546 | | | | CMP |
| 09-JUL-96 | ORANGE 76X | U/S SEWER MAIN 91065 A | 1 | |
| 53844 | | | | CMP |
| 10-JUL-96 | P-13 | U/S OUTSIDE SEWER, N/SIDE,518 | 1 | |

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 54208 | | | | CMP |
| 11-JUL-96 | S-21 | BLOW OUT SEWER LINE IN MESS HA | 2 | |
| 54217 | | | | SHP |
| 11-JUL-96 | S-20 | SUCK GREAS FROM WET WELL, 4851 | 1 | |
| 54230 | | | | CMP |
| 11-JUL-96 | MS MORALES | 52024 CHECK SEWER MAIN CUST | 1 | |
| 54292 | | | | C[illegible] |
| 12-JUL-96 | S-25 | ASSIST WITH SEWER LINE OUTSIDE | 2 | |
| 54502 | | | | CMP |
| 13-JUL-96 | SGT BALLARD | CK RPR SODA ASH PUMP BLOWING | 1 | |
| 54550 | | | | CMP |
| 14-JUL-96 | SGT BALLARD | CK RPR CLOG IN LINE OF SODA AS | 1 | |

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 54551 | | | | CMF |
| JUL-96 | S-26 | CK RPR OPN 8 INCH MAIN LINE V | 2 | |
| 54562 | | | | CMF |
| 15-JUL-96 | MR LANG | U/S MANHOLE OVER FLOWING IN FR | 1 | |
| 55099 | | | | CMF |
| 16-JUL-96 | S-25 | RPR 2 MANHOLES ON S/WEST SIDE | 2 | |
| 55100 | | | | CMF |
| 16-JUL-96 | S-25 | RPR SUMP, 88025 | 2 | |
| U2492 | | | | CMF |
| 16-JUL-96 | S-26 | RPR SEWER MAIN 20149 | 1 | |
| 55288 | | | | SHF |
| 17-JUL-96 | S-25 | RPR MANHOLE ALONG SHORELINE NE | 2 | |

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 55453 | | | | CMF |
| 17-JUL-96 | S-22 | RPR SWR LINE BROKEN BY CONTRAC | 1 | |
| 5[illegible]498 | | | | CMF |
| JUL-96 | S-25 | RPR MANHOLE NEAR JOGGING TRACK | 2 | |
| 56990 | | | | CAN |
| 25-JUL-96 | MRS. HAVLIK | CK/RPR PUMP STATION RED LIGHT | 1 | |
| 57533 | | | | CMF |
| 26-JUL-96 | MR. BASS | RPR WATER LINE BEHIND BLDG | 1 | |
| 58403 | | | | SHF |
| 31-JUL-96 | S-25 | RPR CLEAN OUT BLDG 10041 | 2 | |
| 58485 | | | | CMF |
| 31-JUL-96 | S-26 | RPR SEWER MAIN HIT BY CONTRACT | 1 | |

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 58591 | | | | CMF |
| 01-AUG-96 | MR. BASS | BLOW OUT SHOWER DRAINS AT SIER | 2 | |
| 58622 | | | | CM |
| 01-AUG-96 | R-1 | CLEAN OUT SEWER LINE ON EAST S | 2 | |
| [illegible]759 | | | | CM |
| [illegible]-AUG-96 | DIN 16 | ASSIST TO U/S OUTSIDE DRAIN | 1 | |
| 58829 | | | | SH |
| [illegible]2-AUG-96 | MR. BASS | U/S SHOWER DRAINS AT BLORA BLD | 1 | |
| 59018 | | | | CM |

59070 CMP
04-AUG-96 MS BURMINGHAM CK RPR RAW SEWAGE COMING FROM 1

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 59673 | | | | CMP |
| 06-AUG-96 | P-5 | U/S SEWER LINE WEST SIDE OF FE | 1 | |
| 59742 | | | | CMP |
| 06-AUG-96 | S-21 | U/S SEWER LINE | 2 | |
| 60035 | | | | CMP |
| 07-AUG-96 | TECOM ORP 35 | COMMANCHE I SEWER MAIN OVERFLO | 1 | |
| 61456 | | | | CMP |
| 13-AUG-96 | S-22 | CK RPR LIFT PUMPS TO BLDG 5140 | 1 | |
| 61551 | | | | CMP |
| 14-AUG-96 | S-25 | RPR MANHOLE ACROSS STREET BLDG | 2 | |
| 62072 | | | | CMP |
| 15-AUG-96 | S-22 | 1676 CHECK SEWER LINES | 1 | |

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 62196 | | | | |
| 16-AUG-96 | O-25 | 92072 RPR 4-EA SEPTIC TANK LIN | 2 | |
| 62345 | | | | SHP |
| 17-AUG-96 | Z-23 | 51400 SEWER LIFT STATION OVERF | 1 | |
| 62353 | | | | SHP |
| 17-AUG-96 | Z-23 | 51400 SEWER LIFT STN OVERFLOWI | 1 | |
| U2754 | | | | CMP |
| 17-AUG-96 | MR WOODELL | CK RPR SEWER LIFT 51400 HAS OV | 1 | |
| 62453 | | | | CMP |
| 19-AUG-96 | S-22 | RPR RUPTURED SEWER LINE SOUTHW | 1 | |
| U2769 | | | | CMP |
| 20-AUG-96 | S-25 | RPR/CK SEWER LIFT STATION | 1 | |

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 63164 | | | | CMP |
| 21-AUG-96 | M-51 | BLOW STORM DRAIN ON WASHRACK A | 2 | |
| 63460 | | | | |
| 22-AUG-96 | SGT HOTCHKISS | CK/RPR BAD SEWER ODOR COMING O | 1 | |
| 63782 | | | | CMP |
| 24-AUG-96 | MR DODD | RPR/CK SEWER ALARM GOING OFF, | 1 | |
| 65030 | | | | SHP |

65178
02-SEP-96 DIN 16 CHECK,BLOW OUT THE MANHOLE IN 2 CMP

65814
04-SEP-96 S-26 RPR 12" FORCE SEWER MAIN 1 CMP

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARK. CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 65890 05-SEP-96 | S-25 | BLDG 4001 RPR/RPL BLOW OFF VAL | 2 | CMP |
| 66145 06-SEP-96 | P-8 | NEED TO BLOW DOWN OUTSIDE DRAI | 1 | CMP |
| 66712 09-SEP-96 | S-26 | RPR/CK BLOW OUT 12" MAIN ON SE | 2 | CMP |
| 67189 11-SEP-96 | P -5 | U/S SEWER DRAIN OUTSIDE OF BLD | 1 | CMP |
| 67349 12-SEP-96 | NOTHING LEAVING FROM PIPE MR BULLIGAN | 7013 BROKEN SEWER CLEAN OUT/// | 2 | SHP |
| 67526 12-SEP-96 | V-5 | RPR/CK SEWER ALARM GOING OFF 5 | 1 | CMP |

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARK. CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| U3005 19-SEP-96 | P-5 | U/S OUTSIDE SWR, EASR SIDE BLD | 1 | CMP |
| 68406 19-SEP-96 | S-25 | BLDG 41 DIG UP AND REPAIR SEWE | 2 | SHP |
| 68574 20-SEP-96 | MR ZIELINWICZ | CK/RPR SEWER LINE BACKING UP A | 1 | CMP |
| 68880 23-SEP-96 | P-17 | U/S GREASE TRAP 50001 | 1 | CMP |
| 68881 23-SEP-96 | BRAVO | RPR/CK SEWER LINE BROKEN BY CO | 2 | CMP |
| 69099 24-SEP-96 | MR MOLINA | CK/RPR SANITARY SEWER SYSTEM, | 2 | SHP |

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARK. CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 0 24-SEP-96 | S-30 | RPR 6" SEWER LINE | 1 | CMP |
| 69384 25-SEP-96 | S-28 | RPL MANHOLE COVER | 2 | SHP |
| 69469 | | | | SHP |

.9566 CMP
6-SEP-96 SPC BARNES U/S SEWER DRAIN NORTHWEST SIDE 2

.9681 CMP
6-SEP-96 MAYO RPR/CK ALARM GOING OFF AT SEWE 1

.9870 C
8-SEP-96 S-21 TANK DESTROYER AND 78TH STREET 1

PLEASE HIT <CR> TO CONTINUE
SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 70053 30-SEP-96 | D-34 | CK/RPR SEWER LIFT STATION OVER | 1 | CMP |
| 70137 30-SEP-96 | S-22 | 4417 BROKEN SEWER LINE BY CONT | 1 | CMP |
| 00248 01-OCT-96 | O-25 | ASSIST 83X SHOP AT 87017, U/S | 1 | CMP |
| 00154 02-OCT-96 | NETWORK CONST | 67TH & TD RPR MAIN SEWER LINE | 1 | CMP |
| 00691 03-OCT-96 | S-26 | RPR/CK BROKEN WATER LINE 56012 | 2 | CMP |
| 01669 11-OCT-96 | MR. SPIRES | CLARK RD & LOGISTICS HAVE CUT | 1 | SHP |

PLEASE HIT <CR> TO CONTINUE
SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| U0193 14-OCT-96 | MP STATION | RPR/CK SEWAGE BACKING UP NEAR | 1 | CMP |
| 01873 15-OCT-96 | MR. BURNEY | BLOW OUT SEWER MAIN WITH HIGH | 2 | CMP |
| 02502 18-OCT-96 | P-8 | 12012 U/S SEWER MAIN ATT | 1 | CMP |
| 02510 18-OCT-96 | P-8 | 12012 RPR CLEAN-OUT ON NORTHSI | 2 | SHP |
| 02936 22-OCT-96 | P-13 | CK/RPR MANHOLE BACKED UP OUTSI | 1 | CMP |
| 03552 24-OCT-96 | 710F | RPR/CK SEWER ALARM GOING OFF 5 | 1 | CMP |

PLEASE HIT <CR> TO CONTINUE
SO NO SHORT REMARKS CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 03561 24-OCT-96 | S-26 | ASSIST CONTRACTOR IN REPAIRING | 2 | CMP |
| 03773 | | CK/RPR CONTRACTOR BROKE INTO S | 1 | SHP |

| | | | | |
|---|---|---|---|---|
| 29-OCT-96 S-26 | | RPR/CK BROKEN SEWER LINE BEHIN | 2 | SH |
| 04345<br>29-OCT-96 G-6 | | ASSITS SHOP S2 WITH UNSTOPPING | 1 | CM |
| 780<br>-OCT-96 S-28 | | 9211 NORTHSIDE : RPR/RP. 4-EA | 2 | CM |
| 04699<br>31-OCT-96 P-26 | | RPR FORCE SEWER MAIN HIT BY CO | 1 | CM |

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS

CW

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 05183 ELEC. CABLES ARE NOW BEING COVERED W/WTR. (ELEC. HAZZARD)7/11/96. | | | | |
| 04-NOV-96 | SGM WILLIAMS | CK/RPR SOUTH SIDE OUTSIDE FRON | 2 | CMP |
| 06267<br>12-NOV-96 | S-26 | CK/RPR MAIN SEWER STATION ABOU | 1 | CMP |
| 07084<br>16-NOV-96 | P-8 | 16008 U/S OUTSIDE DRAINS | 1 | CMP |
| 07110<br>17-NOV-96 | MR LEPPO | CK RPR SEWER LIFT STATION ALAR | 1 | CAN |
| 07173<br>18-NOV-96 | WD1 NALEY | WATER PUMP TO OIL AND SAND INT | 2 | CMP |
| 78<br>-NOV-96 | H HALL | RPR/CK MANHOLE COVER PART OF C | 2 | SHP |

PLEASE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS

CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 07757<br>20-NOV-96 | MR WOODELL | ASSIST CONTRACTOR AT 51400 BR | 1 | SHP |
| 08929<br>25-NOV-96 | S-26 | RPR SEWER MAIN THAT CONTRACTOR | 1 | SHP |
| U0475<br>26-NOV-96 | DELTA 29 | RPR/CK DISCHARGE VALVE AT 4851 | 1 | CMP |
| U0480<br>27-NOV-96 | MR BUMPERS | CK RPR ALARM SOUNDING AT LIFT | 1 | SHP |
| 09687<br>27-NOV-96 | MS DAIVSON | CK RPR SEWER OVERFLOWING BEHIN | 1 | CMP |
| 09798<br>29-NOV-96 | MS MITCHELL | SEWAGE COMING UP TO PARKING LO | 1 | SHP |

SE HIT (CR) TO CONTINUE
SO NO SHORT REMARKS

CWS

| RECEIVED | NAME OF CALLER | DESCRIPTION | P | |
|---|---|---|---|---|
| 09848<br>01-DEC-96 | MR FAW | CHECK SEWER LIFT, 51400, IN AL | 1 | CMP |

| | | | |
|---|---|---|---|
| 10072<br>02-DEC-96 S-21 | U/S SEWER MAIN | 2 | SHP |
| 10561<br>04-DEC-96 P-13 | 15023 SEWER LINE STOPPED UP | 1 | SHP |

465 rows selected.

# Appendix I

# Fire Department Spill Response Report

# Appendix I

## Fire Department Spill Response Report

The blank fire department spill report was included to indicate the type of information that could be obtained in case of a fire department response to a release of a hazardous material. This report does not indicate anywhere whether the spill entered the sanitary sewer system. These reports would not be important to review for this SWMU and were therefore not reviewed further. The report was obtained from the Directorate of Public Works Fort Hood Fire Department.

For Official use Only

# DoD FIRE INCIDENT REPORTING SYSTEM
## INCIDENT / EXPOSURE FIRE REPORT

| NEW ( ) | CHANGE ( ) | DELETE ( ) | RELEASE DATE ___/___/_____ |
|---|---|---|---|

| EVENT NUMBER | FDID NUMBER | Branch of Service \|___\| UIC/RUC \|___\|___\|___\|___\|___\|___\| | EXPOSURE NUMBER \|___\|___\| |
|---|---|---|---|
| | INCIDENT NUMBER | YR \|___\|___\| Run Number \|___\|___\|___\|___\|___\|___\|___\|___\| | |

**SECTION I - GENERAL INCIDENT / EXPOSURE FIRE INFORMATION**

| Involvement Code \|___\|___\| | Method of Alarm Code \|___\|___\| | Alarm Date ___/___/___ | Alarm Time ___ ___ ___ ___ | Day Code \|___\| | Arrival Date ___/___/___ | Arrival Time ___ ___ ___ ___ |
|---|---|---|---|---|---|---|
| District \|___\|___\|___\| | Shift \|___\| | Situation Found Code\|___\|___\|___\| | Action Taken Code \|___\| | Date Cleared ___/___/___ | Time Cleared ___ ___ ___ ___ | |

Activity Service Affiliation Code \|___\| Activity Name:_____ UIC/RUC

Total Number of Fire-Related Rescues of People (Not Assists) _____

Mutual Aid Given / Received ( ) YES ( ) NO

Mutual Aid Fire Department FDID \|___\|___\|___\|___\|___\|___\|___\|

Mutual Aid Incident Number \|___\|___\|___\|___\|___\|___\|___\|___\|___\|___\|

Joint Effort by Equally Responsible FDID's ( ) YES ( ) NO

Joint Effort Fire Department FDID \|___\|___\|___\|___\|___\|___\|___\|

Joint Effort Incident Number \|___\|___\|___\|___\|___\|___\|___\|___\|___\|___\|

Shipboard Aircraft Related Fire/Salvage Handle by Shipboard Team(s) ( ) YES ( ) NO

Investigated by Non-DoD Component ( ) YES ( ) NO

Problems / Deficiencies
Check All That Apply

1 ( ) Alarm Transmittal
2 ( ) Fire Department Response
3 ( ) Pumpers, Hose, Ladders, Etc...
4 ( ) Manpower
5 ( ) Breathing apparatus, protective clothing, etc
6 ( ) Extinguishing Agents, Water Supply,
7 ( ) Ventilation, Forcible Entry, Salvage
8 ( ) Weather
9 ( ) Items of Non-Compliance (OSHA)
0 ( ) Other

Incident Commander (In command or control of Scene) _____
Aerospace Incident/Exposure ( ) Yes ( ) No

Type of Information Submitted (Additional Reports)

A ( ) Structural, Mobile
B ( ) Aerospace
C ( ) Casualty Loss
D ( ) Property Loss
E ( ) Environmental Conditions
F ( ) Hazardous Materials
G ( ) FDID Support Vehicle(s)

Incident / Exposure Narrative

_____
_____
_____
_____
_____
_____

| Fire Department Name And Address | Senior Officer in Charge of the Reporting Fire Department |
|---|---|
| Name: _____ | Name: _____ |
| Address: _____ | Title: _____ |
| _____ | DSN Phone Number: _____ |
| _____ Zip Code: _____ | Commercial Phone Number: _____ |

## SECTION II - STRUCTURE / MOBILE INFORMATION

| Incident/Exposure Location | |
|---|---|
| Address: _____ | Fixed Property Use Code \|___\|___\|___\| |
| _____ | Mobile Property Type Code \|___\|___\| |
| _____ | Number of Alarms \|___\| |
| _____ Zip Code: _____ | Number of Off Duty Personnel Responded \|___\|___\|___\| |
| | Number of On Duty Personnel Responded \|___\|___\|___\| |

## SECTION III - GENERAL AEROSPACE INFORMATION

| Date Alarm Received By Responding Unit: | Time Alarm Received By Responding Unit: |
|---|---|
| ____ / ____ / _____ | ___ ___ : ___ ___ : ___ ___ (24 Hour, HR MN SEC) |

Original Source of Alarm - Check One Only

A ( ) Aircraft / Job Maintenance
B ( ) Air Traffic Control
C ( ) Automatic Alarm / Distress Signal
D ( ) Dispatched ARFF Standby Crew
E ( ) Flightline Patrol
F ( ) Hot Spot or Line Standby
G ( ) Person Off the Installation
H ( ) Pilot / Aircrew
I ( ) Other Person on the Installation

| Inflight Emergency Declared: | Initial Vehicle Responded From (Check One Only) |
|---|---|
| ( ) YES ( ) NO ( ) Not Applicable | A ( ) Hot Spot/Live Fire Standby B ( ) ARFF Station C ( ) Other D ( ) No Vehicle Response |
| Egress/Rescue: ( )YES ( ) NO ( ) Not Applicable | SCBA Utilized ( ) YES ( ) NO |

Hazardous Materials Containment by Response Crew ( ) YES ( ) NO ( ) Not Applicable

| Jettison Wreckage (Shipboard) | Jettison Ordnance (Shipboard) |
|---|---|
| ( ) YES ( ) NO ( ) Unknown ( ) Not Applicable | ( ) YES ( ) NO ( ) Unknown ( ) Not Applicable |

**ARFF Emergency Situation**

Number in Chronological Order of Emergency Situation(s)

01( ) Fire
02( ) Explosion
03( ) Aborted Takeoff
04( ) Aircrew Injury, Illness, Incapacitation
05( ) Bird Strike(s)
06( ) Blown Tire(s)
07( ) Braking System Failure
08( ) Collision On Ground
09( ) Crash / Impact
10( ) Electrical Malfunction
11( ) Engine Malfunction
12( ) Fire in Auxiliary Power Unit (APU)
13( ) Fire in Cargo Area
14( ) Fire in Cockpit / Crew Station
15( ) Fire in Engine(s) Area
16( ) Fire in Fuselage Compartment
17( ) Fire in Passenger Compartment
18( ) Fire During Refueling/Defueling
19( ) Flight Control / Surface Problem
20( ) Fuel System Malfunction
21( ) Fuel / POL Spill
22( ) Hard Landing
23( ) Hot Brakes
24( ) Hung Ordinance
25( ) Hydraulic Malfunction
26( ) Landing Gear Collapsed
27( ) Landing Gear(s) Malfunction
28( ) Landing Gear(s) Unsafe
29( ) Lightning Strike
30( ) Loss or Puncture of Canopy
31( ) Mid Air Collision
32( ) Smoke / Fumes in Aircraft
33( ) Transmission / Gearbox Malfunction
34( ) Rapid Decompression
35( ) Wheels Up landing
36( ) Precautionary Standby
37( ) Not Reported
38( ) Other

ARFF General Narrative

# DoD FIRE INCIDENT REPORTING SYSTEM

For Official Use Only

## MUTUAL AID/JOINT EFFORT/NARRATIVE SUPPLEMENTAL REPORT

| NEW ( ) | CHANGE ( ) | DELETE ( ) | RELEASE DATE ___/___/_____ |
|---|---|---|---|

| EVENT NUMBER | FDID NUMBER | Branch of Service \|__\| UIC/RUC \|__\|__\|__\|__\|__\|__\| | EXPOSURE NUMBER \|__\|__\| |
|---|---|---|---|
| | INCIDENT NUMBER | YR \|__\|__\| Run Number \|__\|__\|__\|__\|__\|__\|__\|__\| | |

**SUPPLEMENTAL SECTION I - MUTUAL AID INFORMATION**

| Mutual Aid Code R( X )Received | Mutual Aid Fire Department FDID \|__\|__\|__\|__\|__\|__\|__\| | Mutual Aid Incident Number \|__\|__\|__\|__\|__\|__\|__\|__\|__\|__\| |
|---|---|---|

**SUPPLEMENTAL SECTION I - MUTUAL AID INFORMATION**

| Mutual Aid Code R( X )Received | Mutual Aid Fire Department FDID \|__\|__\|__\|__\|__\|__\|__\| | Mutual Aid Incident Number \|__\|__\|__\|__\|__\|__\|__\|__\|__\|__\| |
|---|---|---|

**SUPPLEMENTAL SECTION I - MUTUAL AID INFORMATION**

| Mutual Aid Code R( X )Received | Mutual Aid Fire Department FDID \|__\|__\|__\|__\|__\|__\|__\| | Mutual Aid Incident Number \|__\|__\|__\|__\|__\|__\|__\|__\|__\|__\| |
|---|---|---|

**SUPPLEMENTAL SECTION I - MUTUAL AID INFORMATION**

| Mutual Aid Code R( X)Received | Mutual Aid Fire Department FDID \|__\|__\|__\|__\|__\|__\|__\| | Mutual Aid Incident Number \|__\|__\|__\|__\|__\|__\|__\|__\|__\|__\| |
|---|---|---|

**SUPPLEMENTAL SECTION I - MUTUAL AID INFORMATION**

| Mutual Aid Code R( X )Received | Mutual Aid Fire Department FDID \|__\|__\|__\|__\|__\|__\|__\| | Mutual Aid Incident Number \|__\|__\|__\|__\|__\|__\|__\|__\|__\|__\| |
|---|---|---|

**SUPPLEMENTAL SECTION I - MUTUAL AID INFORMATION**

| Mutual Aid Code R( X )Received | Mutual Aid Fire Department FDID \|__\|__\|__\|__\|__\|__\|__\| | Mutual Aid Incident Number \|__\|__\|__\|__\|__\|__\|__\|__\|__\|__\| |
|---|---|---|

**SUPPLEMENTAL SECTION I - JOINT EFFORT INFORMATION**

| | Joint Effort Fire Department FDID \|__\|__\|__\|__\|__\|__\|__\| | Joint Effort Incident Number \|__\|__\|__\|__\|__\|__\|__\|__\|__\|__\| |
|---|---|---|

**SUPPLEMENTAL SECTION I - JOINT EFFORT INFORMATION**

| | Joint Effort Fire Department FDID \|__\|__\|__\|__\|__\|__\|__\| | Joint Effort Incident Number \|__\|__\|__\|__\|__\|__\|__\|__\|__\|__\| |
|---|---|---|

**SUPPLEMENTAL SECTION I - JOINT EFFORT INFORMATION**

| | Joint Effort Fire Department FDID \|__\|__\|__\|__\|__\|__\|__\| | Joint Effort Incident Number \|__\|__\|__\|__\|__\|__\|__\|__\|__\|__\| |
|---|---|---|

**SUPPLEMENTAL SECTION I - JOINT EFFORT INFORMATION**

| | Joint Effort Fire Department FDID \|__\|__\|__\|__\|__\|__\|__\| | Joint Effort Incident Number \|__\|__\|__\|__\|__\|__\|__\|__\|__\|__\| |
|---|---|---|

SUPPLEMENTAL SECTION I___I___I - Narrative / Comments

draft

# DoD FIRE INCIDENT REPORTING SYSTEM
# STRUCTURE, MOBILE EVOLUTION/LOSS REPORT

For Official Use Only

| NEW ( ) | CHANGE ( ) | DELETE ( ) | RELEASE DATE ___/___/_____ |
|---|---|---|---|

| EVENT NUMBER | FDID NUMBER | Branch of Service I___I UIC/RUCI I___I___I___I___I___I___I | EXPOSURE NUMBER |
|---|---|---|---|
| | INCIDENT NUMBER | YR I___I___I Run Number I___I___I___I___I___I___I___I___I | I___I___I |

## SECTION IV - FIRE EVOLUTION

### FIRE ORIGIN CODES

Level of Fire Origin I___I___I  Area of Fire Origin I___I___I  Equipment Involved in Ignition I___I___I

Form of Heat of Ignition I___I___I  Ignition Factor I___I___I  Type of Material Ignited I___I___I

Form of Material Ignited I___I___I

### METHOD OF DETECTION - CHECK ONE ONLY

A ( ) Occupants
B ( ) Watchman
C ( ) Roving Patrol
D ( ) Passerby
E ( ) Occupants, Neighboring Building
F ( ) Sprinkler System Actuation
G ( ) Suppression System Actuation
H ( ) Fire Detection System Actuation
I ( ) Not Detected During Burning
J ( ) Aerospace Occupants
K ( ) Runway Alert / Patrol
L ( ) Maintenance / Support
M ( ) Tower
N ( ) Other
Z ( ) Undetermined / Unreported

### METHOD OF EXTINGUISHMENT (ADDITIONAL METHOD'S SEE SUPPLEMENTAL REPORT)

Method Of Extinguishment - CHECK All That Apply

1 ( ) Self-Extinguishment
2 ( ) Make Shift Aids
3 ( ) Portable Extinguisher
4 ( ) Automatic Extinguishing System
5 ( ) Preconnected Hose Lines, Tank Water
6 ( ) Preconnected Hose Lines Other Water Source
7 ( ) Hand-laid Lines, Other Water Source
8 ( ) Master Stream, Other Water Source
9 ( ) Not Classified
0 ( ) Undetermined / Unreported

Extinguishment Agent - Check One Only

01 ( ) AFFF
02 ( ) Water
03 ( ) Other Foams
04 ( ) PKP
05 ( ) Other Dry Chemical
06 ( ) Carbon Dioxide
07 ( ) Halogenated Agent - Halon 1211
08 ( ) Halogenated Agent - Halon 1301
09 ( ) Water With Additives
10 ( ) Others (Metal Agents)
99 ( ) Undetermined / Unreported

Extinguishment Agent Quantity I___I___I___I___I___I___I___I___I  Extinguishment Unit of Measure 1 ( ) Gallons 2 ( ) Pounds 3 ( ) Not Applicable

### If Mobile Property Involved in Ignition

Year: I___I___I___I___I  Make: _____  Model: _____  Serial Number: _____  License number: _____

### If Equipment Involved in Ignition

Year: I___I___I___I___I  Make: _____  Model: _____  Serial Number: _____

### FIRE PROPERTY INFORMATION

Construction Year: I___I___I___I___I (FOUR DIGIT YEAR)  Ground Floor Area: I___I___I___I___I___I___I___I___I (SQ FOOTAGE)

Number Of Stories - Check One Only

1 ( ) 1 Story
2 ( ) 2 Stories
3 ( ) 3 to 4 Stories
4 ( ) 5 to 6 Stories
5 ( ) 7 to 12 Stories
6 ( ) 13 to 24 Stories
7 ( ) 25 to 49 Stories
8 ( ) 50 or more stories
0 ( ) Undetermined / Unreported

Construction Type - Check ONE Only

1( )Fire resistive
2( )Heavy timber
3( )Protected non-combustible
4( )Unprotected non-combustible
5( )Protected ordinary
6( )Unprotected ordinary
7( )Protected wood frame
8( )Unprotected wood frame
9( )Not classified
0( )Undetermined / unreported

Occupancy Status - Check One Only

1 ( ) Occupied by awake persons
2 ( ) Occupied by sleeping persons
3( ) Occupied by children or aged persons
4 ( ) Not occupied
5 ( ) Vacant
6 ( ) Not Classified

Non Government Property Type - Check One Only

1( )Private
2( )Contractor
3( )Special services
4( )Exchange, (PX,BX)
5( )Government loss, reimbursed
6( )Other
7 ( ) Not Applicable

### SMOKE TRAVEL - SMOKE / FLAME DAMAGE

**Extent Of Flame Damage - Check One Only**

1( )Confined to the object of origin
2( )Confined to part of room or area of origin
3( )Confined to room of origin
4( )Confined to fire rated compartment of origin
5( )Confined to floor of origin
6( )Confined to structure of origin
7( )Extended beyond structure of origin
9( )No damage of this type
0( )Undetermined / unreported

**Extent Of Smoke / Heat Damage - Check One Only**

1( )Confined to the object of origin
2( )Confined to part of room or area of origin
3( )Confined to room of origin
4( )Confined to fire rated compartment of origin
5( )Confined to floor of origin
6( )Confined to structure of origin
7( )Extended beyond structure of origin
9( )No damage of this type
0( )Undetermined / unreported

Type Of Material Generating Most Smoke Code: |___|___|

Form Of Material Generating Most Smoke Code: |___|___|

**Avenue Of Smoke Travel - Check One Only**

1( )Air handling unit
2( )Corridor
3( )Elevator shaft
4( )Stairwell
5( )Opening in construction
6( )Utility opening in wall
7( )Utility opening in floor
8( )No significant avenue of smoke travel
9( )Not classified
0( )Undetermined / unreported

**Detector Performance - Check One Only**

1( )Detector(s) In The Room/Space Of Fire Origin And They Operated
2( )Detector(s) Not In The Room/Space Of Fire Origin And They Operated
3( )Detector(s) In The Room/Space Of Fire Origin And They Did Not Operate
4( )Detector(s) Not In The Room/Space Of Fire Origin And They Did Not Operate
5( )Detector(s) In The Room/Space Of Fire Origin, Fire Too Small To Activate
6( )Detector Performance Unsatisfactory
8( )No Detectors Present
9( ) Not Classified
0( )Undetermined / Unreported

**Sprinkler Performance - Check One Only**

1( )Equipment Operated
2( )Equipment Should Have Operated But Did Not
3( )Equipment Present But Fire Too Small To Require Operation
4( ) Equipment Operation Unsatisfactory
8( )No Equipment Present In Room Or Space Of Fire Origin
9( )Not Classified
0( )Undetermined / Unreported

## SECTION XV - PROPERTY LOSS ESTIMATES

| | |
|---|---|
| DoD Non-Fire Value \|___\|___\|___\|___\|___\|___\|___\|___\|___\|.00 | DoD Non-Fire Loss \|___\|___\|___\|___\|___\|___\|___\|___\|___\|___\|.00 |
| DoD Fire Property Value \|___\|___\|___\|___\|___\|___\|___\|___\|___\|.00 | DoD Fire Property Loss \|___\|___\|___\|___\|___\|___\|___\|___\|___\|___\|.00 |
| DoD Fire Content Value \|___\|___\|___\|___\|___\|___\|___\|___\|___\|.00 | DoD Fire Content Loss \|___\|___\|___\|___\|___\|___\|___\|___\|___\|___\|.00 |
| DoD Fire Aircraft Value \|___\|___\|___\|___\|___\|___\|___\|___\|___\|.00 | DoD Fire Aircraft Loss \|___\|___\|___\|___\|___\|___\|___\|___\|___\|___\|.00 |
| Non-DoD Fire Value \|___\|___\|___\|___\|___\|___\|___\|___\|___\|.00 | Non-DoD Fire Loss \|___\|___\|___\|___\|___\|___\|___\|___\|___\|___\|.00 |
| Fire Service Fire Injury \|___\|___\|___\| | Fire Service Fire Fatality \|___\|___\|___\| |
| Fire Service Non-Fire Injury \|___\|___\|___\| | Fire Service Non-Fire Fatality \|___\|___\|___\| |
| Other Fire Injury \|___\|___\|___\| | Other Fire Fatality \|___\|___\|___\| |
| Other Non-Fire Injury \|___\|___\|___\| | Other Non-Fire Fatality \|___\|___\|___\| |

# DoD FIRE INCIDENT REPORTING SYSTEM

For Official Use Only

## METHOD OF EXTINGUISHMENT SUPPLEMENTAL REPORT

| EVENT NUMBER | FDID NUMBER | Branch of Service \|___\| UIC/RUC \|___\|___\|___\|___\|___\|___\| | EXPOSURE NUMBER |
|---|---|---|---|
| | INCIDENT NUMBER | YR \|___\|___\| Run Number \|___\|___\|___\|___\|___\|___\|___\|___\| | \|___\|___\|___\| |

### SUPPLEMENTAL SECTION IV - METHOD OF EXTINGUISHMENT

**Method Of Extinguishment - CHECK One Only**

1 ( ) Self-Extinguishment
2( ) Make Shift Aids
3( ) Portable Extinguisher
4( ) Automatic Extinguishing System
5( ) Preconnected Hose Lines, Tank Water
6 ( ) Preconnected Hose Lines Other Water Source
7 ( ) Hand-laid Lines, Other Water Source
8 ( ) Master Stream, Other Water Source
9 ( ) Not Classified
0 ( ) Undetermined / Unreported

**Extinguishment Agent Code - Check One Only**

01 ( ) AFFF
02 ( ) Water
03 ( ) Other Foams
04 ( ) PKP
05 ( ) Other Dry Chemical
06 ( ) Carbon Dioxide
07 ( ) Halogenated Agent - Halon 1211
08 ( ) Halogenated Agent - Halon 1301
09 ( ) Water With Additives
10 ( ) Others (Metal Agents)
99 ( ) Undetermined / Unreported

Extinguishment Agent Quantity |___|___|___|___|___|___|___|___|

Extinguishment Unit of Measure 1 ( ) Gallons 2 ( ) Pounds 3 ( ) Not Applicable


### SUPPLEMENTAL SECTION IV - METHOD OF EXTINGUISHMENT

**Method Of Extinguishment - CHECK One Only**

1 ( ) Self-Extinguishment
2( ) Make Shift Aids
3( ) Portable Extinguisher
4( ) Automatic Extinguishing System
5( ) Preconnected Hose Lines, Tank Water
6 ( ) Preconnected Hose Lines Other Water Source
7 ( ) Hand-laid Lines, Other Water Source
8 ( ) Master Stream, Other Water Source
9 ( ) Not Classified
0 ( ) Undetermined / Unreported

**Extinguishment Agent Code - Check One Only**

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02 ( ) Water
03 ( ) Other Foams
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05 ( ) Other Dry Chemical
06 ( ) Carbon Dioxide
07 ( ) Halogenated Agent - Halon 1211
08 ( ) Halogenated Agent - Halon 1301
09 ( ) Water With Additives
10 ( ) Others (Metal Agents)
99 ( ) Undetermined / Unreported

Extinguishment Agent Quantity |___|___|___|___|___|___|___|___|

Extinguishment Unit of Measure 1 ( ) Gallons 2 ( ) Pounds 3 ( ) Not Applicable



### SUPPLEMENTAL SECTION IV - METHOD OF EXTINGUISHMENT

**Method Of Extinguishment - CHECK One Only**

1 ( ) Self-Extinguishment
2( ) Make Shift Aids
3( ) Portable Extinguisher
4( ) Automatic Extinguishing System
5( ) Preconnected Hose Lines, Tank Water
6 ( ) Preconnected Hose Lines Other Water Source
7 ( ) Hand-laid Lines, Other Water Source
8 ( ) Master Stream, Other Water Source
9 ( ) Not Classified
0 ( ) Undetermined / Unreported

**Extinguishment Agent Code - Check One Only**

01 ( ) AFFF
02 ( ) Water
03 ( ) Other Foams
04 ( ) PKP
05 ( ) Other Dry Chemical
06 ( ) Carbon Dioxide
07 ( ) Halogenated Agent - Halon 1211
08 ( ) Halogenated Agent - Halon 1301
09 ( ) Water With Additives
10 ( ) Others (Metal Agents)
99 ( ) Undetermined / Unreported

Extinguishment Agent Quantity |___|___|___|___|___|___|___|___|

Extinguishment Unit of Measure 1 ( ) Gallons 2 ( ) Pounds 3 ( ) Not Applicable



### SUPPLEMENTAL SECTION IV - METHOD OF EXTINGUISHMENT

| Method Of Extinguishment - CHECK One Only | | Extinguishment Agent Code - Check One Only | |
|---|---|---|---|
| 1 ( ) Self-Extinguishment | 6 ( ) Preconnected Hose Lines Other Water Source | 01 ( ) AFFF | 06 ( ) Carbon Dioxide |
| 2( ) Make Shift Aids | 7 ( ) Hand-laid Lines, Other Water Source | 02 ( ) Water | 07 ( ) Halogenated Agent - Halon 1211 |
| 3( ) Portable Extinguisher | 8 ( ) Master Stream, Other Water Source | 03 ( ) Other Foams | 08 ( ) Halogenated Agent - Halon 1301 |
| 4( ) Automatic Extinguishing System | 9 ( ) Not Classified | 04 ( ) PKP | 09 ( ) Water With Additives |
| 5( ) Preconnected Hose Lines, Tank Water | 0 ( ) Undetermined / Unreported | 05 ( ) Other Dry Chemical | 10 ( ) Others (Metal Agents) |
| | | | 99 ( ) Undetermined / Unreported |
| Extinguishment Agent Quantity I__I__I__I__I__I__I__I | | Extinguishment Unit of Measure 1 ( ) Gallons 2 ( ) Pounds 3 ( ) Not Applicable | |

## SUPPLEMENTAL SECTION IV - METHOD OF EXTINGUISHMENT

| Method Of Extinguishment - CHECK One Only | | Extinguishment Agent Code - Check One Only | |
|---|---|---|---|
| 1 ( ) Self-Extinguishment | 6 ( ) Preconnected Hose Lines Other Water Source | 01 ( ) AFFF | 06 ( ) Carbon Dioxide |
| 2( ) Make Shift Aids | 7 ( ) Hand-laid Lines, Other Water Source | 02 ( ) Water | 07 ( ) Halogenated Agent - Halon 1211 |
| 3( ) Portable Extinguisher | 8 ( ) Master Stream, Other Water Source | 03 ( ) Other Foams | 08 ( ) Halogenated Agent - Halon 1301 |
| 4( ) Automatic Extinguishing System | 9 ( ) Not Classified | 04 ( ) PKP | 09 ( ) Water With Additives |
| 5( ) Preconnected Hose Lines, Tank Water | 0 ( ) Undetermined / Unreported | 05 ( ) Other Dry Chemical | 10 ( ) Others (Metal Agents) |
| | | | 99 ( ) Undetermined / Unreported |
| Extinguishment Agent Quantity I__I__I__I__I__I__I__I__I | | Extinguishment Unit of Measure 1 ( ) Gallons 2 ( ) Pounds 3 ( ) Not Applicable | |

## SUPPLEMENTAL SECTION IV - METHOD OF EXTINGUISHMENT

| Method Of Extinguishment - CHECK One Only | | Extinguishment Agent Code - Check One Only | |
|---|---|---|---|
| 1 ( ) Self-Extinguishment | 6 ( ) Preconnected Hose Lines Other Water Source | 01 ( ) AFFF | 06 ( ) Carbon Dioxide |
| 2( ) Make Shift Aids | 7 ( ) Hand-laid Lines, Other Water Source | 02 ( ) Water | 07 ( ) Halogenated Agent - Halon 1211 |
| 3( ) Portable Extinguisher | 8 ( ) Master Stream, Other Water Source | 03 ( ) Other Foams | 08 ( ) Halogenated Agent - Halon 1301 |
| 4( ) Automatic Extinguishing System | 9 ( ) Not Classified | 04 ( ) PKP | 09 ( ) Water With Additives |
| 5( ) Preconnected Hose Lines, Tank Water | 0 ( ) Undetermined / Unreported | 05 ( ) Other Dry Chemical | 10 ( ) Others (Metal Agents) |
| | | | 99 ( ) Undetermined / Unreported |
| Extinguishment Agent Quantity I__I__I__I__I__I__I__I__I | | Extinguishment Unit of Measure 1 ( ) Gallons 2 ( ) Pounds 3 ( ) Not Applicable | |

## SUPPLEMENTAL SECTION IV - METHOD OF EXTINGUISHMENT

| Method Of Extinguishment - CHECK One Only | | Extinguishment Agent Code - Check One Only | |
|---|---|---|---|
| 1 ( ) Self-Extinguishment | 6 ( ) Preconnected Hose Lines Other Water Source | 01 ( ) AFFF | 06 ( ) Carbon Dioxide |
| 2( ) Make Shift Aids | 7 ( ) Hand-laid Lines, Other Water Source | 02 ( ) Water | 07 ( ) Halogenated Agent - Halon 1211 |
| 3( ) Portable Extinguisher | 8 ( ) Master Stream, Other Water Source | 03 ( ) Other Foams | 08 ( ) Halogenated Agent - Halon 1301 |
| 4( ) Automatic Extinguishing System | 9 ( ) Not Classified | 04 ( ) PKP | 09 ( ) Water With Additives |
| 5( ) Preconnected Hose Lines, Tank Water | 0 ( ) Undetermined / Unreported | 05 ( ) Other Dry Chemical | 10 ( ) Others (Metal Agents) |
| | | | 99 ( ) Undetermined / Unreported |
| Extinguishment Agent Quantity I__I__I__I__I__I__I__I__I | | Extinguishment Unit of Measure 1 ( ) Gallons 2 ( ) Pounds 3 ( ) Not Applicable | |

# DoD FIRE INCIDENT REPORTING SYSTEM

For Official use Only

## AEROSPACE EVOLUTION - RESCUE / SALVAGE CRANE REPORT

| NEW ( ) | CHANGE ( ) | DELETE ( ) | RELEASE DATE ___/___/_____ |
|---|---|---|---|

| EVENT NUMBER | FDID NUMBER | Branch of Service \|___\| UIC/RUC \|___\|___\|___\|___\|___\|___\| | EXPOSURE NUMBER \|___\|___\| |
|---|---|---|---|
| | INCIDENT NUMBER | YR \|___\|___\| Run Number \|___\|___\|___\|___\|___\|___\|___\|___\| | |

### SECTION V - AEROSPACE EVOLUTION

Landing/Crash Date ___/___/_____ Landing/Crash Time ___ ___ ___ ___ ___ ___

Delay in Reporting ( ) YES ( ) NO

If YES Then Check All That Apply

A ( ) Communication Malfunction (e.g. Radios, Telephones)
B ( ) Electrical Power System Failure Due to Weather
C ( ) Electrical Power System Malfunctioning Equipment
D ( ) Communications Problems Weather
E ( ) Reportable Event On-Going (e.g. Crash, Fire, Rescue)
F ( ) Error (e.g., Miscommunication in voice transmission)
G ( ) Other

Response Area - Check One Only

A ( ) On The Airfield
B ( ) On The Installation
C ( ) Off Installation / Within Response Zone
D ( ) Off Installation / Beyond Response Zone
E ( ) Shipboard - Hanger Bay One
F ( ) Shipboard - Hanger Bay Two
G ( ) Shipboard - Hanger Bay Three
Z ( ) Not Reported

Distance to Mishap From ARFF Station \|___\|___\|___\|___\|___\|
Distance to Mishap From First Response Vehicle \|___\|___\|___\|___\|___\|

Site Accessable to Vehicle(s) ( )YES ( )NO

Unpaved Surface ( )YES ( )NO

Airlift Support Provided ( ) YES ( ) NO ( ) UNKNOWN

If YES Then Check All That Apply

1 ( ) Firefighter(s) 2 ( ) Firefighting Support 3 ( ) Firefighting Agent

| | |
|---|---|
| First Dispatched ARFF Station Unit Arrived<br>Date___/___/_____ | First Dispatched ARFF Station Unit Arrived<br>Time___ ___:___ ___:___ ___ |
| First Dispatched Non-ARFF Station Unit Arrived<br>Date___/___/_____ | First Displatched Non-ARFF Station Arrived<br>Time___ ___:___ ___:___ ___ |
| Hotspot Line Standby Arrived<br>Date___/___/_____ | Hotspot Line Standby Arrived<br>Time___ ___:___ ___:___ ___ |

| | |
|---|---|
| First Agent Applied<br>Date___/___/_____ | First Agent Applied<br>Time___ ___:___ ___:___ ___ |
| First Unit Undergoing Resupply Started<br>Date___/___/_____ | First Unit Undergoing Resupply Started<br>Time___ ___:___ ___:___ ___ |
| Fire Extinguished<br>Date___/___/_____ | Fire Extinguished<br>Time___ ___:___ ___:___ ___ |
| Rescue Started<br>Date___/___/_____ | Rescue Started<br>Time___ ___:___ ___:___ ___ |
| Rescue Ended<br>Date___/___/_____ | Rescue Ended<br>Time___ ___:___ ___:___ ___ |
| Medical Support Arrived<br>Date___/___/_____ | Medical Support Arrived<br>Time___ ___:___ ___:___ ___ |
| Backup Support Arrival<br>Date___/___/_____ | Backup Support Arrival<br>Time___ ___:___ ___:___ ___ |
| Mutual Aid Requested<br>Date___/___/_____ | Mutual Aid Requested<br>Time___ ___:___ ___:___ ___ |
| Mutual Aid Arrived<br>Date___/___/_____ | Mutual Aid Arrived<br>Time___ ___:___ ___:___ ___ |
| Airfield Closed<br>Date___/___/_____ | Airfield Closed<br>Time___ ___:___ ___:___ ___ |
| Airfield Open<br>Date___/___/_____ | Airfield Open<br>Time___ ___:___ ___:___ ___ |
| Incident Turned Over<br>Date___/___/_____ | Incident Turned Over<br>Time___ ___:___ ___:___ ___ |

Rescue Tools Used ( ) YES ( ) NO
Rescue Crane Requested ( ) YES ( ) NO
Salvage Crane Requested ( ) YES ( ) NO
Weapons Ordnance ( ) YES ( ) NO

## SECTION V - AEROSPACE EVOLUTION

ARFF Rescue/Response Narrative_____

## SECTION VII - AEROSPACE Rescue Crane Information

| | |
|---|---|
| Requested Date<br>___/___/_____ | Crane Name<br>_____ |
| Requested Time<br>___ ___: ___ ___: ___ ___ | Crane Model<br>_____ |
| Arrived Date<br>___/___/_____ | Crane Capacity<br>\|___\|___\| (TONS) |
| Arrived Time<br>___ ___: ___ ___: ___ ___ | Crane Assigned To You<br>( ) YES ( ) NO |

## SECTION VIII - AEROSPACE SALVAGE CRANE INFORMATION

| | |
|---|---|
| Requested Date<br>___/___/_____ | Crane Model<br>_____ |
| Requested Time<br>___ ___: ___ ___: ___ ___ | Crane Capacity<br>\|___\|___\| (TONS) |
| Arrived Date<br>___/___/_____ | Crane Assigned To You<br>( ) YES ( ) NO |
| Arrived Time<br>___ ___: ___ ___: ___ ___ | Crane Cleared Date<br>___/___/_____ |
| Crane Name<br>_____ | Crane Cleared Time<br>___ ___: ___ ___: ___ ___ |

# DoD FIRE INCIDENT REPORTING SYSTEM
## AEROSPACE AIRCRAFT REPORT

For Official use Only

| NEW ( ) | CHANGE ( ) | DELETE ( ) | RELEASE DATE ___/___/___ |
|---|---|---|---|

| EVENT NUMBER | FDID NUMBER / INCIDENT NUMBER | Branch of Service I___I UIC/RUC I___I___I___I___I___I___I<br>YR I___I___I Run Number I___I___I___I___I___I___I___I___I | EXPOSURE NUMBER I___I___I |
|---|---|---|---|

### SECTION VI - AEROSPACE AIRCRAFT INFORMATION

Aircraft Type Modification I___I___I
Series I___I Series Extension I___I

Type Mission & Design Number I___I___I___I___I
Bureau/Serial Number I___I___I___I___I___I___I

Aircraft Operating Agency Code I___I

Aircraft Permanently Based ( ) YES ( ) NO

Aircraft Custodian Name:_____

Commercial Phone Number:_____

Address:_____

_____

_____

Aircraft Position (Compass Reading)

I___I___I___I degrees

Total Personnel Aboard At Time Of Mishap / Standby

I___I___I___I

Total Personnel Evacuated Without Assistance

I___I___I___I

Action Of Aircraft At Time Of Mishap / Standby - Check One Only

A( ) In Arresting Gear / Barrier
B( ) During Hover Flight
C( ) During Landing
D( ) During Takeoff
E( ) During Flight
F( ) Taxiing
G( ) Parked, Engine Start, Shutdown, Test
H( ) Parked, Cold Refueling, Defueling, Fuel Transfer
I( ) Parked, Hot Refueling (Aircraft Engines Running)
J( ) Parked, Maintenance or Inspection
K( ) Parked, Other Servicing
L( ) Parked, Weapons / Ordnance Loading / Unloading
M( ) Parked, MEDEVAC Loading / Unloading
N( ) Parked, Cargo Loading / Unloading
O( ) Parked
P( ) Respot, Towing, Elevator Operations
Z( ) Other / Not Known

Aircraft Structural Condition Upon Arrival - Check One Only

A( ) Airframe Is Intact
B( ) Fuselage and Wing(s) / Rotor(s) Separated
C( ) Fuselage Split Open
D( ) Fuselage Separated Into Major Sections
E( ) Total Aircraft Fragmentation

Fuselage Attitude In Relation To Terrain - Check One Only

A( ) Aircraft Fuselage Is Upright
B( ) Aircraft Fuselage Is Inverted
C( ) Aircraft Fuselage Is On It's Side
D( ) Aircraft Is Upright With One Or More landing Gear Collapsed
E( ) Aircraft Fuselage Position unrecognizable

Surface Came To Rest - Check One Only

A( ) land B( ) Ship's Deck C( ) Water

Circumstances Upon Arrival - Check All That Apply

A( ) Explosion B( ) Fire C( ) Flammable Liquid Leakage

Aircraft Secured - Check All That Apply

A( ) Aircraft Ventilation
B( ) Landing Gear Pinned or Clamped
C( ) Canopy Pinned or Safetied
D( ) Ejection Seat Safetied and/or Pinned
E( ) Engine Shutdown, Normal
F( ) Engine Shutdown, Emergency
G( ) Engine Shutdown, Agent Ingestion
H( ) No Engine Shutdown
I( ) LOX System(s) Secured
J( ) Battery and/or Electrical Power Secured
K( ) Rotor Blades Secured
L( ) Aircraft Tied Down

Type Of Forced Entry - Check One Only

1( ) Canopy Blown
2( ) Canopy or Windows Forced Or Penetrated
3( ) Doors Forced Or Penetrated
4( ) Fuselage Penetrated
5( ) Other
6( ) No Forced Entry

Sample

## SECTION VI - AEROSPACE AIRCRAFT INFORMATION

Aircraft Type Modification |____|____|
Series |____| Series Extension |____|

Type Mission & Design Number |____|____|____|____|
Bureau/Serial Number |____|____|____|____|____|____|

Aircraft Operating Agency Code |____|

Aircraft Permanently Based ( ) YES ( ) NO

Aircraft Custodian Name:_____

Commercial Phone Number:_____

Address:_____

_____

_____

Aircraft Position (Compass Reading)

|____|____|____| degrees

Total Personnel Aboard At Time Of Mishap / Standby

|____|____|____|

Total Personnel Evacuated Without Assistance

|____|____|____|

Action Of Aircraft At Time Of Mishap / Standby - Check One Only

A( ) In Arresting Gear / Barrier
B( ) During Hover Flight
C( ) During Landing
D( ) During Takeoff
E( ) During Flight
F( ) Taxiing
G( ) Parked, Engine Start, Shutdown, Test
H( ) Parked, Cold Refueling, Defueling, Fuel Transfer
I( ) Parked, Hot Refueling (Aircraft Engines Running)
J( ) Parked, Maintenance or Inspection
K( ) Parked, Other Servicing
L( ) Parked, Weapons / Ordinance Loading / Unloading
M( ) Parked, MEDEVAC Loading / Unloading
N( ) Parked, Cargo Loading / Unloading
O( ) Parked
P( ) Respot, Towing, Elevator Operations
Z( ) Other / Not Known

Aircraft Secured - Check All That Apply

A( ) Aircraft Ventilation
B( ) Landing Gear Pinned or Clamped
C( ) Canopy Pinned or Safetied
D( ) Ejection Seat Safetied and/or Pinned
E( ) Engine Shutdown, Normal
F( ) Engine Shutdown, Emergency
G( ) Engine Shutdown, Agent Ingestion
H( ) No Engine Shutdown
I( ) LOX System(s) Secured
J( ) Battery and/or Electrical Power Secured
K( ) Rotor Blades Secured
L( ) Aircraft Tied Down

Aircraft Structural Condition Upon Arrival - Check One Only

A( ) Airframe Is Intact
B( ) Fuselage and Wing(s) / Rotor(s) Separated
C( ) Fuselage Split Open
D( ) Fuselage Separated Into Major Sections
E( ) Total Aircraft Fragmentation

Fuselage Attitude In Relation To Terrain - Check One Only

A( ) Aircraft Fuselage Is Upright
B( ) Aircraft Fuselage Is Inverted
C( ) Aircraft Fuselage Is On It's Side
D( ) Aircraft Is Upright With One Or More landing Gear Collapsed
E( ) Aircraft Fuselage Position unrecognizable

Surface Came To Rest - Check One Only

A( ) land B( ) Ship's Deck C( ) Water

Circumstances Upon Arrival - Check All That Apply

A( ) Explosion B( ) Fire C( ) Flammable Liquid Leakage

Type Of Forced Entry - Check One Only

1( ) Canopy Blown
2( ) Canopy or Windows Forced Or Penetrated
3( ) Doors Forced Or Penetrated
4( ) Fuselage Penetrated
5( ) Other
6( ) No Forced Entry

SAMPLE

# DoD FIRE INCIDENT REPORTING SYSTEM
# AEROSPACE EXTINGUISHMENT REPORT

For Official use Only

| NEW ( ) | CHANGE ( ) | DELETE ( ) | RELEASE DATE ___/___/___ |
|---|---|---|---|

| EVENT NUMBER | FDID NUMBER | Branch of Service \|___\| UIC/RUC \|___\|___\|___\|___\|___\|___\| | EXPOSURE NUMBER \|___\|___\| |
|---|---|---|---|
| | INCIDENT NUMBER | YR \|___\|___\| Run Number \|___\|___\|___\|___\|___\|___\|___\|___\| | |

## SECTION IX - AEROSPACE EXTINGUISHMENT INFORMATION

**Extinguishment Agent**

01 ( ) AFFF
02 ( ) Water
03 ( ) Other Foams
04 ( ) PKP
05 ( ) Other Dry Chemical
06 ( ) Carbon Dioxide
07 ( ) Halon 1211
08 ( ) Halon 1301
09 ( ) Water W/ Additives
10 ( ) Other (Metals Agents)
99 ( ) Undetermined/Not Reported

**Amount of Agent Utilized**

\|___\|___\|___\|___\|___\|___\|___\|___\|

**Agent Unit of Measure**

1 ( ) Gallons 2 ( ) Pounds

**Primary Appliance Used**

A ( ) Roof Turret
B ( ) Bumper Turret
C ( ) Handline(s)
D ( ) Structure Lines
E ( ) Aircraft System or Equipment On Board
F ( ) Air Drop
G ( ) Mobile Twin Agent Unit
H ( ) Wheeled Portable Extinguisher
I ( ) Hand Held Portable Extinguisher
J ( ) Handline With Penetrator Device
K ( ) Monitor / Deck Gun
L ( ) Shipboard Hose Control Device
M ( ) Shipboard Deck Edge Nozzle
N ( ) Shipboard Water Washdown System
Z ( ) Other Primary Appliance Used Not Listed

**Primary Appliance Operator**

A ( ) Firefighter, Structural
B ( ) Firefighter, Aircraft
C ( ) Aircraft Crew member
D ( ) Aircraft Support/Maint
E ( ) Other Individual
F ( ) Shipboard Hose Team

**Agent Resupply Required** ( ) YES ( ) NO

**Agent Resupply Received** ( ) YES ( ) NO

**Water Resupply Source**

A ( ) Water Tanker / Nurse Vehicle
B ( ) Structural Fire Apparatus
C ( ) Hydrant
D ( ) Stem Pipe (standpipe)
E ( ) Open Water (Lake, Pond, Stream, Pool, etc.)
G ( ) ARFF Vehicle Moved To resupply Point
H ( ) Other (not listed)

**Hose Lay length**

\|___\|___\|___\|___\|

**Agent Resupply Quantity**

\|___\|___\|___\|___\|___\|___\|___\|___\|

**Average Resupply Movement Time**

\|___\|___\|___\|

**Distance Resupply Movement**

\|___\|___\|___\|___\|

**Number of Resupply Movements**

\|___\|___\|

Sample

## SECTION IX - AEROSPACE EXTINGUISHMENT INFORMATION

### Extinguishment Agent

01 ( ) AFFF
02 ( ) Water
03 ( ) Other Foams
04 ( ) PKP
05 ( ) Other Dry Chemical
06 ( ) Carbon Dioxide
07 ( ) Halon 1211
08 ( ) Halon 1301
09 ( ) Water W/ Additives
10 ( ) Other (Metal Agents)
99 ( ) Undetermined/Not Reported

### Amount of Agent Utilized

|___|___|___|___|___|___|___|___|

### Agent Unit of Measure

1 ( ) Gallons 2 ( ) Pounds

### Primary Appliance Used

A ( ) Roof Turret
B ( ) Bumper Turret
C ( ) Handline(s)
D ( ) Structure Lines
E ( ) Aircraft System or Equipment On Board
F ( ) Air Drop
G ( ) Mobile Twin Agent Unit
H ( ) Wheeled Portable Extinguisher
I ( ) Hand Held Portable Extinguisher
J ( ) Handline With Penetrator Device
K ( ) Monitor / Deck Gun
L ( ) Shipboard Hose Control Device
M ( ) Shipboard Deck Edge Nozzle
N ( ) Shipboard Water Washdown System
Z ( ) Other (not listed)

### Primary Appliance Operator

A ( ) Firefighter, Structural
B ( ) Firefighter, Aircraft
C ( ) Aircraft Crew member
D ( ) Aircraft Support/Maint
E ( ) Other Individual
F ( ) Shipboard Hose Team

### Agent Resupply Required ( ) YES ( ) NO

### Agent Resupply Received ( ) YES ( ) NO

### Water Resupply Source

A ( ) Water Tanker / Nurse Vehicle
B ( ) Structural Fire Apparatus
C ( ) Hydrant
D ( ) Stem Pipe (standpipe)
E ( ) Open Water (Lake, Pond, Stream, Pool, etc.)
G ( ) AFFF Vehicle Moved To resupply Point
H ( ) Other (not listed)

### Hose Lay length

|___|___|___|___|

### Agent Resupply Quantity

|___|___|___|___|___|___|___|___|

### Average Resupply Movement Time

|___|___|___|

### Distance Resupply Movement

|___|___|___|.|___|

### Number of Resupply Movements

|___|___|

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| SECTION X - AEROSPACE RESCUE TOOLS / EQUIPMENT INFORMATION | |
|---|---|
| Rescue Equipment Name | Rescue Equipment Performed Adequately<br>( ) YES ( ) NO |
| Rescue Equipment Task | Reason Rescue Equipment Did Not Adequately Perform |

| SECTION X - AEROSPACE RESCUE TOOLS / EQUIPMENT INFORMATION | |
|---|---|
| Rescue Equipment Name | Rescue Equipment Performed Adequately<br>( ) YES ( ) NO |
| Rescue Equipment Task | Reason Rescue Equipment Did Not Adequately Perform |

| SECTION X - AEROSPACE RESCUE TOOLS / EQUIPMENT INFORMATION | |
|---|---|
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| Rescue Equipment Name | Rescue Equipment Performed Adequately<br>( ) YES ( ) NO |
| Rescue Equipment Task | Reason Rescue Equipment Did Not Adequately Perform |

| SECTION X - AEROSPACE RESCUE TOOLS / EQUIPMENT INFORMATION | |
|---|---|
| Rescue Equipment Name | Rescue Equipment Performed Adequately<br>( ) YES ( ) NO |
| Rescue Equipment Task | Reason Rescue Equipment Did Not Adequately Perform |

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# DoD FIRE INCIDENT REPORTING SYSTEM
## AEROSPACE RESCUE TOOLS / EQUIPMENT REPORT

| NEW ( ) | CHANGE ( ) | DELETE ( ) | RELEASE DATE ___/___/___ |
|---|---|---|---|

| EVENT NUMBER | FDID NUMBER | Branch of Service I___I UIC/RUC I___I___I___I___I___I___I___I | EXPOSURE NUMBER |
|---|---|---|---|
| | INCIDENT NUMBER | YR I___I___I Run Number I___I___I___I___I___I___I___I___I | I___I___I |

**SECTION X - AEROSPACE Rescue Tools / Equipment Information**

| Rescue Equipment Name | Rescue Equipment Performed Adequately ( ) YES ( ) NO |
|---|---|
| Rescue Equipment Task | Reason Rescue Equipment Did Not Adequately Perform |

**SECTION X - AEROSPACE RESCUE TOOLS / EQUIPMENT INFORMATION**

| Rescue Equipment Name | Rescue Equipment Performed Adequately ( ) YES ( ) NO |
|---|---|
| Rescue Equipment Task | Reason Rescue Equipment Did Not Adequately Perform |

**SECTION X - AEROSPACE RESCUE TOOLS / EQUIPMENT INFORMATION**

| Rescue Equipment Name | Rescue Equipment Performed Adequately ( ) YES ( ) NO |
|---|---|
| Rescue Equipment Task | Reason Rescue Equipment Did Not Adequately Perform |

**SECTION X - AEROSPACE RESCUE TOOLS / EQUIPMENT INFORMATION**

| Rescue Equipment Name | Rescue Equipment Performed Adequately ( ) YES ( ) NO |
|---|---|
| Rescue Equipment Task | Reason Rescue Equipment Did Not Adequately Perform |

**SECTION X - AEROSPACE RESCUE TOOLS / EQUIPMENT INFORMATION**

| Rescue Equipment Name | Rescue Equipment Performed Adequately ( ) YES ( ) NO |
|---|---|
| Rescue Equipment Task | Reason Rescue Equipment Did Not Adequately Perform |

**SECTION X - AEROSPACE RESCUE TOOLS / EQUIPMENT INFORMATION**

| Rescue Equipment Name | Rescue Equipment Performed Adequately ( ) YES ( ) NO |
|---|---|
| Rescue Equipment Task | Reason Rescue Equipment Did Not Adequately Perform |

For Official use Only

# DoD FIRE INCIDENT REPORTING SYSTEM
# AEROSPACE WEAPONS / ORDNANCE REPORT

| NEW ( ) | CHANGE ( ) | DELETE ( ) | RELEASE DATE ___/___/___ |
|---|---|---|---|

| EVENT NUMBER | FDID NUMBER | Branch of Service \|___\| UIC/RUC \|___\|___\|___\|___\|___\|___\| | EXPOSURE NUMBER |
|---|---|---|---|
| | INCIDENT NUMBER | YR \|___\|___\| Run Number \|___\|___\|___\|___\|___\|___\|___\|___\| | \|___\|___\| |

## SECTION XI - AEROSPACE WEAPONS / ORDNANCE INFORMATION

**Weapon / Ordnance Type**

A ( )Missile (e.g. SIDEWINDER, HARM)

B( ) Bomb ( e.g. fragmentation, general purpose, laser guided)

C( ) Cartridge Actuated Devices (CAD's)

D( ) Projectile (e.g. .50 cal, 20mm, 25mm)

E( ) Aircrew Escape Propulsion System (AEPS)

F( ) Classified

G( ) Other

**Reaction To Exposure**

A( ) Detonation

B( ) Partial Detonation

C( ) Explosion

D( ) Propulsion

E( ) Deflagration W/Propulsion

F( ) Burning

G( ) None

**Cooling Duration (Hours, Minutes)**

___ ___ : ___ ___

**Explosive Ordnance Disposal Representative Responded**

( ) Yes ( ) No ( ) Not Applicable

**Explosive Ordnance Disposal Representative Arrival Date**

___ / ___ / _____

**Exposed To Heat / Flame**

( ) Yes ( ) No ( ) Not Applicable

**Duration Of Exposure (Hours, Minutes)**

___ ___ : ___ ___

**Explosive Ordnance Disposal Representative Arrival Time**

___ ___ : ___ ___ : ___ ___

## SECTION XI - AEROSPACE WEAPONS / ORDNANCE INFORMATION

**Weapon / Ordnance Type**

A ( )Missile (e.g. SIDEWINDER, HARM)

B( ) Bomb ( e.g. fragmentation, general purpose, laser guided)

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F( ) Classified

G( ) Other

**Reaction To Exposure**

A( ) Detonation

B( ) Partial Detonation

C( ) Explosion

D( ) Propulsion

E( ) Deflagration W/Propulsion

F( ) Burning

G( ) None

**Cooling Duration (Hours, Minutes)**

___ ___ : ___ ___

**Explosive Ordnance Disposal Representative Responded**

( ) Yes ( ) No ( ) Not Applicable

**Explosive Ordnance Disposal Representative Arrival Date**

___ / ___ / _____

**Exposed To Heat / Flame**

( ) Yes ( ) No ( ) Not Applicable

**Duration Of Exposure (Hours, Minutes)**

___ ___ : ___ ___

**Explosive Ordnance Disposal Representative Arrival Time**

___ ___ : ___ ___ : ___ ___

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| SECTION X - AEROSPACE RESCUE TOOLS / EQUIPMENT INFORMATION | |
|---|---|
| Rescue Equipment Name | Rescue Equipment Performed Adequately<br>( ) YES ( ) NO |
| Rescue Equipment Task | Reason Rescue Equipment Did Not Adequately Perform |

| SECTION X - AEROSPACE RESCUE TOOLS / EQUIPMENT INFORMATION | |
|---|---|
| Rescue Equipment Name | Rescue Equipment Performed Adequately<br>( ) YES ( ) NO |
| Rescue Equipment Task | Reason Rescue Equipment Did Not Adequately Perform |

| SECTION X - AEROSPACE RESCUE TOOLS / EQUIPMENT INFORMATION | |
|---|---|
| Rescue Equipment Name | Rescue Equipment Performed Adequately<br>( ) YES ( ) NO |
| Rescue Equipment Task | Reason Rescue Equipment Did Not Adequately Perform |

| SECTION X - AEROSPACE RESCUE TOOLS / EQUIPMENT INFORMATION | |
|---|---|
| Rescue Equipment Name | Rescue Equipment Performed Adequately<br>( ) YES ( ) NO |
| Rescue Equipment Task | Reason Rescue Equipment Did Not Adequately Perform |

| SECTION X - AEROSPACE RESCUE TOOLS / EQUIPMENT INFORMATION | |
|---|---|
| Rescue Equipment Name | Rescue Equipment Performed Adequately<br>( ) YES ( ) NO |
| Rescue Equipment Task | Reason Rescue Equipment Did Not Adequately Perform |

| SECTION X - AEROSPACE RESCUE TOOLS / EQUIPMENT INFORMATION | |
|---|---|
| Rescue Equipment Name | Rescue Equipment Performed Adequately<br>( ) YES ( ) NO |
| Rescue Equipment Task | Reason Rescue Equipment Did Not Adequately Perform |

| SECTION X - AEROSPACE RESCUE TOOLS / EQUIPMENT INFORMATION | |
|---|---|
| Rescue Equipment Name | Rescue Equipment Performed Adequately<br>( ) YES ( ) NO |
| Rescue Equipment Task | Reason Rescue Equipment Did Not Adequately Perform |

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## SECTION XI - AEROSPACE WEAPONS / ORDNANCE INFORMATION

**Weapon / Ordnance Type**

A ( )Missile (e.g. SIDEWINDER, HARM)

B( ) Bomb ( e.g. fragmentation, general purpose, laser guided)

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D( ) Projectile.(e.g. .50 cal, 20mm, 25mm)

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F( ) Classified

G( ) Other

**Reaction To Exposure**

A( ) Detonation

B( ) Partial Detonation

C( ) Explosion

D( ) Propulsion

E( ) Deflagration W/Propulsion

F( ) Burning

G( ) None

**Cooling Duration (Hours, Minutes)**

___ ___ : ___ ___

**Explosive Ordnance Disposal Representative Responded**

( ) Yes ( ) No ( ) Not Applicable

**Explosive Ordnance Disposal Representative Arrival Date**

___ / ___ / _____

**Explosive Ordnance Disposal Representative Arrival Time**

___ ___ : ___ ___ : ___ ___

**Exposed To Heat / Flame**

( ) Yes ( ) No ( ) Not Applicable

**Duration Of Exposure (Hours, Minutes)**

___ ___ : ___ ___


## SECTION XI - AEROSPACE WEAPONS / ORDNANCE INFORMATION

**Weapon / Ordnance Type**

[illegible]issile (e.g. SIDEWINDER, HARM)

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E( ) Aircrew Escape Propulsion System (AEPS)

F( ) Classified

G( ) Other

**Reaction To Exposure**

A( ) Detonation

B( ) Partial Detonation

C( ) Explosion

D( ) Propulsion

E( ) Deflagration W/Propulsion

F( ) Burning

G( ) None

**Cooling Duration (Hours, Minutes)**

___ ___ : ___ ___

**Explosive Ordnance Disposal Representative Responded**

( ) Yes ( ) No ( ) Not Applicable

**Explosive Ordnance Disposal Representative Arrival Date**

___ / ___ / _____

**Explosive Ordnance Disposal Representative Arrival Time**

___ ___ : ___ ___ : ___ ___

**Exposed To Heat / Flame**

( ) Yes ( ) No ( ) Not Applicable

**Duration Of Exposure (Hours, Minutes)**

___ ___ : ___ ___

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# DoD FIRE INCIDENT REPORTING SYSTEM
## CASUALTY REPORT

| NEW ( ) | CHANGE ( ) | DELETE ( ) | RELEASE DATE ___/___/___ |
|---|---|---|---|

| EVENT NUMBER | FDID NUMBER / INCIDENT NUMBER | Branch of Service \|___\| UIC/RUC \|___\|___\|___\|___\|___\|___\| YR \|___\|___\| Run Number \|___\|___\|___\|___\|___\|___\|___\|___\| | EXPOSURE NUMBER \|___\|___\| |
|---|---|---|---|

### SECTION XII - GENERAL CASUALTY INFORMATION

Casualty Number \|___\|___\|___\|___\|___\| Date Of Injury ___/___/_____ Time Of Injury (HH:MM) ___ ___:___ ___

Name: _____ SEX M ( ) Male F ( ) Female U ( ) Unknown

**Service Affiliation**

A( )Army
C( )Commercial / Civilian
D( )Defense Mapping Agency
F( )Air Force
G( )Coast Guard
L( )Defense Logistics Agency
M( )Marine
N( )Navy
P( )Private
U( )Other Federal Agency

**Casualty Category**

1( )DOD Fire Service (Civilian)
2( )DOD Fire Service (Military)
3( )Military Personnel
4( )Civil Service Personnel
5( )Military Dependents
6( )Contractor Personnel
7( )Non DOD Fire Service
8( )Other DOD EMS/Non-Fire Service (Military)
9( )Other DOD EMS/Non-Fire Serv (Civilian)
0( )Other (Guest)

**General Casualty Type**

1( )Fire
2( )Emergency Medical Service
3( )Hazardous Materials
4( )Other

**Severity Of Injury**

1( )Minor
2( )Moderate
3( )Severe
4( )Life Threat
5( )D.O.A.
6( )Died Subsequent To Arrival

### SECTION XII - GENERAL CASUALTY INFORMATION

Casualty Number \|___\|___\|___\|___\|___\| Date Of Injury ___/___/_____ Time Of Injury (HH:MM) ___ ___:___ ___

Name: _____ SEX M ( ) Male F ( ) Female U ( ) Unknown

**Service Affiliation**

A( )Army
C( )Commercial / Civilian
D( )Defense Mapping Agency
F( )Air Force
G( )Coast Guard
L( )Defense Logistics Agency
M( )Marine
N( )Navy
P( )Private
U( )Other Federal Agency

**Casualty Category**

1( )DOD Fire Service (Civilian)
2( )DOD Fire Service (Military)
3( )Military Personnel
4( )Civil Service Personnel
5( )Military Dependents
6( )Contractor Personnel
7( )Non DOD Fire Service
8( )Other DOD EMS/Non-Fire Service (Military)
9( )Other DOD EMS/Non-Fire Serv (Civilian)
0( )Other (Guest)

**General Casualty Type**

1( )Fire
2( )Emergency Medical Service
3( )Hazardous Materials
4( )Other

**Severity Of Injury**

1( )Minor
2( )Moderate
3( )Severe
4( )Life Threat
5( )D.O.A.
6( )Died Subsequent To Arrival

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## SECTION XII - GENERAL CASUALTY INFORMATION

Casualty Number |___|___|___|___|___|___| Date Of Injury ____ / ____ / _____ Time Of Injury (HH:MM) ____ ____:____ ____

Name: _____ SEX M ( ) Male F ( ) Female U ( ) Unknown

**Service Affiliation**

A( )Army
C( )Commercial / Civilian
D( )Defense Mapping Agency
F( )Air Force
G( )Coast Guard
L( )Defense Logistics Agency
M( )Marine
N( )Navy
P( )Private
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**Casualty Category**

1( )DOD Fire Service (Civilian)
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3( )Military Personnel
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8( )Other DOD EMS/Non-Fire Service (Military)
9( )Other DOD EMS/Non-Fire Serv (Civilian)
0( )Other (Guest)

**General Casualty Type**

1( )Fire
2( )Emergency Medical Service
3( )Hazardous Materials
4( )Other

**Severity Of Injury**

1( )Minor
2( )Moderate
3( )Severe
4( )Life Threat
5( )D.O.A.
6( )Died Subsequent To Arrival


## SECTION XII - GENERAL CASUALTY INFORMATION

Casualty Number |___|___|___|___|___|___| Date Of Injury ____ / ____ / _____ Time Of Injury (HH:MM) ____ ____:____ ____

Name: _____ SEX M ( ) Male F ( ) Female U ( ) Unknown

**Service Affiliation**

A( )Army
C( )Commercial / Civilian
D( )Defense Mapping Agency
F( )Air Force
G( )Coast Guard
L( )Defense Logistics Agency
M( )Marine
N( )Navy
P( )Private
U( )Other Federal Agency

**Casualty Category**

1( )DOD Fire Service (Civilian)
2( )DOD Fire Service (Military)
3( )Military Personnel
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5( )Military Dependents
6( )Contractor Personnel
7( )Non DOD Fire Service
8( )Other DOD EMS/Non-Fire Service (Military)
9( )Other DOD EMS/Non-Fire Serv (Civilian)
0( )Other (Guest)

**General Casualty Type**

1( )Fire
2( )Emergency Medical Service
3( )Hazardous Materials
4( )Other

**Severity Of Injury**

1( )Minor
2( )Moderate
3( )Severe
4( )Life Threat
5( )D.O.A.
6( )Died Subsequent To Arrival

For Official use Only

# DOD FIRE INCIDENT REPORTING SYSTEM
# NON FIRE SERVICE CASUALTY REPORT

| NEW ( ) | CHANGE ( ) | DELETE ( ) | RELEASE DATE ___/___/___ |
|---|---|---|---|

| EVENT NUMBER | FDID NUMBER | Branch of Service I___I UIC/RUC I___I___I___I___I___I___I___I | EXPOSURE NUMBER I___I___I |
|---|---|---|---|
| | INCIDENT NUMBER | YR I___I___I Run Number I___I___I___I___I___I___I___I___I | |

## SECTION XIII - NON FIRE SERVICE CASUALTY INFORMATION

Casualty Number I___I___I___I___I___I

**Age - Check One Only**

1( )0 - 12 Months
2( )1 - 5 Years
3( )6 - 15 Years
4( )16 - 35 years
5( )36 - 45 years
6( )46 - 55 Years
7( )56 - 65 Years
8( )66 Years or Older
9( )Undetermined / Unreported

**Familiarity With Structure - Check One Only**

1( )Less than 1 Day
2( )1 to 7 Days
3( )8 to 30 Days
4( )1 to 2 Months
5( )3 to 6 Months
6( )7 to 12 Months
7( )Over 1 Year
8( )Not A Structure
0( )Undetermined / Unreported

**Relationship To Ignition - Check One Only**

1( )Fire Casualty Intimately Involved With Ignition
2( )Fire Casualty In Room Or Space Of Fire Origin
3( )Fire Casualty On Same Floor As Origin Of Fire
4( )Fire Casualty In Same Building As Origin Of Fire
5( )Fire Casualty Outside Of Building Of Origin of Fire / On Property
6( )Fire Casualty Off Property Of Fire Origin At Time Of Ignition
8( )Not A Fire Casualty
9( )Not Classified
0( ) Undetermined / Unreported

**Condition Before Injury - Check one Only**

1( )Asleep
2( )Bedridden, Physical Handicap
3( )Impaired By Drugs, Alcohol
4( )Under Restraint
5( )Too Young To Act
6( )Too Old To Act
7( )Mentally Handicapped
8( )Awake, Unimpaired
9( )Not Classified
0( )Undetermined / Unreported

**Activity At time Of Injury - Check One Only**

1( )Escaping
2( )Rescue Attempt
3( )Fire Control
4( )Response / Return
5( )Cleanup, Salvage, Mop-Up
6( )Sleeping
7( )Unable To Act
8( )Irrational Action
9( )Not Classified
0( )Undetermined / Unreported

**Nature Of Injury - Check One Only**

1( )Burns and Asphyxia/Smoke
2( )Burns Only
3( )Asphyxia / Smoke Only
4( )Wound, Cut, Bleeding
5( )Dislocation, Fracture
6( )Complaint Of Pain
7( )Shock
8( )Strain, Sprain
9( )Not Classified
0( )Undetermined / Unreported

**Injury Cause - Check One Only**

11( )Caught In, Under, Between, Trapped By
12( )Exposed To Fire Products (Flame, Heat, Smoke, & Gas)
13( )Exposed To hazardous Materials (Chemical, Radiation)
14( )Fell Or Stepped On, Over, Into
15( )Overexertion
16( )Rubbed By, Contact With
17( )Struck By
18( )Blast / Shock
08( )Not Applicable
09( )Not Classified
00( )Undetermined / Unreported

**Body Part Injured - Check One Only**

1( )Head, Neck
2( )Body, Trunk, Back
3( )Arm
4( )Leg
5( )Hand
6( )Foot
7( )Internal
8( )Multiple Parts
9( )Not Classified
0( )Undetermined / Unreported

Sample

Condition Preventing Escape - Check One Only

1( )No time To Escape, Explosion or Too Rapid Fire Progression
2( )Fire Between Casualty and Exit
3( )Locked Door
4( )Illegal Gates, Locks
5( )Clothing on Casualty Burning
6( )Moved Too Slowly
7( )Victim Incapacitated Prior to Ignition
8( )No Conditions Prevented Escape or Not a Factor
9( )Not Classified
0( )Undetermined or Not Reported

Casualty Disposition - Check One Only

1( )Refused Help
2( )Treated at Scene and Released
3( )Taken to Hospital by Fire Department Vehicle
4( )Taken to Hospital by Non-Fire Department Vehicle
5( )Taken to Other Than Hospital
6( )Died
9( )Not Classified
0( )Undetermined or Not Reported

Casualty Comments

Sample

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# DoD FIRE INCIDENT REPORTING SYSTEM
# FIRE SERVICE CASUALTY / CLOTHING REPORT

| NEW ( ) | CHANGE ( ) | DELETE ( ) | RELEASE DATE ___/___/___ |
|---|---|---|---|

| EVENT NUMBER | FDID NUMBER / INCIDENT NUMBER | Branch of Service \|___\| UIC/RUC \|___\|___\|___\|___\|___\|___\| YR \|___\|___\| Run Number \|___\|___\|___\|___\|___\|___\|___\|___\| | EXPOSURE NUMBER \|___\|___\| |
|---|---|---|---|

## SECTION XIV - FIRE SERVICE CASUALTY INFORMATION

Casualty Number |___|___|___|___|___|

Where Injury Occurred Code |___|

**Casualty Status Before Alarm - Check One Only**

1( ) Asleep
2( ) Awake
9( ) Not Classified
0( ) Undetermined/Not Reported

**Casualty Physical Condition - Check One Only**

1( ) Rested
2( ) Fatigued
3( ) Impaired By Drugs / Alcohol
4( ) Impaired By Illness / Meds
9( ) Not Classified
0( ) Undetermined/Not Reported

**Number Of Responses Prior To Injury - Check One Only**

1( ) One
2( ) Two
3( ) Three
4( ) Four
5( ) Five
6( ) Six To Eight
7( ) Nine To Twelve
8( ) Over Twelve
9( ) None
0( ) Undetermined/Not Reported

**Casualty Duty Assignment - Check One Only**

1( ) Fire Suppression
2( ) Emergency Medical Service
3( ) Fire Prevention/Inspection
4( ) Training
5( ) Maintenance
6( ) Administration
7( ) Hazmat
8( ) Rescue
9( ) Not Classified
0( ) Undetermined/Not Reported

**Casualty Type - Check One Only**

1( ) Fireground Injury
2( ) Injury During Response
3( ) Injury During Return
4( ) Non-Fire Incident After Alarm
5( ) Medical Aid Call
6( ) Hazmat
7( ) Rescue
9( ) Not Classified
0( ) Undetermined/Not Reported

Firefighter Activity Code |___|

Cause Of Injury Code |___|___|___|

Most Serious Part Code |___|___|

Most Serious Injury Code |___|___|

**Medical care Provided - Check One Only**

1( ) None
2( ) Treated At Scene
3( ) Treated At Medical Clinic
4( ) Treated At Doctor's Office
5( ) Hospital Emergency Room
6( ) Hospital Outpatient
7( ) Hospital Inpatient
8( ) Care After Hospital Release
9( ) Not Classified
0( ) Undetermined/Not Reported

**Casualty Destination - Check One Only**

1( ) Hospital, E.R, Gen Admission
2( ) Doctor's Office, Clinic
3( ) Triage Area
4( ) Morgue
5( ) Funeral Home
6( ) Residence
7( ) Treated At Scene
8( ) Not Transported
9( ) Not Classified
0( ) Undetermined/Not Reported

**Protective Coat Worn - Check One Only**

01( ) Nomex Coat With Liner
02( ) Nomex Coat Without Liner
03( ) Canvas Coat With Liner
04( ) Canvas Coat Without Liner
05( ) Rubber(ized) With Liner
06( ) Rubber(ized) Without Liner
07( ) Other Coat With Liner
08( )Other Coat Without Liner
10( )Proximity Coat
11( )PBI / Kevlar
12( ) Wildland Ensemble
13( ) Fire Retardant Coveralls
97( )Not Being When Injuried
99( ) Undetermined / Not Reported

**Protective Coat Status - Check One Only**

01( )Open
02( )Partially Open
03( )Closed, Collar Up
04( )Closed, Collar Down
97( )Not Being Worn
98( )Not Classified
99( )Undetermined / Not Reported

**Protective Coat Problem - Check One Only**

01( )Burned
02( )Ripped
03( )Melted
04( )Punctured / Cut
05( )Trapped Steam / Hazardous Gasses
06( )Penetrated / Permeated
96( )No Failure Of Protective Coat
97( )Not Worn When Injured
98( )Not Classified
99( )Undetermined / Not Reported

**Protective Trouser Worn - Check One Only**

01( )Nomex Trouser With Liner
02( )Nomex Trouser Without Liner
03( )Canvas Trouser With Liner
04( )Canvas Trouser Without Liner
05( )Rubber(ized) With Liner
06( )Rubber(ized) Without Liner
07( )Other Protective Trouser With Liner
08( )Other Protective Trouser Without Liner
10( )Proximity Trouser
11( )PBI / Kevlar
12( )Wildland Ensemble
13( ) Fire Retardant Coveralls
97( )Not Worn When Injured
99( )Undetermined / Not Reported

**Protective Trouser Status - Check One Only**

01( )Trousers Worn Properly
02( )Trousers Worn Inside Boots
03( )Trousers Worn Without Suspension
97( )No Trousers Worn
98( )Not Classified
99( )Undetermined / Not Reported

**Protective Trouser Problem - Check One Only**

01( )Burned
02( )Ripped
03( )Melted
04( )Punctured / Cut
05( )Trapped Steam / Hazardous Gasses
06( )Penetrated / Permeated
96( )No Failure Of Trousers
97( )Not Worn When Injured
98( )Problem Not Classified
99( )Undetermined / Not Reported

**Footwear Worn - Check One Only**

01( )Boots Knee Length (Steel Baseplate, Toe)
02( )Boots Knee Length (Steel Toe Only)
03( )3/4 Length (Steel Baseplate, Toe)
04( )3/4 Length (Steel Toe Only)
05( )Shoes, Safety (Steel Baseplate, Toe)
06( )Shoes, Safety (Steel Toe Only)
07( )Boots, Without Steel Reinforcement
08( )Shoes, Non Safety
10( )Proximity Footwear
97( )No Footwear Worn
98( )Not Classified , Other Footwear
99( )Undetermined / Not Reported

**Footwear Status - Check One Only**

01( )3/4 Length Boots Pulled Up(Full Length)
02( )3/4 Length Boots Not Pulled Up
03( )Knee Boots Worn
97( )No Protective Footwear Worn Injured
98( ) Not Classified
99( )Undetermined / Not Reported

**Footwear Problem - Check One Only**

01( )Burned
02( )Ripped
03( )Cut
04( )Punctured
05( )Object Fell Into
06( )Failed Under Impact
96( )No Failure Of Footwear
97( )No Footwear Worn
98( )Not Classified
99( )Undetermined / Not Reported

**Face Protection Used - Check One Only**

01( )Full Face Protection
02( )Partial Face Protection
03( )Goggles Worn
97( )No Face Protection Worn
98( )Face Protection Not Classified
99( )Undetermined / Not Reported

**Face Protection Problem - Check One Only**

01( )Burned
02( )Melted
03( )Fractured / Cracked / Broke
04( )Scratched
96( )No Failure Of Face Protection
97( )No Face Protection Worn
98( )Not Classified
99( )Undetermined / Not Reported

**Protective Helmet Worn - Check One Only**

01( )Leather Helmet
02( )Aluminum
03( )Glass Fiber Helmet
04( )Polycarbonate / Lexan Helmet
05( )Proximity
97( )Not Worn When Injured
98( )Helmet Not Classified
99( )Undetermined / Not Reported

**Protective Helmet Status - Check One Only**

01( )Chin Strap In Use
02( )Chin Strap & Ear/Neck protector Used
03( )Ear/Neck Protector Only Used
04( )Chin Strap & Ear/Neck Protector Not Used
97( )Not Worn When Injured
98( )Helmet Not Classified
99( )Undetermined / Not Reported

**Protective Helmet Problem Code - Check One Only**

01( )Burned
02( )Melted
03( )Fractured
04( )Punctured
05( )Knocked Off
06( ) Penetrated / Permeated
96( ) No Failure
97( )Not Worn When Injured
98( )Problem Not Classified
99( )Undetermined / Not Reported

**Protective Gloves Worn - Check One Only**

01( )Cotton
02( )Wool
03( )Canvas
04( )Leather
05( )Asbestos
06( )Rubber
07( )Synthetic / Nomex
08( )Proximity
09( )PBI / Kevlar
10( )Wildland
97( )Not Worn When Injured
98( )Gloves Not Classified
99( )Undetermined / Not Reported

**Protective Gloves Problem - Check One Only**

01( )Burned
02( )Ripped
03( )Melted
04( )Punctured / Cut
05( )Object Fell Into
06( )Insufficient Insulation
07( )Required Liner Not Worn
96( )No Failure Of Gloves
97( )Not Worn When Injured
98( )Problem Not Classified
99( )Undetermined / Not Reported

**Breathing Apparatus - Check One Only**

01( )Self Contained, Open Circuit, Demand Type
02( )Self Contained, Open Circuit, Pressure Type
03( )Self Contained, Closed Circuit Type
04( )Not Self Contained
05( )Self Contained Supplied Air Breathing Apparatus
[illegible] Breathing Apparatus Being Used When Injured
[illegible]thing Apparatus Used Not Classified
99( )Undetermined / Not Reported

**Apparatus Status - Check One Only**

01( )Face Plate And Regulator Connected
02( )Air Supply Turned Off
03( )Face Plate Not In Place
04( )Harness Not Secured
05( )Breathing Apparatus Property Worn
97( )No Breathing Apparatus Worn
98( )Breathing Apparatus Not Classified
99( )Undetermined / Not Reported

**Apparatus Problem - Check Most Serious Problem Only**

Face Piece / Hose

11( )Burned
12( )Ripped
13( )Melted
14( )View Plate Broken / Cracked
15( )Detached
16( )Exhalation Valve Inoperative / Damaged
19( )Problem Not Classified
10( )Insufficient Information To Classify Problem

Alarm

41( )Failed To operate
42( )Damaged By Contact
49( )Problem Not Classified
40( )Insufficient Information To Classify Problem

HARNESS

21( )Burned
22( )Ripped
23( )Melted
24( )Detached / Separated
29( )Problem Not Classified
20( )Insufficient Information To Classify Problem

SUPPLY CYLINDER / VALVE

51( )Failed To Operate
52( )Damaged By Contact
53( )Contained Insufficient Air / Oxygen
59( )Problem Not Classified
50( )Insufficient Information To Classify Problem

REGULATOR

31( )Failed
32( )Damaged by Contact
33( )Problem With Admission Valve
39( )Problem Not Classified
30( )Insufficient Information To Classify Problem

OTHER PROBLEMS WITH BREATHING APPARATUS

96( )No Failure Of Breathing Apparatus
97( )No Breathing Apparatus Being Used
98( )Problem Not Classified
99( )Problem Undetermined / Not Reported

**Special Equipment Used - Check One Only**

01( )Chemical Level A Suit
02( )Chemical Level B Suit
03( )Scuba Gear
04( )Exposure Suit
05( )Life Preserver
06( )Life Belt, Ladder Belt
07( )Rescue Equipment
97( )No Special Equipment Worn When Injured
98( )Special Equipment Not Classified
99( )Special Equipment Undetermined / Not Reported

**Special Equipment Status - Check One Only**

01( )Being Worn Properly, Used For Designed Purpose
02( )Being Worn Properly, Not Used For Designed Purpose
03( )Not Being Worn Properly, Used For Designed Purpose
04( )Not Being Worn Properly, Not Used For Designed Purpose
97( )No Special Equipment Being Worn When Injured
09( )Special Equipment Undetermined / Not Reported

**Special Equipment Problem - Check One Only**

01( )Burned
02( )Ripped, Torn, Cut, Punctured, Permeated
03( )Melted
04( )Not Properly Serviced/Stored Prior To Use
05( )Not Used For Designed Purpose
06( )Not Used As Recommended By Manufacture
96( )No Problem with Special Equipment
97( )No Special Equipment Worn When Injured
98( )Problem Not Classified
99( )Problem Undetermined / Not Reported

**Casualty Narrative**

For Official use Only

# DoD FIRE INCIDENT REPORTING SYSTEM
## FIRE VEHICLE RESPONSE / ENVIRONMENTAL REPORT

| NEW ( ) | CHANGE ( ) | DELETE ( ) | RELEASE DATE ___/___/_____ |
|---|---|---|---|

| EVENT NUMBER | FDID NUMBER | Branch of Service I___I UIC/RUC I___I___I___I___I___I___I___I | EXPOSURE NUMBER |
|---|---|---|---|
| | INCIDENT NUMBER | YR I___I___I Run Number I___I___I___I___I___I___I___I___I | I___I___I |

### SECTION XIX - FDID SUPPORT VEHICLE INFORMATION

Vehicle Registration Number: _____

Type of Vehicle: _____

Vehicle Category

A ( ) Ladder-Tiller
B ( ) Ladder -Tower
C ( ) Ladder -Rear Mounted
D ( ) Pumper-Standard
E ( ) Pumper-Squirt
F ( ) Rescue Truck
G ( ) Airfield Crash Unit
H ( ) Ambulance
I ( ) Emergency Medical
J ( ) Brush Fire Truck
K ( ) Light Truck
L ( ) Communications
M ( ) Specialty Vehicle
N ( ) Hazardous materials
O ( ) Other

Required Number Of Crew Needed For Proper Operation

I___I___I

Primary Agent Capacity I___I___I___I

Unit of Measure

1 ( ) Gallons 2 ( ) Pounds 3 ( ) Not Applicable

Number of Positions Manned I___I___I

Vehicle Damage

A ( ) Fire Caused B ( ) Non Fire Caused C ( ) None

Vehicle Mobility Problem

A ( ) Traction
B ( ) Braking
C ( ) Insufficient Power
D ( ) Clearance
E ( ) Other
F ( ) No Problems

Vehicle Status

A ( ) Effective response B ( ) Non Effective Response

Non-Effective Response Reason

1 ( ) Accident
2 ( ) Breakdown
3 ( ) Unable to locate
4 ( ) Unable to overcome terrain
5 ( ) Unable to overcome traffic

### SECTION XIX - FDID SUPPORT VEHICLE INFORMATION

Vehicle Registration Number: _____

Type of Vehicle: _____

Vehicle Category

A ( ) Ladder-Tiller
B ( ) Ladder -Tower
C ( ) Ladder -Rear Mounted
D ( ) Pumper-Standard
E ( ) Pumper-Squirt
F ( ) Rescue Truck
G ( ) Airfield Crash Unit
H ( ) Ambulance
I ( ) Emergency Medical
J ( ) Brush Fire Truck
K ( ) Light Truck
L ( ) Communications
M ( ) Specialty Vehicle
N ( ) Hazardous materials
O ( ) Other

Required Number Of Crew Needed For Proper Operation

I___I___I

Primary Agent Capacity I___I___I___I

Unit of Measure

1 ( ) Gallons 2 ( ) Pounds 3 ( ) Not Applicable

Number of Positions Manned I___I___I

Vehicle Damage

A ( ) Fire Caused B ( ) Non Fire Caused C ( ) None

Vehicle Mobility Problem

A ( ) Traction
B ( ) Braking
C ( ) Insufficient Power
D ( ) Clearance
E ( ) Other
F ( ) No Problems

Vehicle Status

A ( ) Effective response B ( ) Non Effective Response

Non-Effective Response Reason

1 ( ) Accident
2 ( ) Breakdown
3 ( ) Unable to locate
4 ( ) Unable to overcome terrain
5 ( ) Unable to overcome traffic

Sample

For Official Use Only

## SECTION XIX - FDID SUPPORT VEHICLE INFORMATION

Registration Number: _____

Number of Positions Manned |____|____|

Type of Vehicle: _____

**Vehicle Category**

A ( ) Ladder-Tiller
B ( ) Ladder -Tower
C ( ) Ladder -Rear Mounted
D ( ) Pumper-Standard
E ( ) Pumper-Squirt
F ( ) Rescue Truck
G ( ) Airfield Crash Unit
H ( ) Ambulance
I ( ) Emergency Medical
J ( ) Brush Fire Truck
K ( ) Light Truck
L ( ) Communications
M ( ) Specialty Vehicle
N ( ) Hazardous materials
O ( ) Other

**Vehicle Damage**

A ( ) Fire Caused B ( ) Non Fire Caused C ( ) None

**Vehicle Mobility Problem**

A ( ) Traction
B ( ) Braking
C ( ) Insufficient Power
D ( ) Clearance
E ( ) Other
F ( ) No Problems

**Vehicle Status**

A ( ) Effective response B ( ) Non Effective Response

**Non-Effective Response Reason**

1 ( ) Accident
2 ( ) Breakdown
3 ( ) Unable to locate
4 ( ) Unable to overcome terrain
5 ( ) Unable to overcome traffic

Required Number Of Crew Needed For Proper Operation

|____|____|

Primary Agent Capacity |____|____|____|

Unit of Measure

1 ( ) Gallons 2 ( ) Pounds 3 ( ) Not Applicable

## SECTION XVI - ENVIRONMENTAL CONDITIONS INFORMATION

**Hazardous Weather - Check One Only**

( ) Yes ( ) No ( ) Unknown

**Light Conditions (Check One Only)**

1( ) Dawn 2( ) Day 3( ) Dusk 4( ) Night

**Surface Conditions-Check One Only**

1( )Wet 2( )Dry 3( )Icy 4( )Snow Covered 5( )Not Reported

**Visibility-Check One Only**

1( ) Less Than .5 mile
2( ) .5 Mile - 1 Mile
3( ) 1 Mile - 3 Miles
4( ) 3 Miles - 5 Miles
5( ) + 5 Miles
6( )Undetermined/Unreported

Temperature |____|____|____| (degrees fahrenheit)

Wind Direction |___|___|___| Wind Speed |___|___|___|

**Weather (Check All That Apply)**

A( ) Clear
B( ) Cloudy
C( ) Rain
D( ) Snow
E( ) Hail
F ( ) Sleet
G( ) Ice Storm
H( ) Electrical Storm
I( ) Fog
J( ) High Winds
K( ) Hurricane
L( ) Tornado
M( ) Surface Accumulation
N( ) Blowing Dust/Sand
O( ) Lightning
P( ) Humidity Low (0% - 25%)
Q( ) Humidity Med (26% - 50%)
R( ) Humidity High (51% - 75%)
S( ) Humidity Ext. (76% - 100%)
T( ) Sea State I
U( ) Sea State II
V ( ) Sea State III
W ( ) Sea State IV
X ( ) Sea State V
Y ( ) Not Classified
Z ( ) Undetermined/Un reported

Sample

For Official use Only

# DoD FIRE INCIDENT REPORTING SYSTEM
# HAZARDOUS MATERIALS INCIDENT REPORT

| NEW ( ) | CHANGE ( ) | DELETE ( ) | RELEASE DATE ___/___/___ |
|---|---|---|---|

| EVENT NUMBER | FDID NUMBER | Branch of Service \|___\| UIC/RUC \|___\|___\|___\|___\|___\|___\| | EXPOSURE NUMBER \|___\|___\| |
|---|---|---|---|
| | INCIDENT NUMBER | YR \|___\|___\| Run Number \|___\|___\|___\|___\|___\|___\|___\|___\| | |

## SECTION XVII - HAZARDOUS MATERIALS INCIDENT

Area Of Release Code \|___\|___\|

Equipment Involved In Release Code \|___\|___\|

Extent Of Release Code \|___\|___\|

Level Of Release Code \|___\|___\|

Release Factor Code \|___\|___\|

Hazmat Level Code
1( )Potential 2( )Limited 3( )Full;

Estimated Number Of Chemicals / Hazmat Release \|___\|___\|___\|

Radiation Exposure Resulted
( )YES ( )NO ( )UNKNOWN

Type Of Radiation \|___\|

Radiation Quantity \|___\|___\|___\|

Radiation Unit Of Measure \|___\|

Decontamination Performed ( )YES ( )NO ( )UNKNOWN

Decontamination Solution Code - Check All That Apply

A ( ) Sodium Carbonate / Trisodium Phosphate
B ( ) Calcium Hypochlorite
C ( ) Trisodium Phosphate
D ( ) Hydrochloric Acid / Diluted Solution
E ( ) Concentrated Detergent Solution
F ( ) Soap & Water
G ( ) Solution not Classified
N ( ) Undetermined / Unreported

Highest Level Of Protection Code - Check Only One

A( )Highest Level Of Respiratory, Skin, Eye, Mucous Membrane Protection
B( )Highest Level Of Respiratory, With Lesser Level Of Skin And Eye Protection
C( )Same Level of Skin Protection As Level B With Lower Level Of Respiratory Protection
D( )No Respiratory Protection With Minimum Skin Protection

ACTION TAKEN (NUMBER BY CHRONOLOGICAL ORDER OF STEPS TAKEN)

16( )Smoke or Toxic Gas Ventilation
31( )Rescue, Remove From Harm
32( )Extrication, Disentanglement
33( )Emergency Medical Service
34( )Provide Manpower
35( )Search
36( )Transport
37( )Forcible Entry
41( )Remove Hazard
42( )Identify Hazardous Materials
43( )Evacuation
44( )Establish Safe Area
45( )Monitor/Sample Materials
46( )Decontaminate Persons/Equipment
47( )Decontaminate Occupancy/Area
51( )Assist Invalids
53( )Standby, Firewatch
54( )Water Removal
55( )Restore Sprinkler/Protection System
56( )Restore Alarm System
57( )Assist Animal
61( )Crowd Control
62( )Traffic Control
63( )Notify Other Agencies
64( )Provide Public/Media Information
71( )Investigate
72( )Placed Inservice Enroute
73( )Shut Down System
81( )Restore City Services
82( )Secure Property
91( )Code Enforcement
92( )Refer To Proper Authority
97( )Material Determined Non-Hazardous
98( )No Action taken
99( )Action Not Classified
00( )Action Undetermined / Unreported

SAMPLE

## PERSONNEL IDENTIFYING Hazardous Materials (Check all that apply)

ON-SITE FIRE DEPARTMENT PERSONNEL

- 1[illegible] rdous Materials Team Personnel
- 1[illegible] Firefighter
- 113( )Hazmat Specialist, Technician
- 114( )Chemist, Toxicologist
- 115( )Medical Doctor
- 117( )Laboratory Personnel
- 119( )Personnel Not Classified

OFF SITE FIRE DEPARTMENT PERSONNEL

- 221( )Hazardous Materials Team Personnel
- 222( )Firefighter
- 223( )Hazmat Specialist Technician
- 224( )Chemist, Toxicologist
- 225( )Medical Doctor
- 226( )Dispatch Center Personnel
- 227( )Laboratory Personnel
- 229( )Off Site Personnel Not Classified

ON-SITE NON-FIRE SERVICE PERSONNEL

- 331( )Brigade, Hazmat Response Team
- 332( )Responsible Owner, Manager, Supervisor
- 333( )Driver Of Transporting Vehicle
- 334( )Chemist, Toxicologist
- 335( )Medical Doctor
- 337( )Laboratory Personnel
- 341( )Hazmat Response Team Personnel
- 343( )Hazardous Materials Specialist
- 348( )Hazmat Clean-Up Personnel
- 349( )Personnel Not Classified
- 340( )Insufficient Information To Classify

OFF-SITE NON-FIRE SERVICE PERSONNEL

- 551( )Hazardous Materials Team Personnel
- 552( )Responsible Owner, Manager
- 554( )Chemist, Toxicologist
- 555( )Medical Doctor
- 556( )Dispatcher
- 557( )Laboratory Personnel
- 558( )Toxic Center
- 559( )Chemtrec, Industrial Expert
- 561( )University
- 562( )Medical Center / Hospital
- 563( )Hazardous Materials Specialist
- 569( )Personnel Not Classified
- 560( )Insufficient Information to Classify

Other Personnel

- 999( )Personnel Not Classified
- 900( )Personnel Undetermined/Unreported

## REFERENCE MATERIAL's Used to Indentify Hazardous Material (Check all that apply)

ON-SITE REFERENCE MATERIALS

- 11( )Department Of Transportation Manual
- 12( )Chemical Hazards Response Information (CHRIS) Manual
- 13( )Material Safety Data Sheet (MSDS)
- 14( )Placards, Signs on Building, Room, Container, Vehicle
- 15( )Labels
- 16( )Computer Software
- 17( )Shipping Papers & Inventory Listing
- 18( )Handbooks, Textbooks, Reference Books
- 19( )On-Site Materials Not Classified

OFF-SITE REFERENCE MATERIALS

- 21( )Department Of Transportation (DOT) Manual
- 22( )Chemical Hazards Response Information (CHRIS) Manual
- 23( )Material Safety Data Sheet (MSDS)
- 25( )Contractual Information Services
- 26( )Computer Software
- 27( )Shipping Papers & Inventory Listings
- 28( )Handbooks, Textbooks, Reference Books
- 29( )On-Site Reference Materials Not Classified

OTHER REFERENCE MATERIALS USED

- 98( )No Reference Materials Used
- 99( )Reference Materials Used Not Classified
- 90( )Reference Materials Undetermined / Unreported

## INCIDENT DISPOSITION - CHECK ONE ONLY

- 1( )Incident Completed By Fire Service Only
- 2( )Incident Completed While Fire Service Present
- 3( )Incident Scene Released To Local Agency Within Activity/Command
- 4( )Incident Scene Released For Disposition To City/County Agency
- [illegible] Scene Released For Disposition To State Agency
- 6( )Incident Scene Released For Disposition To Federal Agency
- 7( )Incident Scene Released For Disposition To Private Agency / Contractor
- 8( )Incident Scene Released For Disposition To Property Owner / Manager
- 9( )Not Classified
- 0( )Undetermined / Unreported

## HAZMAT NARRATIVE

# Appendix J

# Sanitary Sewer System Evaluation

# Appendix J

## Sanitary Sewer System Evaluation

This report documents an evaluation done in and before 1985 of the sanitary sewer system. This copy included here does not include all of the maps because they are full size and were not transmitted for use by the Corps of Engineers. Much of the information in this report can be used without the benefit of the maps.

# SANITARY SEWER SYSTEM ANALYSIS

## FORT HOOD

MILITARY INSTALLATION MASTER PLANNING

UTILITY ANALYSIS

U.S. ARMY ENGINEER DISTRICT, FORT WORTH

CORPS OF ENGINEERS

FORT WORTH, TEXAS

Prepared by

BOHANNAN-HUSTON, INC.

ALBUQUERQUE, NEW MEXICO

JUNE 1985

# EXECUTIVE SUMMARY
# SANITARY SEWER SYSTEM

## FORT HOOD, TEXAS

## JUNE, 1985

The comprehensive study of the Fort Hood sanitary system includes a detailed set of maps in scales of 1"=400' and 1"=100', available from the Directorate of Facilities Engineering at Fort Hood and from the U.S. Army Corps of Engineers, Fort Worth District.

Fort Hood consists of two separate sewer systems, North Fort Hood and the main post, the latter including West Fort Hood and Robert Gray Army Airfield. The main post system comprises 507,670 feet of gravity sewer main ranging in diameter from 6-inch to 30-inch, 1,840 manholes, ten active lift stations, and 19 known septic tanks in use. Pipe materials are clay, concrete, reinforced concrete, polyvinyl chloride (plastic), and some ductile and cast iron.

All septic tanks in use are performing adequately and it is recommended that they be left in service, with regular maintenance, until gravity sewers are made available through construction of other projects, such as the new hanger project at West Fort Hood. If desired, however, eleven tanks can be eliminated with construction of gravity sewers, itemized in Appendix H, at a cost of $504,800.00.

Rodding, hydrocleaning, and television inspection of the lines given in Table 7, and illustrated in Appendix J, is recommended both for a general indication of sewer conditions on the post and to identify several surcharging problem causes. The results of the procedure will show how much rehabilitative work is needed, if any. Estimated cost for the work, itemized in Table 7 and included below, is $22,400.00.

Most line problems can be corrected with cleaning, maintenance, and minor repairs, some of which may be handled by post personnel. Appendix D lists the specific deficiencies in each subarea and the estimated costs for correction, summarized below.

The North Fort Hood sewer system is composed of 53,293 feet of 6-inch to 24-inch gravity sewer main, 183 manholes, and a two-stage treatment lagoon with tertiary filtration and chlorination. Pipe materials are reinforced concrete, asbestos cement, clay, and polyvinyl chloride. The system suffers from lack of use and maintenance, with flat slopes causing blockages and pipe damage. Costs of maintenance, repair, and construction necessary to increase capacities are itemized in Appendix K and summarized below.

## Sanitary Sewer Cost Summary

**Main Post**

| | | |
|---|---|---|
| Repairs | | $ 17,790.00 |
| Construction | | 23,900.00 |
| T.V. Inspection | | 17,600.00 |
| Septic Tank Tie-In * | | 504,800.00 |
| | Sub-total | $ 564,090.00 |

**North Fort Hood**

| | | |
|---|---|---|
| Rehabilitation | | $ 53,100.00 |
| Maintenance (Hydrojet & Cleaning) | | 164,000.00 |
| T.V. Inspection | | 4,800.00 |
| Construction | | 305,850.00 |
| | Sub-total | $ 527,750.00 |
| | TOTAL | $1,091,840.00 |

* Without Septic Tank Work: TOTAL $ 587,040.00

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## GLOSSARY OF ABBREVIATIONS

| | |
|---|---|
| AC | asbestos cement |
| AR | army regulation |
| AVG. | average |
| BEQ | bachelor enlisted quarters |
| BHP | brake horsepower |
| BN | battalion |
| BOD | biochemical oxygen demand |
| BOQ | bachelor officer quarters |
| Bldg. | building |
| CF | cubic feet |
| CFM | cubic feet per minute |
| CP | concrete pipe |
| cu. ft. | cubic feet |
| cu. yds. | cubic yards |
| DFE | Directorate of Facilities Engineering |
| dia. | diameter |
| DI | Ductile Iron |
| DIO | Directorate of Industrial Operations |
| EPA | Environmental Protection Agency |
| fps | feet per second |
| GPCD | gallons per capita per day |
| GPD | gallons per day |
| GPM | gallons per minute |
| Gals. | gallons |
| HRS | hours |
| Hp | horsepower |
| lb. | pound |
| max. | maximum |
| MCA | military construction, Army |
| MG | million gallons |
| MGD | million gallons per day |
| n | Manning roughness coefficient for pipe friction |
| NCO | Noncommissioned Officer |
| no. | number |
| OCE | Office, Chief of Engineers |
| OMA | Operation and maintenance, Army |
| PVC | Polyvinyl Chloride |
| R | Hydraulic Radius (ft) |
| RCP | Reinforced Concrete Pipe |
| Rd | road |
| Rg | range |
| S | Slope of Pipe (ft/ft) |
| sq. ft. | square feet |
| TB | technical bulletin |
| TDH | Total Dynamic Head |
| TM | technical manual |
| V | velocity (Ft/sec) |
| VCP | Vitrified Clay Pipe |

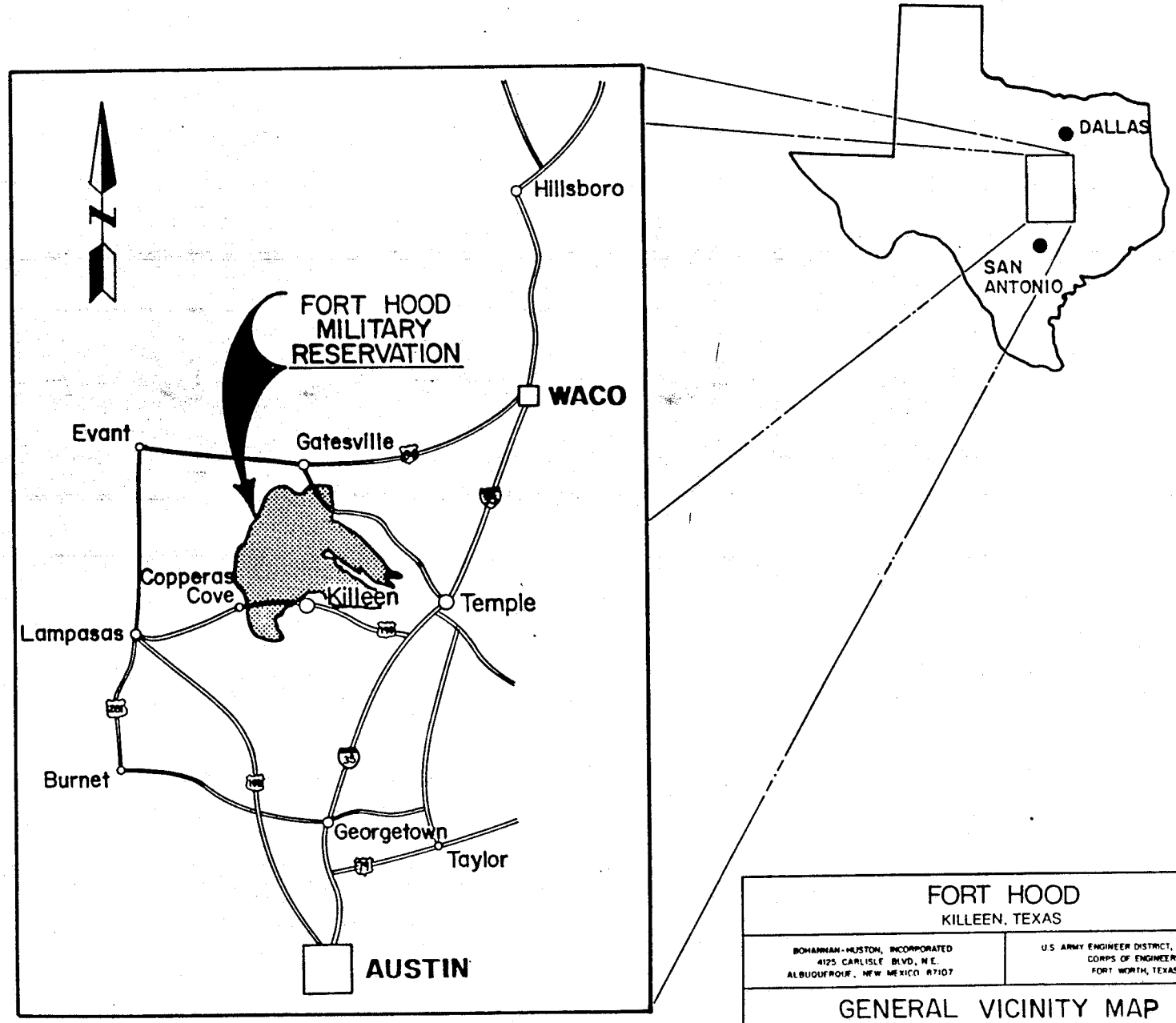
## 1.0 INTRODUCTION

This report, under Contract DACA63-82-C-D138, describes the methods and results of a comprehensive analysis of the Fort Hood sanitary sewer system. The analysis includes a tabulation of sizes, construction materials, and flow characteristics of all existing sanitary sewer lines. A determination of system adequacy is made along with recommended improvements.

A separate part of this project includes the update and preparation of computer generated general sanitary sewer site maps (1"=400') and the preparation of detailed sanitary sewer site maps (1"=100'). These maps may be obtained through DFE at Fort Hood or the Fort Worth District Corps of Engineers. All manhole rim and invert elevations were field surveyed as part of the mapping and analysis.

Fort Hood, located between Dallas and San Antonio (Figure 1), was established in 1942 and today ranks as the only two division post in this country and the largest armored training base in the free world. It can be divided into three geographic areas (see Figure 2):

1) North Fort Hood
2) the range areas
3) the main post, which includes the main cantonment area, surrounding family housing units, and West Fort Hood.



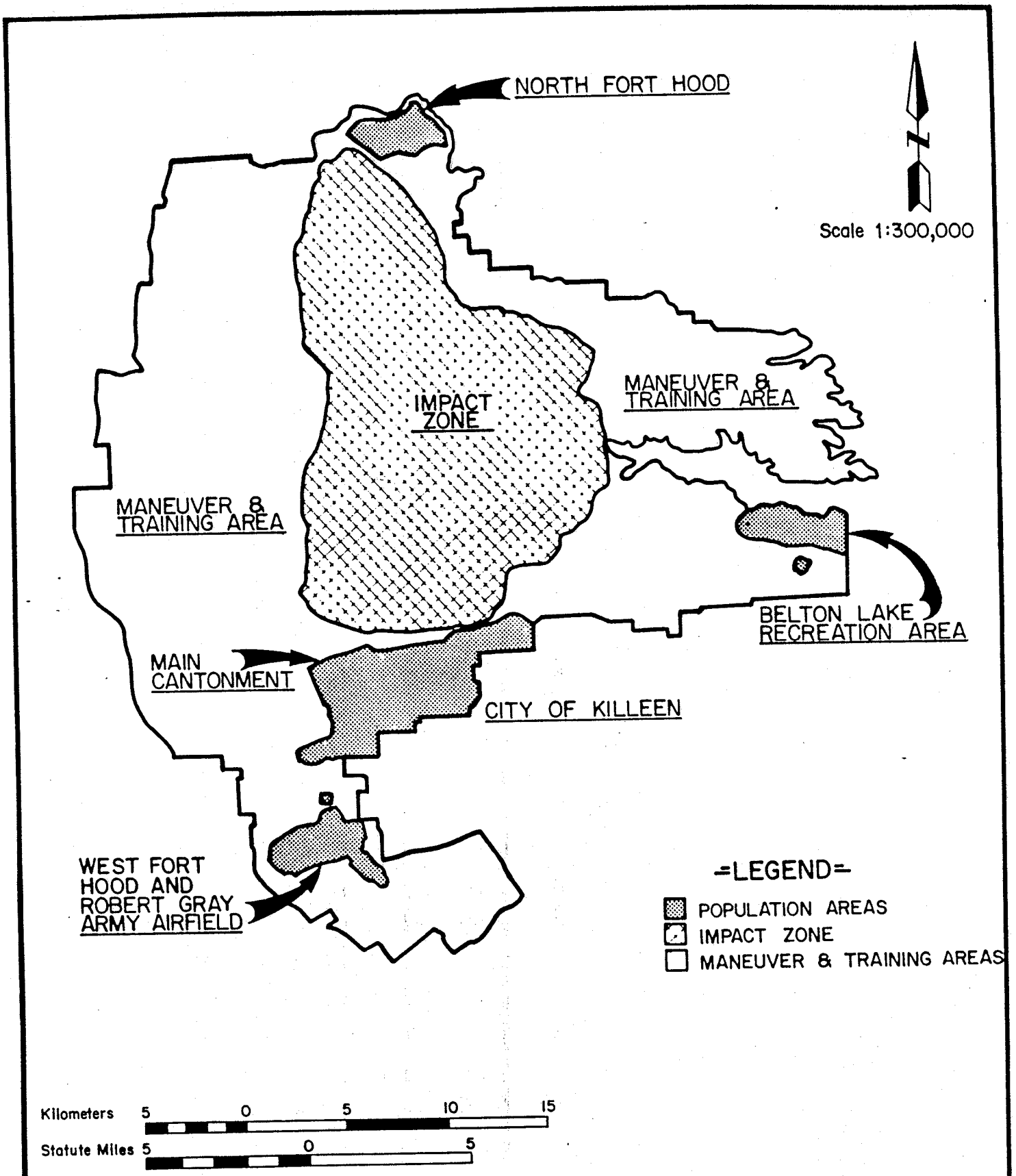

FORT HOOD
KILLEEN, TEXAS

BOHANNAN-HUSTON, INCORPORATED
4125 CARLISLE BLVD, N.E.
ALBUQUERQUE, NEW MEXICO 87107

U.S. ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS

GENERAL VICINITY MAP
FIGURE 1

FIGURE 1 — FORT HOOD LOCATION MAP

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FORT WORTH, TEXAS

GENERAL INFORMATION MAP
FIGURE 2

The weather at Fort Hood is characterized as humid subtropical with mild dry winters and hot summers. The average annual precipitation is approximately 30 inches (see Appendix A for climatological data at Fort Hood for the period 1950 to 1982).

## 1.1 Purpose and Scope

The purpose of this report is to summarize an analysis of the existing sanitary sewer system at Fort Hood. The scope of the analysis is as follows:

- Determine population size and distribution for predicting average and peak sewer flows throughout the sewer system.
- Measure sewer flows at selected manholes to verify predicted estimates.
- Analyze and evaluate infiltration and rainfall-runoff seepage into the sanitary sewer system.
- Analyze and evaluate lift stations for adequacy and compliance with applicable regulations.
- Evaluate metering stations.
- Evaluate the feasibility of connecting existing septic tanks to the existing gravity system.
- Compute and tabulate estimated existing flow, estimated peak flow, and full pipe capacity for all existing lines.
- Analyze problems within the sanitary sewer system and make recommendations and cost estimates for improvements.

## 1.2 System Overview

Fort Hood has two separate sanitary sewer systems - North Fort Hood and the main post.

The main cantonment area of the main post is situated on high ground which allowed the original (1942) branching sewer system to gravity flow to the east. Subsequent growth, generally to the west, has forced construction of additional gravity subsystems, several of which are connected by lift stations to the original system. For this analysis, the main post has been divided into 21 subareas with 10 lift stations (See Appendix L - Location Maps).

The majority of the main post system consists of vitrified clay pipe ranging in diameter from 4 to 30 inches. Other construction materials include cast iron, ductile iron, reinforced concrete, asbestos cement and more recently, polyvinyl chloride pipe. Manholes are constructed of brick or reinforced concrete and vary in depth from 3 feet to 28 feet.

All sewage exits at the east end of the main post through four metering stations, flows east through Killeen, and is treated at the Bell County Water Control and Improvement District treatment plant. Effluent is discharged into a nearby stream.

North Fort Hood, located about 16 miles north of the main post, is used for various training exercises by reserve and other units, with heaviest activity during the summer months. The original sewer system was constructed in 1942 with many lines having very mild slopes. The entire system drains to a two stage lagoon built in the early 1970s. Age, intermittent use, and sporadic maintenance have contributed to produce a sewer system that needs significant cleaning and repair.

## 2.0 ANALYSIS CRITERIA

### 2.1 Population

A determination of the number of people contributing to a particular sewer line or subsystem was necessary to begin the analysis. Monthly population estimates were obtained from the comptroller at Fort Hood. Post population has varied over the last five years so a representative population was calculated, as follows, for the analysis. Table 1 gives the monthly population for the period 1978 through June, 1983. This total population was distributed throughout the main post according to housing units, barracks capacities, office space and general areas of the various military units. It was also divided into military personnel, military dependents, civilians and contractors, and Central Texas College and Metroplex Hospital personnel. The latter two are served by the sewer system but receive water independently of the Fort Hood supply.

Populations for the family housing areas were obtained from DFE - Assignment. Based on historical data, they assume 2.77 dependents per housing unit, regardless of the number of bedrooms. There are 5,236 housing units on post and the military dependent population is therefore estimated to be 14,502.

**TABLE 1**
**POST TOTAL POPULATION, RESIDENT AND NON-RESIDENT**
**FORT HOOD, TEXAS**

| YEAR | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 |
|---|---|---|---|---|---|---|
| January | 71,391 | 65,566 | 61,850 | 65,617 | 62,250 | 61,613 |
| February | 72,010 | 64,215 | 61,925 | 65,804 | 63,167 | 61,613 |
| March | 72,260 | 63,590 | 61,825 | 65,603 | 63,761 | 61,768 |
| April | 72,355 | 62,836 | 61,791 | 65,351 | 63,864 | 61,768 |
| May | 71,956 | 62,469 | 61,673 | 64,740 | 64,102 | 61,768 |
| June | 70,886 | 61,679 | 61,297 | 63,870 | 63,195 | 61,966 |
| July | 70,075 | 61,333 | 61,462 | 63,035 | 62,353 | |
| August | 69,628 | 60,758 | 61,587 | 61,976 | 61,810 | |
| September | 68,279 | 60,767 | 61,790 | 61,387 | 61,031 | |
| October | 67,018 | 61,091 | 62,680 | 61,821 | 61,118 | |
| November | 66,633 | 61,042 | 63,947 | 61,895 | 61,527 | |
| December | 65,860 | 60,739 | 64,443 | 61,202 | 60,622 | |

For this analysis, the dependent population in each housing area was proportioned by the number of bedrooms, based on the following criteria:

| | | | | | |
|---|---|---|---|---|---|
| 2 bedroom unit . . . | 1.95 dependents x | 1934 | units = | 3,772 |
| 3 bedroom unit . . . | 2.93 dependents x | 2268 | units = | 6,646 |
| 4 bedroom unit . . . | 3.92 dependents x | 1004 | units = | 3,937 |
| 5 bedroom unit . . . | 4.90 dependents x | 30 | units = | 147 |
| | | | | 14,502 |

A tabulation of the number of bedrooms per housing unit for each family housing area, along with the populations used in this analysis, is shown in Appendix B.

The total population calculated was 69,700, comprising 38,337 residents and 31,363 non-residents, including the Metroplex Hospital (320) and Central Texas College (5572).

A complete summary of the population distribution in the 21 sewer subsystem areas is given in Table 2.

## 2.2 Loading

TM 5-814-1 provides guidance for the design and analysis of sanitary sewers. Residential areas are assumed to be at full occupancy for the analysis. Sewer flow from barracks complexes and training and work areas is based on existing population estimates since the maximum number of people at work or in training in a given area is not predictable with any regularity.

TABLE 2
POPULATION PROFILE - AREA DISTRIBUTION
MAIN POST

| SANITARY SEWER SUBSYSTEM AREA | NON-RESIDENTIAL DAY USE | | RESIDENTIAL | | | TOTAL |
|---|---|---|---|---|---|---|
| | | | BARRACKS (ENLISTED & B.O.Q.) | FAMILY HOUSING | | |
| | MILITARY | CIVILIAN | | MILITARY | DEPENDENT | |
| 1 | 0 | 10 | 0 | 900 | 2,894 | 3,804 |
| 2 | 0 | 0 | 0 | 1,000 | 2,689 | 3,689 |
| 3 | 0 | 0 | 0 | 280 | 743 | 1,023 |
| 4 | 2,429 | 13 | 1,683 | 0 | 0 | 4,125 |
| 5 | 4,882 | 124 | 5,205 | 0 | 0 | 10,211 |
| 6 | 929 | 2,406 | 21 | 0 | 0 | 3,356 |
| 7 | 3,047 | 363 | 2,985 | 0 | 0 | 6,395 |
| 8 | 0 | 60 | 0 | 334*1 | 716 | 1,110 |
| 9 | 977 | 160 | 468 | 0 | 0 | 1,605 |
| 10 | 810 | 6,489*2 | 796*3 | 0 | 0 | 8,095 |
| 11 | 270 | 522 | 175*4 | 0 | 0 | 967 |
| 12 | 50 | 0 | 0 | 630 | 1,680 | 2,360 |
| 13 | 2,715 | 226 | 3,084 | 316 | 805 | 7,146 |
| 14 | 0 | 0 | 0 | 89 | 261 | 350 |
| 15 | 0 | 0 | 0 | 155 | 436 | 591 |
| 16 | 0 | 0 | 0 | 200 | 784 | 984 |
| 17 | 3,566 | 71 | 4,132 | 116 | 320 | 8,205 |
| 18 | 0 | 13 | 0 | 698 | 1,997 | 2,708 |
| 19 | 0 | 0 | 0 | 50 | 104 | 154 |
| 20 | 304 | 10 | 0 | 518 | 1,073 | 1,905 |
| 21 | 892 | 25 | 0 | 0 | 0 | 917 |
| | 20,871 | 10,492 | 18,549 | 5,286 | 14,502 | 69,700 |
| | 31,363 | | | 38,337 | | |

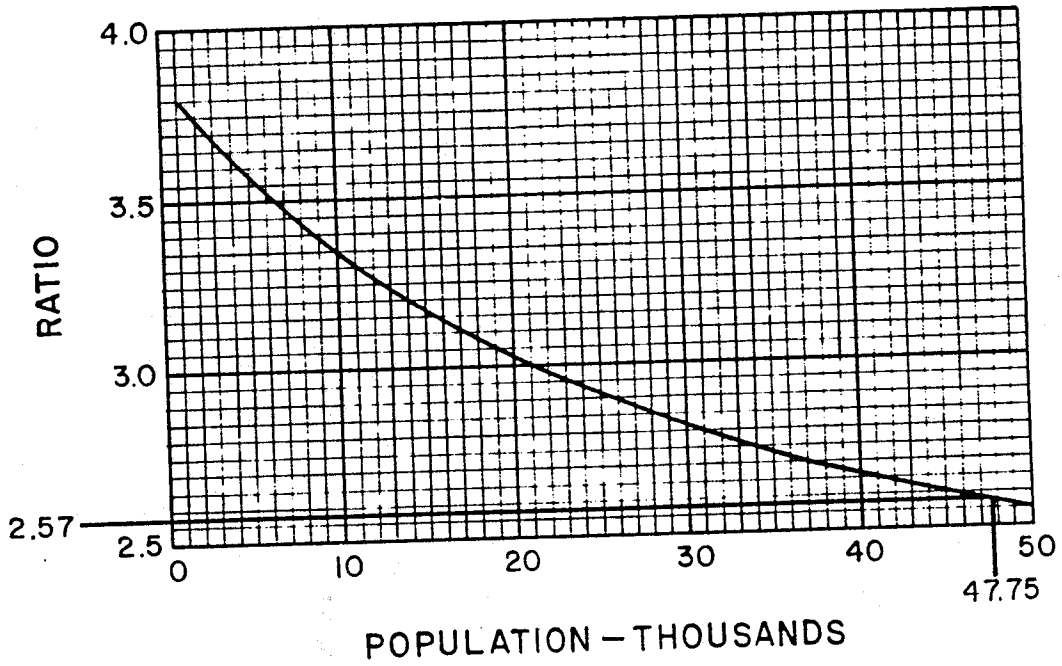
*1 In Area 8, an additional 50 military residents were added to allow for the trailer park (Montague Village)
*2 Includes Central Texas College (5572) and Metroplex Hospital staff (320)
*3 Includes 78 residential at Metroplex Hospital
*4 Includes 10 residential at Poxon Guest House

Table 1 of TM 5-814-1 indicates the average per capita sewage flow for Fort Hood should be 100 gpd for residents and 30 gallons per 8 hour shift per non-resident worker. The effective population is the resident population plus 0.3 times the non-resident population, or 47,750 based upon Table 2 of this report. The rate of flow fluctuates throughout the day and usually ranges from 40% to about 225% of the average. Sewers must have adequate capacity to carry the extreme peak rate of flow. Figure 3, from TM 5-814-1, gives an estimate of maximum peak flow based on contributing population and is the basis for determining the design peak flow.

## 2.3 Historical Data

Historical data for the period January, 1978, through June, 1984, was used to evaluate flow characteristics at the main post. Table 3 is a tabulation of monthly effective population, water consumption, sewage, sewage to water consumption ratio, and the average gallons of sewage generated per person per day for the years 1978 through 1983.

Discussions with Fort Hood personnel indicated that sewage meter A was not working properly until the meter was replaced in June, 1981. Prior to that, several metered sewage flows were significantly larger than the water consumption estimates. As an example, the period December, 1978, through April, 1979, shows an




AVERAGE FLOW X RATIO = PEAK FLOW ESTIMATE

FIGURE 3

PEAK FLOW RATIO GRAPH, FORT HOOD.

TABLE 3

POPULATION-WATER AND SEWER DATA
FORT HOOD, TEXAS

1978

| | EFF. POP | WATER SYST PMPG CAP. (MG) | GAL WATER PER CAP. DAY | SEWER FLOWS (MG) | GAL SEWAGE PER CAP. DAY | RATIO OF SEWER FLOW TO WATER PMPG. |
|---|---|---|---|---|---|---|
| JAN 31 | 55,956 | 207.39 | 119 | 206.84 | 119 | 1.00 |
| FEB 28 | 56,429 | 185.23 | 117 | 210.33 | 120 | 1.14 |
| MAR 31 | 56,656 | 165.31 | 94 | 218.52 | 124 | 1.32 |
| APR 30 | 56,719 | 215.90 | 126 | 215.44 | 122 | 1.00 |
| MAY 31 | 56,434 | 245.49 | 140 | 224.86 | 129 | .92 |
| JUN 30 | 55,544 | 270.78 | 162 | 217.76 | 131 | .80 |
| JUL 31 | 54,911 | 298.72 | 175 | 225.18 | 132 | .75 |
| AUG 31 | 54,554 | 285.23 | 169 | 225.01 | 133 | .79 |
| SEP 30 | 53,595 | 233.61 | 145 | 217.90 | 136 | .93 |
| OCT 31 | 52,623 | 238.51 | 146 | 225.41 | 138 | .95 |
| NOV 30 | 52,284 | 186.69 | 119 | 219.28 | 140 | 1.17 |
| DEC 31 | 51,688 | NA | NA | NA | NA | NA |
| | | | 137.63* | | 129.51* | |

* DEC. FIGURES NOT AVAILABLE SO DIVIDED BY 334, NOT 365

1979

| | EFF. POP | WATER SYST PMPG (MG) | GAL WATER PER CAP. DAY | SEWER FLOWS (MG) | GAL SEWAGE PER CAP. DAY | RATIO OF SEWAGE FLOWS TO WATER PMPG. |
|---|---|---|---|---|---|---|
| JAN 31 | 49,258 | 190.86 | 125 | 227.35 | 149 | 1.19 |
| FEB 28 | 49,220 | 165.53 | 120 | 204.79 | 149 | 1.24 |
| MAR 31 | 49,011 | 181.54 | 119 | 228.89 | 151 | 1.26 |
| APR 30 | 48,896 | 185.89 | 127 | 210.40 | 151 | 1.13 |
| MAY 31 | 48,975 | 175.04 | 115 | 193.53 | 127 | 1.11 |
| JUN 30 | 50,317 | 234.72 | 155 | 200.83 | 133 | .86 |
| JUL 31 | 50,070 | 299.78 | 193 | 203.89 | 131 | .68 |
| AUG 31 | 48,670 | 289.43 | 192 | 201.79 | 133 | .70 |
| SEP 30 | 48,429 | 265.41 | 183 | 178.85 | 123 | .67 |
| OCT 31 | 48,921 | 238.29 | 157 | 151.81 | 100 | .64 |
| NOV 30 | 48,841 | 184.97 | 126 | 160.60 | 109 | .87 |
| DEC 31 | 48,259 | 141.12 | 94 | 125.39 | 84 | .89 |
| | | | 142.29 | | 128.45 | |

1980

| | EFF. POP. | WATER SYST PMPG (MG) | GAL WATER PER CAP. DAY | SEWER FLOWS (MG) | GAL SEWAGE PER CAP. DAY | RATIO OF SEWAGE FLOWS TO WATER PMPG. |
|---|---|---|---|---|---|---|
| JAN 31 | 49,559 | 126.22 | 82 | 146.11 | 95 | 1.16 |
| FEB 28 | 49,700 | 129.63 | 93 | 144.26 | 104 | 1.11 |
| MAR 31 | 49,787 | 170.92 | 111 | 147.19 | 95 | .86 |
| APR 30 | 50,089 | 207.66 | 138 | 156.51 | 104 | .75 |
| MAY 31 | 50,099 | 223.25 | 144 | 218.49 | 141 | .98 |
| JUN 30 | 51,546 | 300.99 | 195 | 183.03 | 115 | .61 |
| JUL 31 | 51,305 | 372.11 | 234 | 190.35 | 120 | .51 |
| AUG 31 | 50,929 | 368.52 | 233 | 204.57 | 130 | .56 |
| SEP 30 | 49,812 | 291.17 | 195 | 194.51 | 130 | .67 |
| OCT 31 | 50,418 | 245.74 | 157 | 203.10 | 130 | .83 |
| NOV 30 | 50,462 | 212.73 | 141 | 186.85 | 120 | .88 |
| DEC 31 | 51,460 | 204.31 | 128 | 173.74 | 109 | .85 |
| | | | 154.61 | | 116.17 | |

1981

| | EFF. POP. | WATER SYST PMPG (MG) | GAL WATER PER CAP. DAY | SEWER FLOWS (MG) | GAL SEWAGE PER CAP. | RATIO OF SEWAGE FLOW TO WATER PMPG |
|---|---|---|---|---|---|---|
| JAN 31 | 51,504 | 196.52 | 123 | 163.49 | 102 | .83 |
| FEB 28 | 51,626 | 190.77 | 132 | 146.10 | 101 | .77 |
| MAR 31 | 51,526 | 214.94 | 135 | 172.61 | 108 | .80 |
| APR 30 | 51,323 | 212.90 | 134 | 172.82 | 112 | .81 |
| MAY 31 | 50,851 | 236.53 | 150 | 172.83 | 113 | .73 |
| JUN 30 | 50,097 | 251.14 | 167 | 230.53 | 153 | .92 |
| JUL 31 | 49,410 | 284.90 | 186 | 181.78 | 119 | .64 |
| AUG 31 | 48,733 | 302.54 | 200 | 174.68 | 116 | .58 |
| SEP 30 | 48,249 | 241.75 | 167 | 164.02 | 113 | .68 |
| OCT 31 | 48,334 | 216.94 | 145 | 169.72 | 113 | .78 |
| NOV 30 | 48,317 | 177.54 | 122 | 141.09 | 97 | .79 |
| DEC 31 | 47,805 | 171.40 | 116 | 133.93 | 90 | .78 |
| | | | 148.22 | | 111.73 | |

1982

| | EFF. POP. | WATER SYST PMPG (MG) | GAL WATER PER CAP. DAY | SEWER FLOWS (MG) | GAL SEWAGE PER CAP. DAY | RATIO OF SEWAGE FLOWS TO WATER PMPG |
|---|---|---|---|---|---|---|
| JAN 31 | 48,830 | 176.94 | 117 | 127.27 | 84 | .72 |
| FEB 28 | 49,262 | 159.15 | 115 | 114.25 | 83 | .72 |
| MAR 31 | 49,572 | 176.76 | 115 | 124.30 | 81 | .70 |
| APR 30 | 49,663 | 175.47 | 118 | 128.63 | 86 | .73 |
| MAY 31 | 49,737 | 200.89 | 130 | 161.16 | 105 | .80 |
| JUN 30 | 48,889 | 228.70 | 156 | 167.50 | 114 | .73 |
| JUL 31 | 48,332 | 270.48 | 181 | 175.83 | 117 | .65 |
| AUG 31 | 47,864 | 353.21 | 238 | 187.87 | 131 | .53 |
| SEP 30 | 47,402 | 282.01 | 198 | 165.04 | 116 | .59 |
| OCT 31 | 47,371 | 217.47 | 148 | 157.97 | 108 | .73 |
| NOV 30 | 47,621 | 174.29 | 122 | 142.51 | 100 | .82 |
| DEC 31 | 46,822 | 157.66 | 109 | 134.81 | 93 | .86 |
| | | | 145.40 | | 101.94 | |

1983

| | EFF. POP. | WATER SYST PMPG (MG) | GAL WATER PER CAP. DAY | SEWAGE FLOWS (MG) | GAL SEWAGE PER CAP. DAY | RATIO OF SEWAGE FLOW TO WATER PMPG |
|---|---|---|---|---|---|---|
| JAN 31 | 46,964 | 160.74 | 110 | 136.05 | 93 | .85 |
| FEB 28 | 46,964 | 151.03 | 115 | 138.47 | 105 | .92 |
| MAR 31 | 47,017 | 167.23 | 94 | 155.00 | 106 | .93 |
| APR 30 | 47,017 | 175.95 | 125 | 128.58 | 91 | .73 |
| MAY 31 | 47,017 | 208.82 | 143 | 154.77 | 106 | .74 |
| JUN 30 | 47,180 | 233.11 | 165 | 163.24 | 115 | .70 |
| JUL 31 | 46,951 | 264.64 | 182 | 164.51 | 113 | .62 |
| AUG 31 | 46,951 | 266.94 | 183 | 168.12 | 115 | .63 |
| SEP 30 | 46,951 | 244.35 | 173 | 146.03 | 104 | .60 |
| OCT 31 | 46,951 | 195.93 | 135 | 139.67 | 96 | .71 |
| NOV 30 | 46,951 | 148.49 | 105 | 124.76 | 88 | .84 |
| DEC 31 | 46,951 | 173.17 | 119 | 128.04 | 88 | |
| | | | 137.55 | | 101.66 | |

average of 20% more sewage than water usage. Also, the yearly averages of sewage flow are about 25% greater for 1978 and 1979 compared to 1982 and 1983. After the meter replacement, sewage flowrates fell back to expected levels.

Figure 4 is a plot comparing the water usage and sewage flow monthly for the period January, 1978, through June, 1984. Both amounts vary throughout the year, as shown, but the water usage per capita remains relatively constant from year to year. The sewage flow per capita, on the other hand, varied significantly and some very large flows were recorded before the meter was replaced. Using the 3 years from July, 1981, through June, 1984, the average per capita sewage flow is 101 GPD. The 4 year time period from January, 1978, through December, 1981, has an average per capita sewage flow of 121 GPD. With an average effective population of 50,000 this difference totals about 365 MG per year additional sewage for the 1978-1981 time period and a total of 1,460 MG overall. This difference seems to be at least partially attributable to the sewer meter problems mentioned earlier.

Bohannan-Huston Inc. metered sewage flows at selected locations (see Appendix L) within several of the main post subsystem areas. These measurements were made for several reasons: to help estimate per capita flows from the various areas such as housing, barracks, and offices; to determine flow characteristics of the different subareas; and to determine the times at which

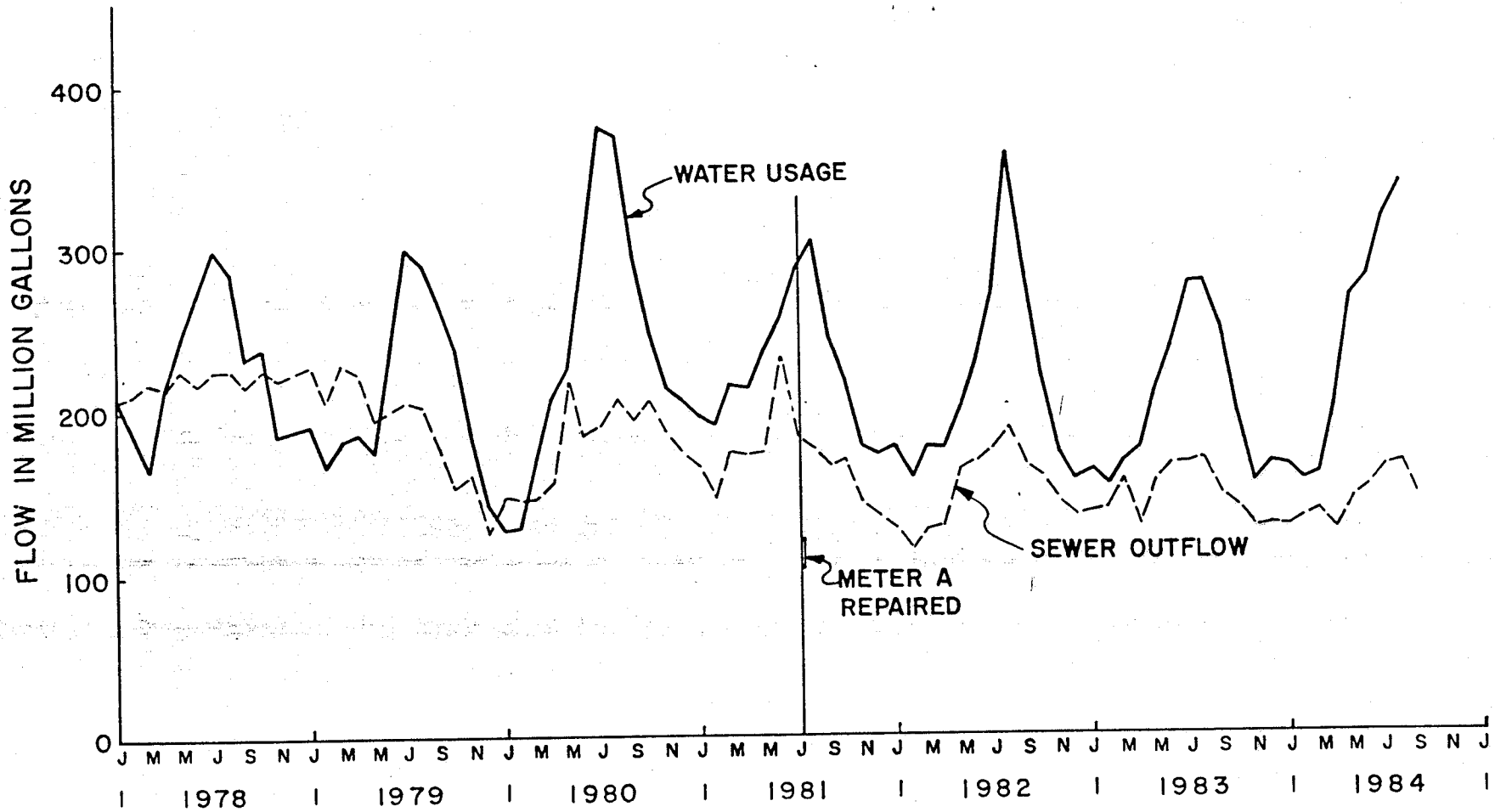



FIGURE 4

PLOT OF WATER USAGE AND SEWER FLOWS
FOR PERIOD 1978 TO JUNE 1984
FORT HOOD, TEXAS

peak flows occurred. The flows and conclusions drawn from these measurements are given in Appendix C. The results indicate that the estimates of sewage flow used for residents (100 GPD) and non-residents (30 GPD) are very reasonable (within 7%) for Fort Hood. Although the measurements show more flow per capita, they were made during the summer and, as indicated by Table 3, Fort Hood produces more flow during the summer.

## 2.4 Flow Characteristics

The criteria set forth in the applicable Army technical manuals and industry standards state that gravity sewers should be designed as follows:

- Maximum pipe capacity should be equal to or greater than expected peak flow.
- Minimum sizes are 6 inch for house connections and 8 inch for all other lines.
- Minimum flow velocity should be 2 fps when the pipe is full, 1.5 fps at the average rate of flow under normal conditions, and 1.2 fps absolute minimum in extenuating circumstances when substantial cost savings can be realized by allowing the flatter slope.

Force mains will not be less than 4 inches in diameter, should be large enough to convey the maximum expected pumping rate without excessive friction loss, and the flow velocity should be between 2 and 5 fps at average pumping rates.

The Continuity Equation and the Manning Equation were used to compute the flow characteristics of each pipe segment between successive manholes. The two equations are given as follows:

$$Q = VA$$

(Continuity Eq.)

Q = pipe flow in $ft^3/sec$
V = velocity in ft/sec
A = cross-section of flow area in $ft^2$

and

$$V = \frac{1.49}{n} R^{2/3} S^{1/2}$$

(Manning Eq.)

V = velocity in ft/sec
n = Manning roughness coefficient
R = hydraulic radius of flow (ft)
S = slope of pipe in ft/ft

A flow rate of 100 GPD per capita was assumed for the analysis. Manning coefficients were as follows:

| Pipe Material | "n" Value |
|---|---|
| Slip-lined or PVC | 0.011 |
| VCP or AC | .013 |
| cast iron or DI | .014 |
| RCP | .015 |

A computer program was developed by Bohannan-Huston Inc. to aid in the computation of flows and velocities. Each subarea of the Main Post and North Fort Hood is listed separately in Appendix D and includes: the upstream and downstream manhole identification for each pipe segment; invert and rim elevations of both manholes; pipe segment length, size and material; slope; the contributing population; the average flow rate and velocity; the peak flow rate and velocity; the pipe-full flow rate and velocity; and the ratio of the peak flow rate to the pipe-full flow rate. There are also printed warnings in the listings when velocities are less than recommended.

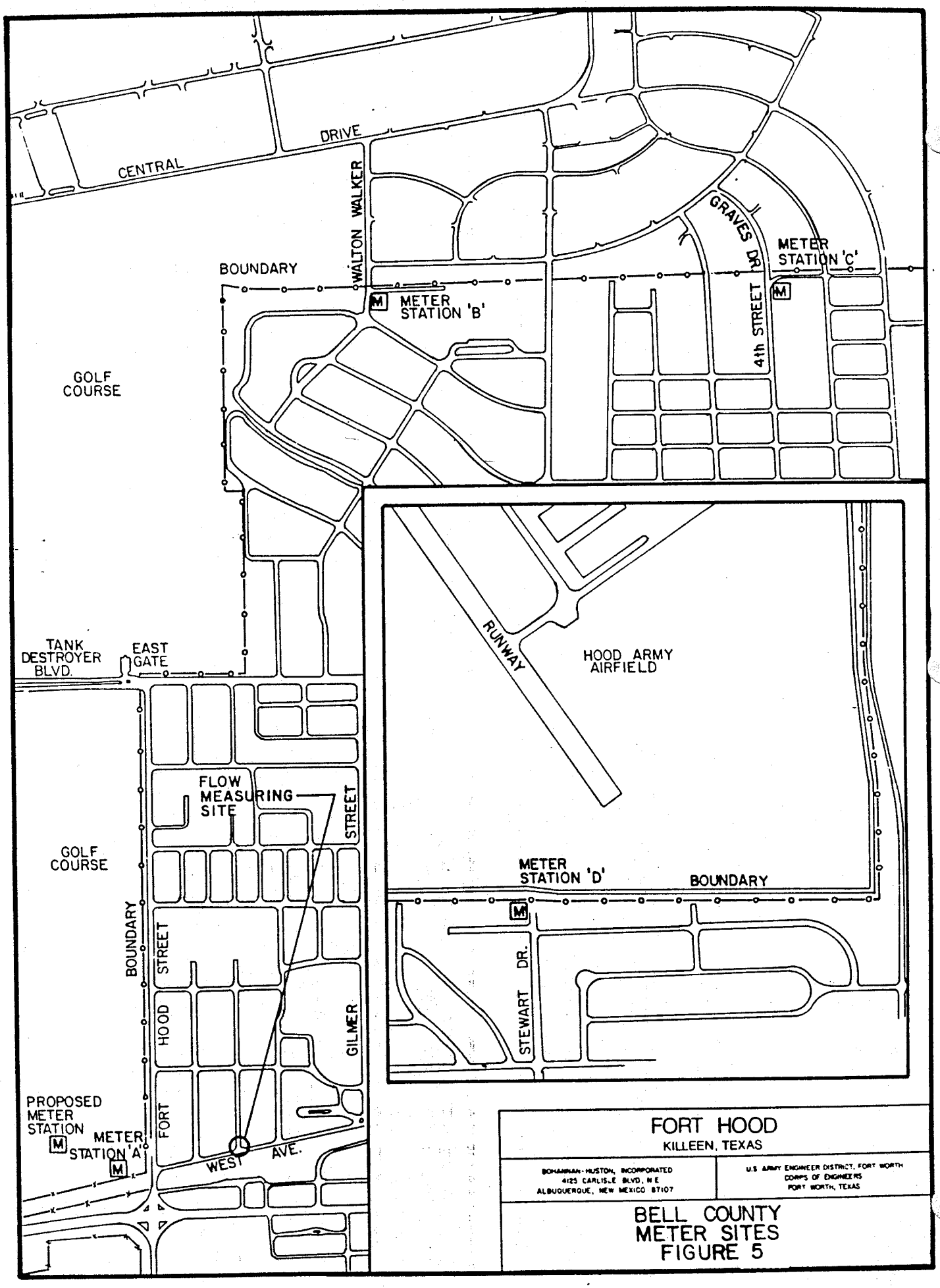
## 3.0 MAIN POST ANALYSIS

The original portion of the Main Post was served by a branching gravity system. As the post expanded additional sewer systems were added, several of which required lift stations to pump the sewage up to the original system. As the sewage leaves the Main Post, it is measured at one of four metering stations, then flows approximately 2 miles through Killeen to the Bell County Treatment Plant located at 28th Street and South Nolan Creek.

### 3.1 Metering Stations

Currently there are four metering stations that measure the outflow from Fort Hood. They are shown in Figure 5 and described as follows:

- Meter A - a 20 inch orifice meter situated on the 30 inch main gravity outflow, located near the intersection of U.S. Highway 190 & FM 440. Meter A records over 90% of the sewage and measures the flows generated within the subareas 1-18.
- Meter B - an 8 inch meter on an 8 inch gravity line, located on Walton Drive near the reservation boundary. Meter B records the flows generated from sewer subarea 19 (a portion of Walker Village).
- Meter C - a 10 inch meter on a 10 inch gravity line located on Graves Drive near the reservation boundary. Meter C records the flows generated by sewer study area 20 (the remainder of Walker Village).
- Meter D - an 8 inch meter on an 8 inch gravity line located on Stewart Drive near the reservation boundary. Meter D records the flows generated by sewer study area 21 (Fort Hood Army Airfield).


CENTRAL DRIVE
WALTON WALKER
GRAVES DR.
METER STATION 'C'
BOUNDARY
METER STATION 'B'
4th STREET
GOLF COURSE
RUNWAY
HOOD ARMY AIRFIELD
TANK DESTROYER BLVD.
EAST GATE
FLOW MEASURING SITE
STREET
GOLF COURSE
METER STATION 'D'
BOUNDARY
BOUNDARY
STREET
HOOD
GILMER
STEWART DR.
PROPOSED METER STATION
METER STATION 'A'
FORT
WEST AVE.
FORT HOOD
KILLEEN, TEXAS
BOHANNAN-HUSTON, INCORPORATED
4125 CARLISLE BLVD. N.E.
ALBUQUERQUE, NEW MEXICO 87107
U.S. ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS
BELL COUNTY
METER SITES
FIGURE 5

Bell County maintains meter reading data on all the meters. Meter A is a Sparling Sonic meter that uses a sonic pulse to measure the instantaneous velocity across the pipe. Once the velocity is obtained, the flow is computed assuming full pipe conditions. This meter is designed to be accurate to ± .2% as long as full pipe conditions exist and the velocity does not drop below 1 fps. Currently under the MCA program, a parallel outfall line is being built which will provide additional outfall capacity prior to Meter "A". As part of this project, Meter A will be relocated into a siphon system along the new pipe, to insure full pipe conditions. A new 6 inch meter will be installed to monitor the existing line.

As a check on the accuracy of Meter A, several flow measurements were made by Bohannan-Huston Inc. personnel using a USGS Pygmy meter at a manhole 2 blocks downstream of the meter. There were slight variations between the metered and measured flow rates, but the differences averaged less than 3%, which is well within the accuracy range of the measurements. A list of the measurements and corresponding metered flow estimates is given in Appendix E. Based on the data, Meter A appears presently to be working properly. Historical data further indicates the meter has been working properly since being replaced in June, 1981.

Records kept by Bell County on flow amounts at the remaining three meters show that the flows are reasonable for the populations serviced. Since the volume through these meters represents only a small portion of the total Fort Hood flow, no measurements were made to verify the accuracy of the meters.

## 3.2 Infiltration

Inflow and infiltration are the result of either groundwater or rainfall-runoff entering the sanitary sewer system. Groundwater levels at Fort Hood are significantly below the sewer lines and infiltration potential is therefore slight.

Surface runoff can enter the sewer system through cross-connects to storm sewers, nonwatertight manholes, and pipe cracks. The number of cross-connects is probably very small since field investigations and review of as-built data did not reveal any. Some runoff does enter the sewer system, however, since there is a significant increase in sewage flows after heavy rainstorms.

The inflow/infiltration analysis was based upon comparing wet-day sewage flows to dry-day sewage flows. Appendix F is a plot of the daily sewage flows for 1982, along with a plot of the 1982 rainfall record. Only the largest rainstorms produced any measureable additional sewage, while smaller storms added little or no flow. Four of the wettest periods during 1983 were selected for additional analysis. A representative dry-day hydrograph was superimposed on the wet-day hydrographs (Appendix G) and the incremental increased sewage was attributed to the rainfall. The results of the analysis of the four wet periods is described in Table 4.

TABLE 4
SUMMARY OF INFLOW/INFILTRATION ANALYSIS

| Period | Total Rainfall (Inches) | Incremental Increase in Sewage per inch of Rainfall (MG/Inch) |
|---|---|---|
| February 9, 1983 | 1.07 | 1.14 |
| February 20, 1983 | 1.49 | .83 |
| March 4-5, 1983 | 3.18 | .90 |
| May 10-11, 1983 | 2.67 | .42 |
| | Average = | .82 |

Based on this analysis, rainstorms greater than one inch will increase sewage flow at an approximate rate of 0.82 MG per inch of rainfall. Lesser rainstorms will increase flow, but not significantly. A very conservative estimate of increased sewage volume due to inflow/infiltration could be made by assuming one-half of the average annual rainfall produces sewage at a rate similar to heavy rainstorms. Therefore, an annual rainfall amount of 34 inches would produce 13.94 MG of additional sewage, representing an increase of less than 1% of the total sewage from Fort Hood.

In summary, there is some infiltration during and immediately after heavy rainstorms, but the total flow increase is slight and system improvements to reduce inflow/infiltration need only be part of other necessary improvements.

### 3.3 Septic Tanks

The purpose of the septic system analysis is to determine whether buildings using septic systems can feasibly be tied into an existing gravity flow collection system. There are 19 buildings which are known to use septic systems and interviews with staff and maintenance personnel revealed no major maintenance problems at this time. The analysis indicates that all but six buildings can be tied into the existing gravity collection system. However, due to the construction costs and the fact that all the septic systems are functioning adequately, it is recommended that these systems be connected to the existing gravity lines only when it would be a feasible addition to other necessary construction.

Septic tanks are usually installed to service facilities in remote locations, low lying depressed areas where a lift station would be required, or where facilities cannot tie directly into a gravity system due to obstructions. Septic tanks and drain fields act as their own treatment facility. The septic tank provides primary settling and begins the digestion process, the drain field disposes of the effluent, while native soils filter out the remaining solids before they can enter the groundwater.

All septic tanks located during the field survey or by as-built information are described in Table 5. This does not rep-

TABLE 5

SEPTIC TANKS FORT HOOD

| Bldg. Number | Dist to Near. MH | MH Ident. Number | Bldg. Elev. (Ft) | Sewer Invert (Ft) | Slope Ft/Ft | No. of Storage Tanks | Capacity (Gallons) |
|---|---|---|---|---|---|---|---|
| 5000 (1) | 2100 | 13C2C | 948 | 925.05 | .0091 | 1 | 500 |
| 56001 | 2250 | A-125D | 936 | 895.88 | .016 | 1 | 500 |
| 56011 | 1950 | A-125D | 938 | 895.88 | .020 | Unknown | |
| 90001 | 2800 | L-85 | 1174 | 978.18 | .07 | 1 | 500 |
| 90056 (2) | 2000 | L-166 | 985 | 1019.65 | -- | 1 | 500 |
| 90063 (3) | 10250 | L-202 | 1200 | 1088.49 | -- | 1 | 500 |
| 90065 (3) | 10300 | L-202 | 1200 | 1088.49 | -- | 1 | 1000 |
| 90066 (3) | 10300 | L-202 | 1200 | 1088.49 | -- | 1 | 750 |
| 90087 (4) | 3400 | L-148 | 1016 | 987.12 | 0.007 | Unknown | |
| 90088 (4) | 3400 | L-148 | 1016 | 987.12 | 0.007 | 3 | |
| 92045 (2) | 10000 | L-194 | 1100 | 1036.42 | -- | 1 | 500 |
| 92050 (2) | 10000 | L-194 | 1101 | 1036.42 | -- | Unknown | |
| 92060 | 3700 | L-202 | 1222 | 1088.49 | 0.036 | 1 | 500 |
| 92065 | 2600 | L-202 | 1205 | 1088.49 | 0.045 | 1 | 500 |
| 92066 | 2200 | L-202 | 1204 | 1088.49 | 0.053 | 1 | 500 |
| 92068 | 2600 | L-202 | 1201 | 1088.49 | 0.043 | Unknown | |
| 92072 | 2700 | L-202 | 1212 | 1088.49 | 0.046 | 1 | 500 |
| 92076 | 1800 | L-202 | 1200 | 1088.49 | 0.093 | 2 | 500 |
| 92080 | 1200 | L-194 | 1170 | 1036.42 | 0.108 | 2 | 500 |

(1) Will require MH's in excess of 20 ft. depths.
(2) Requires a lift station to drain to gravity system.
(3) Building situated on top of Radar Hill and would require lift station to drain over ridges between building and sewer tie.
(4) Scheduled to be connected to West Fort Hood collection system as part of new hangar project.

resent a complete list of septic tanks because, as the post expanded, some of the existing septic systems were abandoned or incorporated into the gravity collection system.

Maintenance of septic tanks and drain fields is performed "as-needed". Most of those with chronic problems requiring frequent pumping have been either improved with new tanks and drain fields or replaced with lift stations. While a regular pumping program is not necessary for proper operation, a minimal inspection program should be initiated. The program, conducted by DFE personnel, should consist of visual inspections at least once yearly. Systems nearing capacity at the time of inspection could be pumped prior to reaching an overflow condition.

If buildings need to be tied to the gravity system, then several can be connected onto one outfall line to help reduce construction costs. Buildings 90087 and 90088 are scheduled to be tied into the existing gravity system as part of the new hangar project at West Fort Hood. Facilities 56001 and 56011 could use a common outfall line. Sewage from buildings 92060 through 92080, located in West Fort Hood, could be collected with a central line and conveyed northeast to manhole L-202. The two remaining facilities not requiring lift stations, buildings 5000 and 90001, would each need a separate outfall line.

The estimated construction cost of tying the 11 buildings into the gravity flow sewer system is shown in Appendix H. The six facilities that could not be connected by gravity flow would require a lift station and force main to reach a manhole.

In summary, septic systems could be routed to a gravity subsystem, but all are generally functioning properly and do not need to be tied into the existing collectors. Maintenance is minimal, with only an occasional pumping of the tanks required, and loading on the systems is not creating problems. If increased loading is expected, conversion to the gravity system may be necessary. However, it is recommended that the septic tanks not be tied into the gravity sewers at this time.

### 3.4 Lift Stations

Lift stations are used to pump sewage from low-lying areas to the gravity system. The general operation of the lift stations is satisfactory. They receive regular maintenance and the housings are basically adequate to protect against vandalism and the elements. Appendix L (Location Maps) shows the locations of the lift stations and Table 6 is a tabulation of the important components of each. A more detailed description of each lift station, including service area, specific equipment, and elevation data, is included in Appendix I.

TABLE 6

LIFT STATION DATA
FORT HOOD, TEXAS

| Lift Staton | Analysis Subarea | Effective Population | Estimated Peak Flow (GPM) | TDH @ Max. Discharge (ft.) | Number of Pumps | Individual Rated Pump Capacity (GPM) | Max. Discharge (All Pumps) (GPM) | Force Main Dia. (in) |
|---|---|---|---|---|---|---|---|---|
| 4115 | 6 | 87 | 24 | 27.25 | 2(1) | 150 | 188 | 4 |
| 8001 | 17 | 3460 | 877 | 1-25.5<br>2-35.7 | 3 | 300 | 2107(2) | 8 (2 lines) |
| 9534 | 17 | 110 | 30 | — | 1 | 100 | - (3) | 6 |
| 38020 | 4 | 67 | 19 | — | 1 | 150 | - (3) | 4 |
| 41012 | 4 | 2300 | 591 | 86 | 3 | 365 | 525 | 8 |
| 41013 | Inactive | — | | — | — | — | — | — |
| 50002 | Removed | — | | — | — | — | — | — |
| 51400 | 1,2, & 3 | 8516 | 2009 | 148 | 3 | 825 | 1310 | 12 |
| 52380 | 1 | 3790 | 953 | 62.7 | 3 | 500 | 1015 | 10 |
| 90012 | 9 | 9 | 3 | 22 | 2 | 250(2) | 400 | 4 |
| 90049 | 9 | 33 | 9 | 39.2 | 2 | 300 | 645 | 6 |
| 93040 | 8 & 9 | 1877 | 489 | 174.5 | 2 | 1000 | 1019 | 10 |

(1) At time of field investigation, one pump inoperative due to scheduled maintenance

See Appendix I for more detailed information on the lift stations.

(2) Pumps not operating within mfgr's spec'd range. See text.

(3) No pump curve data available.

Two of the lift stations do not meet the peak flow design criteria and two more are outside the manufacturer's recommended limits of efficient operation.

Lift station 51400, located at the Clear Creek Golf Course, provides service for subareas 1, 2, and 3, with a design effective population of 8516. Lift station 41013 was designed to operate in conjunction with station 51400. However, station 41013 had major unresolved mechanical problems in that several pump shafts were sheared off during operation. Post personnel analyzed the sewer system and determined that station 51400 could handle the sewer flows and station 41013 was therefore removed from service. This report finds that while station 51400 can convey the average daily flows of 590 GPM, there is insufficient capacity for peak design loading. During peak flow periods, the lift station may experience some surcharging. Since no problems of this nature have been reported thus far, it is apparent that predicted peak flows have not materialized. However, if surcharging does become a problem, Lift station 41013 could be put back onto operation, either with new pump equipment or by repairing the original units. A trash screen or communitor would help prevent solids entering the pump intakes, which probably caused the problems encountered previously.

Lift station 41012, located southeast of Battalion Avenue at the Clear Creek Road intersection, provides service for subarea 4 and also conveys discharge from lift station 38020. The effec-

tive population is 2,300 people. As shown in Table 6, the maximum discharge from the station is about 89% of the peak flow expected. Under normal circumstances, this would probably not cause problems. However, during the field inspection it was noted there had been standing sewage in the dry well. Maintenance personnel stated they had experienced trouble obtaining spare parts and that cleaning clogged pumps was difficult because the cleanouts are not easily accessed. The marginal ability of this station to handle peak flow may be contributing to the problem. For a minimal cost, the impeller sizes can be increased to 9.75 inch diameter. Although not a completely effective repair, the added capacity (565 gpm) will alleviate many possible surcharges in the future.

Lift stations 8001 and 90012, while certainly capable of handling the flows received, are operating on the pump curves significantly below the manufacturer's recommended limits. Essentially, the stations are over designed, meaning that the pumping rate is very high, but efficiency levels are low, less than 50%. Changing to smaller diameter impellers would help somewhat, but not greatly. Replacing the pumps with units more closely matched to the flow and head curves would save money on energy costs, but the equipment cost would offset the benefits for many years. Since the stations are performing satisfactorily and have not experienced major problems, it is recommended that no alterations be made.

All other lift stations have adequate capacity and seem to be functioning properly. A complete inventory of the lift stations is given in Appendix I, including a listing of all pumps, motors, equipment, and elevations.

### 3.5 Sewage Treatment

The sewage from Fort Hood is treated by the Bell County Waste Control and Improvement District. Flow from the main outfall line is measured at Meter A, then travels about two miles through a 30 inch VCP line to the treatment plant located in Killeen at 28th Street and South Nolan Creek. Flow passing through the other three meters into the Killeen collection system travels to the same treatment plant.

The County's treatment plant, in operation since 1970, uses the contact stabilization mode of the activated sludge process to treat the raw sewage. The effluent is chlorinated and discharged into South Nolan Creek. Excess sludge is stabilized in aerobic digesters, dewatered by vacuum filters, and disposed of at an off-site sanitary landfill. The plant is equipped with a storm water diversion weir located just upstream of the flow indicator-recorder. This weir allows flows in excess of 18 MGD to spill over into two 0.5 MG clarifiers for storage and future treatment.

### 3.6 Summary of Recommendations, Main Post

The main post sewer system can be characterized as having many lines with very flat slopes. The resulting slow moving

sewage causes several problems, including greater sediment build-up and increased hydrogen sulfide generation, which corrodes concrete pipe. Many areas have concrete pipe, some as much as 40 years old and probably no longer capable of carrying the design flows. A listing, by subarea, of significant problems and suggested corrective measures may be found in Appendix D. General sewer location maps for the Main Post, West Fort Hood and North Fort Hood are included in Appendix L.

The gently rolling, relatively level topography of Fort Hood has forced construction of equally level sewer lines, leading to the low velocities generally encountered in the pipes. Increasing sewer line slopes would require extensive construction and additional lift stations and is therefore not economically feasible. To determine the extent of damage to the lines, television inspection of the selected reaches listed in Table 7 is recommended. They have been chosen for the process because they represent typical installations in the various subsystem areas of Fort Hood and, in several cases, also show signs of blockage problems, evidenced by surcharging in upstream manholes. Although the segments are listed in descending order of importance, all should undergo inspection for a comprehensive overview of the condition of sanitary sewers at Fort Hood. If major pipe failures are discovered in any lines, it is strongly urged that further videotaping take place to determine the extent of replacement or slip lining necessary to correct the problem.

Each segment in Table 7 is identified by subarea and manhole designations. On a set of location maps in Appendix J, the

**TABLE 7**
**TELEVISION INSPECTION - FORT HOOD**

| SEGM'T | SUB-AREA | AGE (YRS) | UPSTRM MH | | DNSTRM MH | LNGTH (FT) | PIPE MAT'L | SIZE | COST (1) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 13 | 24 | B7-6A | TO | B7-4 | 841 | RCP | 18" | $ 1,472.00 |
| 2 | 13/14 | 40 | R-25 | TO | R-23 | 689 | VCP | 30" | $ 1,206.00 |
| 3 | 5 | 40 | R-28A17 | TO | J-19A | 1,195 | RCP | 24" | $ 2,091.00 |
| 4 | 9 | 15 | L-201 | TO | L-199 | 800 | RCP | 8" | $ 1,400.00 |
| 5 | 18 | 22 | N-6F | TO | R-18 | 1,000 | CI/RCP | 12" | $ 1,750.00 |
| 6 | 21 | 18 | Z-11 | TO | Z-14 | 1,150 | RCP | 8/10" | $ 2,012.00 |
| 7 | 1 | 8 | 5-7L | TO | 5-7J | 501 | PVC | 8" | $ 877.00 |
| 8 | 8 | 15 | L-58 | TO | L-60 | 637 | RCP/VCP | 8" | $ 1,115.00 |
| 9 | 7 | 18 | E-59B | TO | E-59 | 432 | RCP | 8" | $ 756.00 |
| 10 | 2 | 9 | 1-1-2 | TO | 1-1 | 244 | VCP | 10" | $ 427.00 |
| 11 | 5 | 9 | W-109 | TO | W-88B4 | 538 | RCP | 10" | $ 942.00 |
| 12 | 20 | 26 | 4 | TO | 1 | 469 | RCP | 8" | $ 821.00 |
| 13 | 10 | 40 | D-4 | TO | D-2 | 693 | VCP | 12" | $ 1,213.00 |
| 14 | 3 | 11 | 1-4 | TO | 1-3 | 205 | PVC | 10" | $ 359.00 |
| 15 | NFH | 43 | 2-15 | TO | 2-18 | 1,505 | VCP | 21" | $ 2,634.00 |
| 16 | NFH | 42 | 100 | TO | 69 | 1,262 | VCP | 12" | $ 2,208.00 |
| 17 | 9 | | L-149 | TO | L-148 | 621 | VCP | 10" | $ 1,087.00 |
| | | | | TOTAL: | | 12,782 | | | $22,370.00 |

(1) Includes rodding ($.50/L.F.), Hydrocleaning ($.50/L.F.), and T.V. ($.75/L.F.).

recommended videotape reaches have been highlighted for further identification.

A systematic program of hydrocleaning will also help maintain the system and retard future line failures.

## 4.0 NORTH FORT HOOD

North Fort Hood, situated in the northern portion of the installation, is 16 miles north of the main cantonment. The camp, originally designed to support approximately 16,700 people, is used primarily during weekends and summer months by reserve units and for other exercises several times per year. Since its construction in 1942, irregular maintenance has been performed at the facility. This situation, along with problems associated with sporadic use, has resulted in a sewer collection system which is badly in need of cleaning and repair.

### 4.1 System Description

The North Fort Hood collection system, shown in Appendix L, is a composite of materials and pipe sizes ranging from 6 inch to 24 inch diameters. Due to the terrain of North Fort Hood, the pipe slopes are extremely flat, resulting in low velocities of sewage flow. Sediment deposition and corrosive gas concentrations caused by the slow flow, coupled with sporadic use of the facility and general lack of sewer maintenance, have caused considerable damage to the lines. Clogged reaches, broken sewers

and manhole lids, and missing lids are a few of the more serious problems.

The treatment lagoon was modified in 1977 to add a chlorine contact chamber and tertiary filter chamber. Sewage enters the first lagoon through a distribution box prior to beginning the treatment process. Four aerators located in the first stage add oxygen to the lagoon, improving the efficiency and loading capability. The heavy solids and particles settle out at this stage.

The second stage continues the digestion process and additional settling occurs. The tertiary filter removes any debris remaining before discharging into the chlorine contact chamber. A small recirculating pump also sends a portion of the flow from the tertiary filter back to the first lagoon for retreatment. In the chlorine contact chamber, chlorine is diffused into the effluent, destroying microbes in the water prior to discharge from the system.

**4.2 Population Loading**

Population loading at North Fort Hood was not based upon historical loadings, as was the case on the main post. Instead the population used to load and analyze the system was determined by the projected use of this area. The system was loaded using the population figures generated by post personnel and set at approximately 5650 people. Although the camp was originally designed to provide services for 16,700 personnel, the peacetime master plan use has been summer training for National Guard

personnel. Due to the remoteness of the installation, the population was treated as residential with no percentage of non-residents. From TM-814-3, the peaking factor is 1.47, making the design population 8,305. Since the field investigation coincided with the winter months, actual meter readings of sewage flows were not made to verify per capita contributions.

### 4.3 Inflow/Infiltration

The remoteness and lack of rainfall during the field investigation prevented obtaining meter readings on potential inflow due to storm water runoff, as well as a determination of historical waste generation rates. However, the investigation did reveal system deficiencies providing opportunity for inflow. The items listed in Table 8 will require repairs to reduce such inflow. With these repairs, any inflow caused by storm runoff will be reduced.

Infiltration of groundwater into the system is not a problem because of the greater depth of the water table in relation to the sewers and due to the somewhat impervious nature of the thick clay deposits in which most of the sewers were built.

### 4.4 System Analysis

Generally, the sewer system at North Fort Hood requires cleaning, some replacement, and repairs. Listed in Table 8 are

TABLE 8

COLLECTION SYSTEM REPAIR
NORTH FORT HOOD

| | | |
|---|---|---|
| 1. | Manhole 2-19 | Clean and regrout |
| 2. | Manhole 2-22 | Replace and adjust frame and lid to grade |
| 3. | Reach 2-22 to 2-23 | Replace broken pipe and encase stream crossing in concrete |
| 4. | Manhole 2-23 | Plug abandoned 8" CI pipe; regrout manhole |
| 5. | Reach 75-76 | Encase 24" stream crossing in concrete - Note: The 24" line at NFH is in design for slip lining. |
| 6. | Manhole 153 | Clean and grout |
| 7. | Reach 2-27 to 2-25 | Replace broken sewer pipe; encase stream crossing in concrete |
| 8. | Manhole 2-14 | Replace and adjust frame and lid to grade |
| 9. | Manhole 65 | Adjust frame and lid to grade |
| 10. | Manhole 71 | Adjust frame and lid to grade |
| 11. | Manhole 36 | Clean and grout fill |

the items required to bring the system up to minimum operable condition. The estimated cost for those steps in Table 8 is $53,100.00, the details of which are listed in Appendix K. Lack of slope and sporadic use have probably caused sediment buildup and hydrogen sulfide corrosion in the pipes. Repair and cleaning is the highest priority work needed on the North Fort Hood system. With those tasks accomplished, both the present summer and proposed future loads can be handled. The sewage lagoon and tertiary filter, while also neglected, will treat the design flow with routine maintenance.

### 4.5 Sewage Treatment

Sewage treatment at North Fort Hood consists of primary settling and digestion in a two-stage lagoon. Four aerators located in the first stage increase the treatment capacity of the lagoon. The effluent then enters a tertiary filter which removes any microorganisms and remaining suspended particles. The last step adds chlorine by diffusion in the chlorine contact chamber prior to discharging the final effluent into the Leon River basin.

The system capacity is based upon the BOD loading retention time and surface area of the lagoon. Without aerators, the loading would be limited to the field transfer rate, equal to the surface loading rate of 40 lbs/day/acre, times the surface area

of the lagoon. However, with the four aerators adding oxygen to the system the digestion process is enhanced, decreasing the required retention time and increasing the capacity. Additional data on the lagoon and equipment may be found in Appendix K.

The average GPCD for the camp is 100 gallons [2]. From the same regulation, using an individual waste generation rate of 0.20 lb BOD/Capita Day, a BOD concentration of 240 MG/l (.002 lb/gal.) in the influent results. To obtain an effluent BOD quality of 20 MG/l, the required percent removal is 92%. The aerators meet this rate with an average retention time of:

$$\text{Retention Time(T)} = \frac{\text{\% BOD Removal}}{(100\text{-\% BOD Removal})(\text{Ke})}$$

$$T = 15.3 \text{ days}$$

Note: Ke is conservatively used as 0.75 [9], versus 0.50 for colder climates.

Using the lagoon volume of 15.32 MG, the permissible daily flow into the lagoon for treatment is:

$$Q = V/T \text{ where, } V = \frac{15.32 \text{ MG}}{7.482 \text{ gal/cu. ft.}} = 2{,}047{,}580 \text{ cu. ft.}$$

$$Q = \frac{2{,}047{,}580 \text{ cu. ft.}}{15.3 \text{ days}}$$

$$= 133{,}829 \text{ cu. ft./Day}$$

or $= 1.00$ MGD

Based upon the permissible flow, the treatment pond can handle an effective population of:

$$\frac{1{,}000{,}000 \text{ GPD}}{100 \text{ GPCD}} = 10{,}000 \text{ personnel}$$

The daily BOD load on the system is the design population times the allowable loading rate of 0.20 lb BOD/Day or:

$$(8305)(0.20 \text{ lb BOD/Day}) = 1661 \text{ lb BOD/Day}$$

The oxygen required per hour to be supplied to the lagoon through the aerators is (based upon a BOD ratio of 1.3):

$$O(2R) = \frac{(\text{BOD Loading})(\text{BOD ratio})(\%\ \text{Removal})}{24 \text{ hr/Day}}$$

$$O(2R) = \frac{(1661 \text{ lb BOD/Day})(1.3)(0.92)}{24 \text{ hr./Day}}$$

$$= 82.77 \text{ lb./hr.}$$

The four aerators are rated to deliver a minimum of 160 lb/hr of O(2R), equivalent to 16,053 personnel using the above criteria.

Under normal operating conditions, the lagoon will handle flow from 10,000 personnel. Although this is nearly double the usual population, it is short of the original design figure of 16,700. The surplus aerating availability will allow some increase in loading, but the lagoon itself would have to be enlarged to approximately 25.5 MG to accommodate the design population.

The field investigation coincided with the slack period for North Fort Hood and as a result, the lagoon was in an anaerobic state. The chlorine contact chamber had dried sludge throughout the chambers, indicating the system had not been cleaned since it was last in operation. Lack of regular cleaning when the system is not in use will accelerate deterioration of the individual components.

The recirculation pumps and filters were not operated during the inspection but were believed to be in the same condition as the chlorine contact chamber. The lagoon will regenerate the microorganism population with sufficient time and loading. A regular cleaning program for the chlorine contact chamber, filters, and pumps is recommended and will alleviate premature replacement of these components.

It is further recommended that the lagoon be fenced to control access. Lack of proper fencing allows wildlife and livestock to drink untreated sewage, potentially passing viruses and diseases to humans. Estimated construction cost for the 2950 feet of 5-foot high fencing is $59,250.00.

### 4.6 Collection System

The North Fort Hood collection system is composed of various pipe materials and contains a total of 184 reaches. As mentioned, basic maintenance is required in several areas to make the collection system reasonably operational. Presently, the system consists of PVC, RCP, slipped lined and AC pipe with diameters ranging from 6-inch to 24-inch. A complete data listing for all lines is provided in the last section of Appendix D.

Existing pipe slopes range from adverse grades to a maximum of 0.055 ft/ft. Of the 184 total reaches, 46% show velocities of

less than 1.2 fps, which has caused sediment buildup throughout the system and debris accumulations in many manholes. Some portions are plugged to the extent of allowing virtually no flow. Due to the relative elevations of the collectors and the sewage lagoon, the system cannot be improved by increasing slopes. The low velocities could be eliminated by adding lift stations or abandoning the existing system and rebuilding, two options which are neither feasible nor cost effective. However, a thorough cleaning and maintenance program will keep the collector and interceptor lines flowing freely and minimize pipe deterioration. After completion of the work items listed in Table 8 such a program must be initiated.

The study identified three basic problem situations in the collection lines, including five reaches with adverse grades, ten having velocities of less than 1.5 fps under full pipe flow, and 84 reaches with velocities below 1.2 fps at average flow.

Shown in Table 9 are the reaches which have adverse grades and the estimated repair costs. They should be replaced to provide positive flow.

The ten reaches with full pipe velocities below 1.5 fps as shown in Table 11 will require regular cleaning and flushing. After each summer training cycle, the entire system should be cleaned and flushed. This regular maintenance will also remove

any sediment buildup in the 79 reaches having average flow velocities below 1.2 fps.

**TABLE 9**

**ADVERSE GRADES-NORTH FORT HOOD**

| Pipe | Reach | Diameter | Material | Cost Estimate |
|---|---|---|---|---|
| 36 | 37 | 18" | SL | $ 54,100.00 |
| 2-26 | 2-25 | 21" | VCP | 58,600.00 |
| 2-17 | 2-18 | 21" | VCP | 76,900.00 |
| 162 | 163 | 12" | PVC | 21,700.00 |
| 154 | 166 | 12" | PVC | 35,300.00 |
| | | | **Total** | **$246,600.00** |

TABLE 10

VELOCITIES BELOW 1.5 FPS

NORTH FORT HOOD

| Reach | | Diameter | Material |
|---|---|---|---|
| 114 | 113 | 8 | RCP |
| 83 | 84 | 8 | RCP |
| 69 | 68 | 12 | VCP |
| 45 | 43 | 8 | RCP |
| 38 | 2-31 | 12 | RCP |
| 2-13 | 2-14 | 24 | VCP |
| 2-14 | 2-15 | 24 | VCP |
| 2-15 | 2-16A | 24 | VCP |
| 2-17 | 2-18 | 24 | VCP |
| 2-23 | 2-22 | 24 | VCP |

## 4.7 Summary of Recommendations, North Fort Hood

The sanitary sewer system at North Fort Hood is adequate to handle the design flows but, due to flat slopes, requires cleaning and repair. The most immediate items needing attention are those listed in Table 8, estimated to cost $53,100.00, which will insure that all areas in use have sewer service.

After the system has been repaired, a complete cleaning and flushing should be performed. This will enable TV inspection of selected reaches. Furthermore, a regularly scheduled maintenance program to flush and clean the collection system should be established. This will increase the life of the sewer components and should be performed at least annually after summer training. It should also be extended to include the sewage lagoon, tertiary filters, and recirculating pumps as well. Total cost of the initial sewer cleaning, including the purchase of a Hydrojet vehicle, is estimated at $164,000.00. Thereafter, the labor for cleaning would be about $28,000.00 each time.

Television inspection of representative reaches (see Table 7, Page 36) is needed to assess the levels of corrosion damage and sediment deposition in the pipes. If, after the inspection, reconstruction of some reaches is necessary, slip lining the existing pipes is recommended.

Five adverse grades need repair, total cost of which is estimated at $246,600.00.

Lastly, the lagoon should be completely fenced to remove the health hazard created when livestock and wildlife drink the untreated waste. Estimated construction cost is $59,250.00.

The following is a summary of the measures recommended at North Fort Hood by this report and the cost associated with each:

**SUMMARY OF COSTS AT NORTH FORT HOOD**

| Item | Cost |
|---|---|
| System Rehabilitation | $ 53,100.00 |
| Hydrojet Equipment & Cleaning | 164,000.00 |
| Television Inspection | 4,800.00 |
| Adverse Grades | 246,600.00 |
| Sewage Lagoon Fencing | 59,250.00 |
| **Total** | **$527,750.00** |

## 5.0 REFERENCES


1. U.S. Environmental Protection Agency, December, 1975, Hand book for Sewer System Evaluation and Rehabilitation, PB-257 457.

2. Headquarters, Department of the Army, August, 1966 Sanitary Engineering, Sanitary and Industrial Waste Sewers, TM5-814-1.

3. Headquarters, Department of the Army, August, 1965, Sanitary Engineering, Sewage and Industrial Waste Pumping Stations, TM5-814-2.

4. Freese and Nichols, Inc., March, 1978, Sanitary Sewer Collection and Disposal, volume II of V.

5. Freese and Nichols, Inc., March, 1978, Sanitary Sewer System Evaluation.

6. Neenah Foundary Company, 1983, A Report on Inflow of Surface Water through Manhole Covers.

7. Karassik, Krutzsch, Fraser and Messina, 1976, Pump Handbook.

8. ASCE Manual Eng. Practice, vol. 37, 1960, Design and Construction of Sanitary and Storm Sewers.

9. Clark, Viessman and Hammer, 1977, Water Supply and Pollution Control, 3rd Edition, Harper & Row.

10. Headquarters, Department of the Army, August, 1965, Sanitary Engineering, Sewage - Treatment Plants, TM-814-3.

# APPENDIX A

# CLIMATOLOGICAL DATA

# FORT HOOD, TEXAS

| MONTH | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | ANN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **TEMPERATURE** | | | | | | | | | | | | | |
| Mean Monthly (°F) | 48 | 51 | 58 | 67 | 74 | 81 | 84 | 84 | 78 | 69 | 57 | 51 | 67 |
| Mean Maximum (°F) | 57 | 61 | 69 | 77 | 83 | 90 | 94 | 94 | 88 | 79 | 67 | 61 | 77 |
| Mean Minimum (°F) | 38 | 41 | 48 | 57 | 64 | 71 | 74 | 73 | 68 | 58 | 47 | 41 | 57 |
| Extreme Maximum (°F) | 86 | 89 | 101 | 97 | 98 | 107 | 109 | 106 | 105 | 101 | 91 | 89 | 109 |
| Extreme Minimum (°F) | 7 | 9 | 16 | 32 | 42 | 51 | 62 | 61 | 44 | 31 | 21 | 14 | 7 |
| **PRECIPITATION** | | | | | | | | | | | | | |
| Mean Monthly Precipitation (Inches) | 1.6 | 2.4 | 2.0 | 3.4 | 4.4 | 2.6 | 1.5 | 2.4 | 3.2 | 3.1 | 2.1 | 1.6 | 30.2 |
| Mean No. Days Precipitation (>01 in.) | 11.7 | 10.4 | 11.5 | 12.6 | 13.1 | 8.2 | 6.4 | 7.8 | 9.2 | 7.5 | 9.1 | 8.8 | 116.8 |
| Mean Monthly Snowfall (Inches) | .7 | .9 | T | T | 0 | 0 | 0 | 0 | 0 | T | .2 | .1 | 1.9 |
| Mean No. Thunderstorm Days | .96 | 1.9 | 3.7 | 5.6 | 6.5 | 4.9 | 3.6 | 4.4 | 3.6 | 2.1 | 1.3 | .8 | 39.4 |

**APPENDIX A**

**CLIMATOLOGICAL DATA FOR FORT HOOD, TEXAS**
**SEPTEMBER, 1950-JUNE, 1982**

# APPENDIX B

## FAMILY HOUSING
## BEDROOM COUNT

## FORT HOOD, TEXAS

## APPENDIX B

## FAMILY HOUSING - BEDROOM COUNT

| Housing Area | Housing Units 2-Br. | 3-Br. | 4-Br. | 5-Br. | Total | Total Population (Mil. & Dep.) |
|---|---|---|---|---|---|---|
| Patton Park | | 133 | | | 133 | 523 |
| Wainwright Heights | 39 | 188 | | | 227 | 854 |
| Pershing Park | 150 | 449 | 99 | | 698 | 2,695 |
| Chaffee Village | 294 | 380 | | | 674 | 2,362 |
| McNair Village | | 272 | | | 272 | 1,069 |
| Walker Village | 497 | 71 | | | 568 | 1,745 |
| Montague Village | 134 | 135 | 15 | | 284 | 1,000 |
| Venable Village | | | 200 | | 200 | 984 |
| Comanche Village I | 180 | | 100 | | 280 | 1,023 |
| Comanche Village II | 640 | | 330 | 30 | 1,000 | 3,689 |
| Comanche Village III | | 640 | 260 | | 900 | 3,794 |
| TOTAL | 1,934 | 2,268 | 1,004 | 30 | 5,236 | 19,738 |

# APPENDIX C

# METERED SUBAREA FLOWS

# FORT HOOD, TEXAS

## APPENDIX C

The daily flows in five manholes located throughout the post were recorded during the month of July and first week in August, 1983. Mannings Dipper Flow meters were used to measure total flow, depth, daily lows, and peaks through the system. The location of the six manholes are shown in Appendix I and are tabulated as follows:

1. Manhole 1-1-7 meters all the flow from Comanche Village II, which is subarea 2. Population 3618 resident with zero nonresident.

2. Manhole B-14 meters a portion of subarea 13, mainly the barracks in the 1600 block and a portion of family housing in McNair Village. Residential population is 990 and nonresident population 924.

3. Manhole A-3A meters all the flow from subarea 17, which includes the east half of Wainwright Heights and the barracks north and northeast. The residential population is 4557, and nonresident 3637.

4. Manhole HH-11 meters part of the flow from subarea 6. This area includes an industrial complex, the main post exchange, commissary, and field maintenance shop. There is no resident population and the nonresident population is 1735.

5. Manhole R-27 meters all the flows from subareas 1 through 13, including all of Chaffee Village and the area west. The resident population is 26,583 and nonresident 27,514.

Calculating the percentage difference between the metered and theoretical flows for the sites selected above produced differences ranging from 8% above to 11% below the corresponding theoretical flows using 100 gpcd. The data obtained from the measurements are shown in Table C.1.

## APPENDIX C

### TABLE C.1
### METERED FLOW MEASUREMENTS

| Manhole | Dates (1983) | Metered Flow $Q_{Avg}$ (Averaged Readings) MGD | Metered Flow $Q_{Peak}$ (Averaged Readings) MGD | Calculated Flow $Q_{Avg}$ MGD | Calculated Flow $Q_{Peak}$ MGD |
|---|---|---|---|---|---|
| 1-1-7 | 7/21-7/25 | .353 | .711 | .362 | 1.321 |
| B-14 | 7/16-7/20 | .126 | .225 | .1235 | .4653 |
| A-3A | 7/12-7/20 | .672 | 1.047 | .5648 | 1.975 |
| HH-11 (1) | 7/27-7/29 | .192 | .843 | .052 | .208 |
| R-27 | 7/12-7/15 | 3.162 | 4.712 | 3.484 | 9.454 |

The values measured for average flows correspond to within 7% of those calculated on the basis of populations. Differences are attributable to weekend readings (when flows are traditionally lower) and the fact that spot measurements are less likely to produce results close to theory than long-term readings.

Peak flow values metered are nearly 50% below the theoretical amounts. Calculation of peak flow in a system is a conservative, worst-case, analysis which includes a factor of safety in designing sanitary sewers and appurtenances. Army Technical Training Manual TM-814-1 shows a graph, Figure 1, for calculating the peak ratio factor for design. This factor is intended to simulate a situation in which all system users are contributing flow simultaneously at any given moment. As the population rises, the chances of that situation occurring decrease, hence the inverse relation of the factor versus population. Again, longer term measurements would no doubt bring the metered peak flows closer to those calculated.

(1) Large industrial service area. Not included in calculating % error margins.

# APPENDIX D

## SUBAREA SEGMENT ANALYSES AND RECOMMENDATIONS

## FORT HOOD, TEXAS

# APPENDIX D

## DIRECTORY


| SUBAREA | PAGE |
|---|---|
| 1 | D-4 |
| 2 | D-12 |
| 3 | D-18 |
| 4 | D-24 |
| 5 | D-30 |
| 6 | D-38 |
| 7 | D-44 |
| 8 | D-50 |
| 9 | D-56 |
| 10 | D-62 |
| 11 | D-68 |
| 12 | D-72 |
| 13 | D-78 |
| 14 | D-86 |
| 15 | D-90 |
| 16 | D-96 |
| 17 | D-100 |
| 18 | D-110 |
| 19 | D-116 |
| 20 | D-120 |
| 21 | D-126 |
| North Fort Hood | D-130 |

## APPENDIX D

The following subarea analyses include comments relating less than minimum specified velocities to the pipe material involved.

Minimum velocities for sanitary sewers are necessary to provide scouring action and prevent solids accumulations in pipe inverts. When such conditions occur, corrosive gases are generated which can have very damaging effects upon concrete pipe. Clay, PVC, and iron pipe materials are generally not harmed under the same circumstances.

When low velocity conditions in concrete pipe are encountered, therefore, the situation is noted in the subarea introduction. Future problems could easily arise in these high risk reaches.

## SUBAREA 1

Subarea 1 consists of the sanitary sewer system for the Comanche Village III family housing area, located at the west edge of the main post.

Flows are conveyed generally to the southeast, then routed northeast to Lift Station 52380. A 10-inch cast iron force main travels approximately 1700 feet to the wet well at Lift Station 51400, where the flows from Comanche Villages I and II are combined.

Average flow velocities below the specified minimum 1.2 FPS occur in 19 of the 152 reaches. These low velocities are not considered a major problem because the system consists of VC and PVC piping.

The only repair needed is at manhole 5-7J. Overflow conditions were reported in August, 1983 at manholes 5-7J and 5-7L due to debris collecting in the invert of manhole 5-7J. Regrouting of the invert is recommended to provide smoother flow through the manhole. Television inspection will indicate the general condition of sewer lines in the subarea.

| | |
|---|---|
| MH 5-7J -- Regrout Invert | $1,500.00 |

COMANCHE VILLAGE III
**********

AREA 1 ,AS DEFINED BY THE SANITARY SEWER ANALYSIS, COMPLETED BY BOHANNAN-HUSTON, INC., SEPTEMBER 1984.

COMMENT COLUMN "NOTES"
**********

EXCEPT AS NOTED:
> ELEVATIONS WERE OBTAINED THROUGH FIELD SURVEYS
> DISTANCES WERE GENERATED FROM COMPUTER PLOTS

A = INVERT BASED ON REPORT BY FREESE & NICHOLS (4/78)
B = DISTANCE BETWEEN MANHOLES IS SCALED
C = INVERT BASED ON "AS-BUILT" DRAWINGS
D = INVERT BASED ON TOPOGRAPHY & ADJACENT MANHOLE DATA
NA = NOT AVAILABLE
NF = NOT FOUND

COMMENT COLUMN "WARNINGS"
**********

W = ZERO OR ADVERSE SLOPE PRESENT
(PEAK FLOW MAY EXCEED PIPE CAPACITY)
X = PEAK FLOW EXCEEDS PIPE CAPACITY
(LOW VELOCITIES MAY BE PRESENT)
Y = FULL PIPE VELOCITY BELOW 1.5 FPS
(AVERAGE VELOCITY MAY ALSO BE LOW)
Z = AVERAGE VELOCITY BELOW 1.2 FPS

FORMER MANHOLE IDENTIFICATION NUMBERS ALSO APPEAR IN THE COMMENT COLUMN UNDER "NOTES"

| MANHOLES FROM MH ID | MANHOLES TO MH ID | INVERT ELEV FROM FT | INVERT ELEV TO FT | DIST FT | PIPE DIA IN | PIPE TYP | PIPE SLOPE FT/FT | POPULATION RES | POPULATION N-RES | RATE OF FLOW(MGD) AVERAGE QA | RATE OF FLOW(MGD) PEAK QP | RATE OF FLOW(MGD) CAPACITY QF | PIPE RATIO QP/QF | VELOCITY AVG FPS | VELOCITY PEAK FPS | VELOCITY CAP FPS | UPSTREAM MANHOLE RIM ELEV | COMMENTS NOTE | WARNING |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5-41 | 5-39 | 908.89 | 906.02 | 283. | 6. | PVC | 0.010 | 42 | 0 | 0.0042 | 0.0160 | 0.4316 | 0.04 | 1.08 | 1.65 | 3.40 | 915.59 | | Z |
| * MANHOLE 5-40 WAS NOT FOUND IN THE FIELD AND DOES NOT SHOW ON AS-BUILT DRAWINGS. | | | | | | | | | | | | | | | | | | | |
| 5-39 | 5-38 | 906.02 | 904.61 | 292. | 8. | PVC | 0.005 | 76 | 0 | 0.0076 | 0.0289 | 0.6414 | 0.05 | 0.97 | 1.44 | 2.84 | 910.68 | | Z |
| 5-38E | 5-38D | 918.92 | 918.28 | 98. | 6. | PVC | 0.007 | 25 | 0 | 0.0025 | 0.0095 | 0.3463 | 0.03 | 0.79 | 1.22 | 2.73 | 924.66 | | Z |
| 5-38D | 5-38C | 918.28 | 916.63 | 246. | 6. | PVC | 0.006 | 59 | 0 | 0.0059 | 0.0224 | 0.3255 | 0.07 | 1.00 | 1.49 | 2.57 | 924.86 | | Z |
| 5-38C | 5-38B | 916.63 | 911.44 | 180. | 6. | PVC | 0.029 | 101 | 0 | 0.0101 | 0.0384 | 0.7277 | 0.05 | 2.05 | 3.09 | 5.73 | 923.31 | | |
| 5-38B | 5-38A | 911.44 | 910.71 | 199. | 6. | PVC | 0.004 | 126 | 0 | 0.0126 | 0.0479 | 0.2596 | 0.18 | 1.06 | 1.56 | 2.05 | 915.32 | | Z |
| 5-38A | 5-38 | 910.71 | 904.61 | 153. | 6. | PVC | 0.040 | 143 | 0 | 0.0143 | 0.0543 | 0.8557 | 0.06 | 2.56 | 3.83 | 6.74 | 916.59 | | |
| * AT MH 5-38 | | | | | | | | 219 | 0 | | | | | | | | | | |
| 5-38 | 5-37 | 904.61 | 902.92 | 325. | 8. | PVC | 0.005 | 253 | 0 | 0.0253 | 0.0961 | 0.6655 | 0.14 | 1.42 | 2.11 | 2.95 | 909.20 | | |
| 5-37A | 5-37 | 920.78 | 902.92 | 341. | 6. | PVC | 0.052 | 67 | 0 | 0.0067 | 0.0255 | 0.9808 | 0.03 | 2.20 | 3.39 | 7.73 | 925.52 | | |
| * AT MH 5-37 | | | | | | | | 320 | 0 | | | | | | | | | | |
| 5-37 | 5-36 | 902.92 | 901.78 | 253. | 8. | PVC | 0.005 | 345 | 0 | 0.0345 | 0.1311 | 0.6195 | 0.21 | 1.48 | 2.18 | 2.75 | 907.55 | | |
| 5-36 | 5-35 | 901.78 | 900.67 | 230. | 8. | PVC | 0.005 | 387 | 0 | 0.0387 | 0.1471 | 0.6412 | 0.23 | 1.57 | 2.30 | 2.84 | 909.28 | | |
| 5-35 | 5-34 | 900.67 | 900.15 | 81. | 8. | PVC | 0.006 | 395 | 0 | 0.0395 | 0.1501 | 0.7395 | 0.20 | 1.74 | 2.57 | 3.28 | 908.57 | | |
| 5-34 | 5-33 | 900.15 | 899.52 | 126. | 8. | PVC | 0.005 | 395 | 0 | 0.0395 | 0.1501 | 0.6526 | 0.23 | 1.59 | 2.35 | 2.89 | 906.95 | | |
| 5-33C | 5-33B | 917.81 | 914.58 | 216. | 6. | PVC | 0.015 | 51 | 0 | 0.0051 | 0.0194 | 0.5241 | 0.04 | 1.32 | 2.01 | 4.13 | 923.71 | | |
| 5-33B | 5-33A | 914.58 | 911.66 | 191. | 6. | PVC | 0.015 | 51 | 0 | 0.0051 | 0.0194 | 0.5299 | 0.04 | 1.33 | 2.02 | 4.18 | 919.10 | | |
| 5-33A | 5-33 | 911.66 | 899.52 | 295. | 6. | PVC | 0.041 | 85 | 0 | 0.0085 | 0.0323 | 0.8694 | 0.04 | 2.19 | 3.33 | 6.85 | 917.32 | | |
| * AT MH 5-33 | | | | | | | | 480 | 0 | | | | | | | | | | |
| 5-33 | 5-32 | 899.52 | 898.31 | 251. | 8. | PVC | 0.005 | 489 | 0 | 0.0489 | 0.1858 | 0.6408 | 0.29 | 1.68 | 2.44 | 2.84 | 906.87 | | |
| 5-32 | 5-31 | 898.31 | 897.12 | 216. | 8. | PVC | 0.006 | 498 | 0 | 0.0498 | 0.1892 | 0.6851 | 0.28 | 1.77 | 2.58 | 3.04 | 905.42 | | |
| 5-31 | 5-30 | 897.12 | 896.67 | 168. | 8. | PVC | 0.003 | 523 | 0 | 0.0523 | 0.1987 | 0.4777 | 0.42 | 1.39 | 2.02 | 2.12 | 905.27 | | |
| 5-30D | 5-30C | 928.12 | 924.53 | 347. | 6. | PVC | 0.010 | 59 | 0 | 0.0059 | 0.0224 | 0.4359 | 0.05 | 1.22 | 1.84 | 3.43 | 935.05 | | |
| 5-30C | 5-30B | 924.53 | 920.42 | 212. | 6. | PVC | 0.019 | 109 | 0 | 0.0109 | 0.0414 | 0.5967 | 0.07 | 1.83 | 2.74 | 4.70 | 929.71 | | |
| 5-30B | 5-30A | 920.42 | 913.32 | 203. | 6. | PVC | 0.035 | 126 | 0 | 0.0126 | 0.0479 | 0.8015 | 0.06 | 2.35 | 3.53 | 6.32 | 926.54 | | |
| 5-30A | 5-30 | 912.01 | 897.36 | 328. | 6. | PVC | 0.045 | 168 | 0 | 0.0168 | 0.0638 | 0.9057 | 0.07 | 2.80 | 4.18 | 7.14 | 920.24 | | |
| * AT MH 5-30 | | | | | | | | 691 | 0 | | | | | | | | | | |

| MANHOLES FROM MH ID | TO MH ID | INVERT ELEV FROM FT | TO FT | DIST FT | DIA IN | PIPE TYP | SLOPE FT/FT | POPULATION RES | N-RES | RATE OF FLOW(MGD) AVERAGE QA | PEAK QP | CAPACITY QF | PIPE RATIO QP/QF | VELOCITY AVG FPS | PEAK FPS | CAP FPS | UPSTREAM MANHOLE RIM ELEV | COMMENTS NOTE WARNIN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5-30 | 5-29 | 896.67 | 895.48 | 159. | 10. | VCP | 0.007 | 691 | 0 | 0.0691 | 0.2626 | 1.2250 | 0.21 | 1.88 | 2.77 | 3.48 | 909.00 | |
| 5-29D | 5-29C | 933.69 | 925.74 | 358. | 6. | PVC | 0.022 | 76 | 0 | 0.0076 | 0.0289 | 0.6386 | 0.05 | 1.71 | 2.59 | 5.03 | 941.92 | |
| 5-29C | 5-29B | 925.74 | 921.83 | 281. | 6. | PVC | 0.014 | 118 | 0 | 0.0118 | 0.0448 | 0.5055 | 0.09 | 1.68 | 2.49 | 3.98 | 931.09 | |
| 5-29B | 5-29A | 921.83 | 913.61 | 304. | 6. | PVC | 0.027 | 152 | 0 | 0.0152 | 0.0578 | 0.7047 | 0.08 | 2.28 | 3.39 | 5.55 | 927.05 | |
| 5-29A | 5-29 | 913.61 | 895.48 | 295. | 6. | PVC | 0.061 | 169 | 0 | 0.0169 | 0.0642 | 1.0624 | 0.06 | 3.12 | 4.69 | 8.37 | 919.12 | |
| * AT MH 5-29 | | | | | | | | 860 | 0 | | | | | | | | | |
| 5-29 | 5-28 | 895.48 | 894.85 | 169. | 10. | VCP | 0.004 | 860 | 0 | 0.0860 | 0.3268 | 0.8645 | 0.38 | 1.57 | 2.28 | 2.45 | 904.42 | |
| 5-28A6 | 5-28A5 | 939.15 | 935.80 | 194. | 6. | PVC | 0.017 | 42 | 0 | 0.0042 | 0.0160 | 0.5632 | 0.03 | 1.30 | 2.00 | 4.44 | 946.05 | |
| * MANHOLE 5-28A5 COULD NOT BE OPENED. | | | | | | | | | | | | | | | | | | |
| 5-28A5 | 5-28A4 | 935.80 | 928.84 | 346. | 6. | PVC | 0.020 | 76 | 0 | 0.0076 | 0.0289 | 0.6078 | 0.05 | 1.65 | 2.50 | 4.79 | 941.64 | A |
| 5-28A4 | 5-28A3 | 928.84 | 925.94 | 147. | 6. | PVC | 0.020 | 101 | 0 | 0.0101 | 0.0384 | 0.6019 | 0.06 | 1.80 | 2.70 | 4.74 | 934.81 | |
| 5-28A3 | 5-28A2 | 925.94 | 920.00 | 329. | 6. | PVC | 0.018 | 135 | 0 | 0.0135 | 0.0513 | 0.5758 | 0.09 | 1.91 | 2.84 | 4.54 | 932.03 | |
| 5-28A2 | 5-28A1 | 920.00 | 914.39 | 301. | 6. | PVC | 0.019 | 177 | 0 | 0.0177 | 0.0673 | 0.5851 | 0.11 | 2.11 | 3.10 | 4.61 | 925.11 | |
| 5-28A1 | 5-28A | 914.39 | 900.32 | 354. | 6. | PVC | 0.040 | 194 | 0 | 0.0194 | 0.0737 | 0.8544 | 0.09 | 2.81 | 4.17 | 6.73 | 920.22 | |
| 5-28F | 5-28E | 937.58 | 933.36 | 152. | 6. | PVC | 0.028 | 34 | 0 | 0.0034 | 0.0129 | 0.7141 | 0.02 | 1.42 | 2.22 | 5.63 | 944.52 | |
| 5-28E | 5-28D | 933.36 | 926.00 | 304. | 6. | PVC | 0.024 | 68 | 0 | 0.0068 | 0.0258 | 0.6668 | 0.04 | 1.70 | 2.59 | 5.25 | 939.80 | |
| 5-28D | 5-28C | 926.00 | 918.01 | 298. | 6. | PVC | 0.027 | 101 | 0 | 0.0101 | 0.0384 | 0.7017 | 0.05 | 2.00 | 3.01 | 5.53 | 931.08 | |
| 5-28C | 5-28B | 918.01 | 906.00 | 301. | 6. | PVC | 0.040 | 135 | 0 | 0.0135 | 0.0513 | 0.8560 | 0.06 | 2.51 | 3.77 | 6.75 | 923.20 | |
| 5-28B | 5-28A | 906.00 | 900.32 | 206. | 6. | PVC | 0.028 | 152 | 0 | 0.0152 | 0.0578 | 0.7116 | 0.08 | 2.30 | 3.42 | 5.61 | 916.89 | |
| * AT MH 5-28A | | | | | | | | 346 | 0 | | | | | | | | | |
| 5-28A | 5-28 | 900.32 | 894.85 | 140. | 8. | PVC | 0.039 | 346 | 0 | 0.0346 | 0.1315 | 1.0243 | 0.07 | 3.19 | 4.76 | 8.09 | 906.25 | |
| * AT MH 5-28 | | | | | | | | 1206 | 0 | | | | | | | | | |
| 5-28 | 5-27 | 894.85 | 893.48 | 295. | 10. | VCP | 0.005 | 1206 | 0 | 0.1206 | 0.4380 | 0.9649 | 0.45 | 1.87 | 2.67 | 2.74 | 901.85 | |
| 5-27 | 5-26 | 893.48 | 891.76 | 300. | 10. | VCP | 0.006 | 1206 | 0 | 0.1206 | 0.4380 | 1.0721 | 0.41 | 2.01 | 2.86 | 3.04 | 897.58 | |
| 5-26 | 5-25 | 891.76 | 889.53 | 304. | 10. | VCP | 0.007 | 1206 | 0 | 0.1206 | 0.4380 | 1.2127 | 0.36 | 2.20 | 3.16 | 3.44 | 896.63 | |
| 5-25 | 5-24 | 889.53 | 887.82 | 302. | 10. | VCP | 0.006 | 1206 | 0 | 0.1206 | 0.4380 | 1.0655 | 0.41 | 2.00 | 2.87 | 3.02 | 895.58 | |
| 5-24 | 5-23 | 887.82 | 880.30 | 229. | 10. | VCP | 0.033 | 1231 | 0 | 0.1231 | 0.4470 | 2.5659 | 0.17 | 3.74 | 5.48 | 7.28 | 897.83 | |
| 5-23 | 5-22 | 880.30 | 872.51 | 205. | 10. | VCP | 0.038 | 1239 | 0 | 0.1239 | 0.4499 | 2.7602 | 0.16 | 3.95 | 5.79 | 7.83 | 888.15 | |
| 5-22 | 5-21 | 872.51 | 871.00 | 301. | 10. | VCP | 0.005 | 1264 | 0 | 0.1264 | 0.4588 | 1.0029 | 0.46 | 1.95 | 2.78 | 2.85 | 876.03 | |
| 5-21B | 5-21A | 884.66 | 876.14 | 230. | 6. | PVC | 0.037 | 59 | 0 | 0.0059 | 0.0224 | 0.8248 | 0.03 | 1.88 | 2.89 | 6.50 | 890.21 | |
| 5-21A | 5-21 | 876.14 | 871.00 | 240. | 6. | PVC | 0.021 | 84 | 0 | 0.0084 | 0.0319 | 0.6272 | 0.05 | 1.74 | 2.63 | 4.94 | 882.48 | |
| * AT MH 5-21 | | | | | | | | 1348 | 0 | | | | | | | | | |
| 5-21 | 5-20 | 871.00 | 861.65 | 266. | 10. | VCP | 0.035 | 1390 | 0 | 0.1390 | 0.5041 | 2.6547 | 0.19 | 3.98 | 5.80 | 7.53 | 874.88 | |
| 5-20 | 5-19 | 861.65 | 851.87 | 311. | 10. | VCP | 0.031 | 1415 | 0 | 0.1415 | 0.5130 | 2.5110 | 0.20 | 3.84 | 5.60 | 7.12 | 867.99 | |
| 5-19F | 5-19E | 887.18 | 879.53 | 251. | 6. | PVC | 0.030 | 51 | 0 | 0.0051 | 0.0194 | 0.7482 | 0.03 | 1.67 | 2.58 | 5.90 | 896.42 | |
| 5-19E | 5-19D | 879.53 | 871.06 | 175. | 6. | PVC | 0.048 | 76 | 0 | 0.0076 | 0.0289 | 0.9428 | 0.03 | 2.23 | 3.42 | 7.43 | 886.05 | |
| 5-19D | 5-19C | 871.06 | 867.32 | 131. | 6. | PVC | 0.029 | 84 | 0 | 0.0084 | 0.0319 | 0.7241 | 0.04 | 1.92 | 2.92 | 5.71 | 875.95 | |
| 5-19C | 5-19B | 867.32 | 859.01 | 284. | 6. | PVC | 0.029 | 135 | 0 | 0.0135 | 0.0513 | 0.7331 | 0.07 | 2.26 | 3.37 | 5.78 | 872.01 | |
| 5-19B4 | 5-19B3 | 892.48 | 881.76 | 254. | 6. | PVC | 0.042 | 34 | 0 | 0.0034 | 0.0129 | 0.8804 | 0.01 | 1.64 | 2.57 | 6.94 | 899.68 | |
| 5-19B3 | 5-19B2 | 881.76 | 875.81 | 160. | 6. | PVC | 0.037 | 68 | 0 | 0.0068 | 0.0258 | 0.8264 | 0.03 | 1.97 | 3.01 | 6.51 | 888.43 | |
| 5-19B2 | 5-19B1 | 875.81 | 865.45 | 339. | 6. | PVC | 0.031 | 110 | 0 | 0.0110 | 0.0418 | 0.7492 | 0.06 | 2.15 | 3.23 | 5.90 | 883.26 | |
| 5-19B1 | 5-19B | 865.45 | 859.01 | 264. | 6. | PVC | 0.024 | 152 | 0 | 0.0152 | 0.0578 | 0.6693 | 0.09 | 2.20 | 3.27 | 5.27 | 870.62 | |
| * AT MH 5-19B | | | | | | | | 287 | 0 | | | | | | | | | |
| 5-19B | 5-19A | 859.01 | 857.47 | 335. | 8. | PVC | 0.005 | 304 | 0 | 0.0304 | 0.1155 | 0.6258 | 0.18 | 1.43 | 2.12 | 2.77 | 863.84 | |
| 5-19A | 5-19 | 857.47 | 851.67 | 207. | 8. | PVC | 0.028 | 338 | 0 | 0.0338 | 0.1284 | 1.5449 | 0.08 | 2.83 | 4.20 | 6.85 | 862.50 | |
| * AT MH 5-19 | | | | | | | | 1753 | 0 | | | | | | | | | |
| 5-19 | 5-18 | 851.32 | 844.70 | 200. | 10. | VCP | 0.033 | 1778 | 0 | 0.1778 | 0.6428 | 2.5761 | 0.25 | 4.19 | 6.05 | 7.31 | 859.21 | |
| 5-18B | 5-18A | 856.52 | 848.06 | 298. | 6. | PVC | 0.028 | 42 | 0 | 0.0042 | 0.0160 | 0.7221 | 0.02 | 1.54 | 2.38 | 5.69 | 862.98 | |
| 5-18A | 5-18 | 848.06 | 844.70 | 335. | 6. | PVC | 0.010 | 67 | 0 | 0.0067 | 0.0255 | 0.4292 | 0.06 | 1.25 | 1.88 | 3.38 | 853.94 | |

| MANHOLES FROM MH ID | MANHOLES TO MH ID | INVERT ELEV FROM FT | INVERT ELEV TO FT | DIST FT | PIPE DIA IN | PIPE TYP | PIPE SLOPE FT/FT | POPULATION RES | POPULATION N-RES | RATE OF FLOW(MGD) AVERAGE QA | RATE OF FLOW(MGD) PEAK QP | RATE OF FLOW(MGD) CAPACITY QF | PIPE RATIO QP/QF | VELOCITY AVG FPS | VELOCITY PEAK FPS | VELOCITY CAP FPS | UPSTREAM MANHOLE RIM ELEV | COMMENTS NOTE WARNING |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| * AT MH 5-18 | | | | | | | | 1845 | 0 | | | | | | | | | |
| * | MANHOLE 5-18 COULD NOT BE OPENED. | | | | | | | | | | | | | | | | | |
| 5-18 | 5-17 | 844.70 | 843.24 | 216. | 10. | RCP | 0.007 | 1870 | 0 | 0.1870 | 0.6755 | 1.0089 | 0.67 | 2.19 | 3.06 | 2.86 | 850.80 | A |
| 5-17 | 5-16 | 843.24 | 841.75 | 270. | 10. | RCP | 0.006 | 1887 | 10 | 0.1890 | 0.6826 | 0.9116 | 0.75 | 2.04 | 2.83 | 2.59 | 847.68 | |
| 5-16 | 5-15 | 841.75 | 840.40 | 273. | 10. | RCP | 0.005 | 1904 | 10 | 0.1907 | 0.6887 | 0.8630 | 0.80 | 1.97 | 2.72 | 2.45 | 845.91 | |
| 5-15A | 5-15 | 849.31 | 840.40 | 347. | 6. | PVC | 0.026 | 59 | 0 | 0.0059 | 0.0224 | 0.6867 | 0.03 | 1.66 | 2.54 | 5.41 | 854.85 | |
| * AT MH 5-15 | | | | | | | | 1963 | 10 | | | | | | | | | |
| 5-15 | 5-14 | 840.40 | 838.45 | 198. | 10. | RCP | 0.010 | 1971 | 10 | 0.1974 | 0.7125 | 1.2178 | 0.59 | 2.54 | 3.59 | 3.45 | 846.26 | |
| 5-14 | 5-13 | 838.45 | 837.26 | 244. | 12. | RCP | 0.005 | 1988 | 10 | 0.1991 | 0.7185 | 1.3936 | 0.52 | 1.95 | 2.77 | 2.75 | 843.97 | |
| 5-13A | 5-13 | 847.42 | 837.26 | 325. | 6. | PVC | 0.031 | 67 | 0 | 0.0067 | 0.0255 | 0.7577 | 0.03 | 1.84 | 2.82 | 5.97 | 852.29 | |
| * AT MH 5-13 | | | | | | | | 2055 | 10 | | | | | | | | | |
| 5-13 | 5-12 | 837.26 | 836.18 | 207. | 12. | RCP | 0.005 | 2055 | 10 | 0.2058 | 0.7423 | 1.4414 | 0.51 | 2.01 | 2.86 | 2.84 | 844.47 | |
| 5-12E | 5-12D | 891.19 | 873.32 | 297. | 8. | PVC | 0.060 | 42 | 0 | 0.0042 | 0.0160 | 2.2639 | 0.01 | 1.86 | 2.99 | 10.03 | 896.37 | |
| 5-12D | 5-12C | 873.32 | 860.38 | 300. | 8. | PVC | 0.043 | 84 | 0 | 0.0084 | 0.0319 | 1.9168 | 0.02 | 2.09 | 3.27 | 8.50 | 881.06 | |
| 5-12C | 5-12B | 860.38 | 852.41 | 200. | 8. | PVC | 0.040 | 109 | 0 | 0.0109 | 0.0414 | 1.8424 | 0.02 | 2.22 | 3.43 | 8.17 | 869.26 | |
| 5-12B1 | 5-12B | 854.94 | 852.41 | 173. | 6. | PVC | 0.015 | 34 | 0 | 0.0034 | 0.0129 | 0.5183 | 0.02 | 1.15 | 1.77 | 4.08 | 860.81 | Z |
| * AT MH 5-12B | | | | | | | | 143 | 0 | | | | | | | | | |
| 5-12B | 5-12A | 852.41 | 841.16 | 349. | 8. | PVC | 0.032 | 185 | 0 | 0.0185 | 0.0703 | 1.6571 | 0.04 | 2.45 | 3.64 | 7.35 | 858.32 | |
| 5-12A | 5-12 | 841.16 | 836.18 | 271. | 8. | PVC | 0.018 | 218 | 0 | 0.0218 | 0.0828 | 1.2511 | 0.07 | 2.13 | 3.19 | 5.55 | 849.21 | |
| * AT MH 5-12 | | | | | | | | 2273 | 10 | | | | | | | | | |
| 5-12 | 5-11 | 836.18 | 833.58 | 224. | 12. | RCP | 0.012 | 2281 | 10 | 0.2284 | 0.8223 | 2.1499 | 0.38 | 2.76 | 3.95 | 4.24 | 842.53 | |
| 5-11E | 5-11D | 871.94 | 859.73 | 245. | 6. | PVC | 0.050 | 51 | 0 | 0.0051 | 0.0194 | 0.9567 | 0.02 | 1.98 | 3.07 | 7.54 | 876.52 | |
| 5-11D | 5-11C | 859.73 | 858.86 | 143. | 6. | PVC | 0.006 | 68 | 0 | 0.0068 | 0.0258 | 0.3343 | 0.08 | 1.06 | 1.58 | 2.63 | 866.46 | Z |
| 5-11C | 5-11B | 858.86 | 849.07 | 249. | 6. | PVC | 0.039 | 110 | 0 | 0.0110 | 0.0418 | 0.8498 | 0.05 | 2.34 | 3.54 | 6.70 | 866.20 | |
| 5-11B | 5-11A | 849.07 | 840.11 | 300. | 6. | PVC | 0.030 | 135 | 0 | 0.0135 | 0.0513 | 0.7406 | 0.07 | 2.27 | 3.40 | 5.84 | 854.17 | |
| 5-11A | 5-11 | 840.11 | 833.58 | 209. | 6. | PVC | 0.031 | 160 | 0 | 0.0160 | 0.0608 | 0.7575 | 0.08 | 2.44 | 3.63 | 5.97 | 844.86 | |
| * AT MH 5-11 | | | | | | | | 2441 | 10 | | | | | | | | | |
| 5-11 | 5-10 | 833.58 | 832.50 | 264. | 12. | RCP | 0.004 | 2458 | 10 | 0.2461 | 0.8848 | 1.2764 | 0.69 | 1.94 | 2.71 | 2.51 | 838.13 | |
| 5-10 | 5-9 | 832.50 | 831.83 | 128. | 12. | RCP | 0.005 | 2466 | 10 | 0.2469 | 0.8876 | 1.4437 | 0.61 | 2.13 | 2.99 | 2.84 | 836.50 | |
| 5-9B | 5-9A | 849.86 | 842.40 | 192. | 6. | PVC | 0.039 | 25 | 0 | 0.0025 | 0.0095 | 0.8447 | 0.01 | 1.44 | 2.28 | 6.66 | 858.57 | |
| 5-9A | 5-9 | 842.40 | 831.83 | 330. | 6. | PVC | 0.032 | 67 | 0 | 0.0067 | 0.0255 | 0.7670 | 0.03 | 1.86 | 2.85 | 6.04 | 847.88 | |
| * AT MH 5-9 | | | | | | | | 2533 | 10 | | | | | | | | | |
| 5-9 | 5-8 | 831.83 | 829.30 | 358. | 12. | RCP | 0.007 | 2541 | 10 | 0.2544 | 0.9140 | 1.6776 | 0.54 | 2.39 | 3.37 | 3.30 | 837.75 | |
| 5-8D | 5-8C | 893.06 | 878.77 | 297. | 6. | PVC | 0.048 | 34 | 0 | 0.0034 | 0.0129 | 0.9400 | 0.01 | 1.71 | 2.69 | 7.41 | 897.67 | |
| 5-8C | 5-8B | 878.77 | 862.02 | 295. | 6. | PVC | 0.057 | 59 | 0 | 0.0059 | 0.0224 | 1.0212 | 0.02 | 2.17 | 3.36 | 8.05 | 883.60 | |
| 5-8B | 5-8A | 862.02 | 845.42 | 329. | 6. | PVC | 0.050 | 84 | 0 | 0.0084 | 0.0319 | 0.9626 | 0.03 | 2.33 | 3.57 | 7.59 | 865.74 | |
| 5-8A | 5-8 | 845.42 | 829.30 | 335. | 6. | PVC | 0.048 | 109 | 0 | 0.0109 | 0.0414 | 0.9401 | 0.04 | 2.50 | 3.79 | 7.41 | 854.02 | |
| * AT MH 5-8 | | | | | | | | 2650 | 10 | | | | | | | | | |
| 5-8 | 5-7 | 829.30 | 828.58 | 150. | 12. | RCP | 0.005 | 2642 | 10 | 0.2645 | 0.9495 | 1.3825 | 0.69 | 2.10 | 2.93 | 2.72 | 834.39 | |
| 5-7P9 | 5-7P8 | 931.32 | 929.96 | 219. | 8. | PVC | 0.006 | 51 | 0 | 0.0051 | 0.0194 | 0.7273 | 0.03 | 0.92 | 1.42 | 3.22 | 937.10 | Z |
| 5-7P8 | 5-7P7 | 929.96 | 928.75 | 250. | 8. | PVC | 0.005 | 68 | 0 | 0.0068 | 0.0258 | 0.6421 | 0.04 | 0.93 | 1.39 | 2.85 | 934.74 | Z |
| 5-7P7 | 5-7P6 | 928.75 | 924.99 | 261. | 8. | PVC | 0.014 | 119 | 0 | 0.0119 | 0.0452 | 1.1078 | 0.04 | 1.62 | 2.41 | 4.91 | 934.26 | |
| 5-7P6A | 5-7P6 | 925.51 | 924.99 | 164. | 6. | PVC | 0.003 | 34 | 0 | 0.0034 | 0.0129 | 0.2413 | 0.05 | 0.68 | 1.03 | 1.90 | 930.05 | Z |
| * AT MH 5-7P6 | | | | | | | | 153 | 0 | | | | | | | | | |

| MANHOLES FROM MH ID | MANHOLES TO MH ID | INVERT ELEV FROM FT | INVERT ELEV TO FT | DIST FT | PIPE DIA IN | PIPE TYP | PIPE SLOPE FT/FT | POPULATION RES | POPULATION N-RES | RATE OF FLOW(MGD) AVERAGE QA | RATE OF FLOW(MGD) PEAK QP | RATE OF FLOW(MGD) CAPACITY QF | PIPE RATIO QP/QF | VELOCITY AVG FPS | VELOCITY PEAK FPS | VELOCITY CAP FPS | UPSTREAM MANHOLE RIM ELEV | COMMENTS NOTE | WARNING |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5-7P6 | 5-7P5 | 924.99 | 923.98 | 203. | 8. | PVC | 0.005 | 170 | 0 | 0.0170 | 0.0646 | 0.6510 | 0.10 | 1.26 | 1.86 | 2.89 | 930.74 | | |
| 5-7P5 | 5-7P4 | 923.98 | 923.59 | 164. | 8. | PVC | 0.002 | 187 | 0 | 0.0187 | 0.0711 | 0.4500 | 0.16 | 0.98 | 1.46 | 1.99 | 930.57 | | Z |
| 5-7P4A | 5-7P4 | 924.19 | 923.59 | 150. | 6. | PVC | 0.004 | 34 | 0 | 0.0034 | 0.0129 | 0.2710 | 0.05 | 0.74 | 1.12 | 2.14 | 928.51 | | Z |
| 5-7P4B | 5-7P4 | 924.52 | 923.59 | 193. | 6. | PVC | 0.005 | 42 | 0 | 0.0042 | 0.0160 | 0.2975 | 0.05 | 0.84 | 1.27 | 2.34 | 928.94 | | Z |
| * AT MH 5-7P4 | | | | | | | | 263 | 0 | | | | | | | | | | |
| 5-7P4 | 5-7P3 | 923.59 | 922.94 | 235. | 8. | PVC | 0.003 | 280 | 0 | 0.0280 | 0.1064 | 0.4854 | 0.22 | 1.17 | 1.72 | 2.15 | 928.46 | | Z |
| 5-7P3 | 5-7P2 | 922.94 | 917.28 | 401. | 8. | PVC | 0.014 | 314 | 0 | 0.0314 | 0.1193 | 1.0965 | 0.11 | 2.18 | 3.22 | 4.86 | 927.43 | | |
| 5-7P2 | 5-7P1 | 917.28 | 916.03 | 208. | 8. | PVC | 0.006 | 322 | 0 | 0.0322 | 0.1224 | 0.7155 | 0.17 | 1.60 | 2.38 | 3.17 | 923.18 | | |
| 5-7P1B | 5-7P1A | 919.94 | 918.74 | 95. | 6. | PVC | 0.013 | 34 | 0 | 0.0034 | 0.0129 | 0.4817 | 0.03 | 1.09 | 1.68 | 3.80 | 925.73 | | Z |
| 5-7P1A | 5-7P1 | 918.74 | 916.03 | 229. | 6. | PVC | 0.012 | 68 | 0 | 0.0068 | 0.0258 | 0.4662 | 0.06 | 1.33 | 2.01 | 3.67 | 924.12 | | |
| * AT MH 5-7P1 | | | | | | | | 390 | 0 | | | | | | | | | | |
| 5-7P1 | 5-7P | 916.03 | 906.50 | 319. | 8. | PVC | 0.030 | 398 | 0 | 0.0398 | 0.1512 | 1.5952 | 0.09 | 3.04 | 4.50 | 7.07 | 919.78 | | |
| 5-7U3 | 5-7U2 | 923.42 | 921.57 | 230. | 8. | PVC | 0.008 | 34 | 0 | 0.0034 | 0.0129 | 0.8277 | 0.02 | 0.88 | 1.38 | 3.67 | 928.15 | | Z |
| 5-7U2 | 5-7U1 | 921.57 | 919.40 | 218. | 8. | PVC | 0.010 | 59 | 0 | 0.0059 | 0.0224 | 0.9208 | 0.02 | 1.14 | 1.76 | 4.08 | 928.08 | | Z |
| 5-7U1 | 5-7U | 915.19 | 911.87 | 158. | 8. | PVC | 0.021 | 101 | 0 | 0.0101 | 0.0384 | 1.3379 | 0.03 | 1.74 | 2.68 | 5.93 | 926.95 | B | |
| 5-7W | 5-7V | 914.04 | 912.49 | 217. | 6. | PVC | 0.007 | 34 | 0 | 0.0034 | 0.0129 | 0.3622 | 0.04 | 0.90 | 1.37 | 2.65 | 917.30 | | Z |
| 5-7V | 5-7U | 912.49 | 911.87 | 187. | 6. | PVC | 0.003 | 42 | 0 | 0.0042 | 0.0160 | 0.2468 | 0.06 | 0.74 | 1.11 | 1.94 | 920.00 | | Z |
| * AT MH 5-7U | | | | | | | | 143 | 0 | | | | | | | | | | |
| 5-7U | 5-7T | 911.87 | 909.74 | 102. | 8. | PVC | 0.021 | 160 | 0 | 0.0160 | 0.0608 | 1.3337 | 0.05 | 2.02 | 3.00 | 5.91 | 921.73 | | |
| 5-7T1 | 5-7T | 915.22 | 910.29 | 99. | 6. | PVC | 0.050 | 25 | 0 | 0.0025 | 0.0095 | 0.9563 | 0.01 | 1.57 | 2.49 | 7.54 | 922.25 | | |
| * AT MH 5-7T | | | | | | | | 185 | 0 | | | | | | | | | | |
| 5-7T | 5-7S | 909.74 | 908.56 | 252. | 8. | PVC | 0.005 | 201 | 0 | 0.0201 | 0.0764 | 0.6316 | 0.12 | 1.30 | 1.91 | 2.80 | 917.34 | | |
| 5-7S | 5-7R | 908.56 | 907.35 | 256. | 8. | PVC | 0.005 | 221 | 0 | 0.0221 | 0.0840 | 0.6345 | 0.13 | 1.34 | 1.96 | 2.81 | 916.10 | | |
| 5-7R1 | 5-7R | 923.20 | 907.35 | 398. | 6. | PVC | 0.040 | 76 | 0 | 0.0076 | 0.0289 | 0.8552 | 0.03 | 2.09 | 3.19 | 6.74 | 928.84 | | |
| * AT MH 5-7R | | | | | | | | 293 | 0 | | | | | | | | | | |
| 5-7R | 5-7Q | 907.35 | 906.25 | 250. | 8. | PVC | 0.004 | 318 | 0 | 0.0318 | 0.1208 | 0.6122 | 0.20 | 1.43 | 2.11 | 2.71 | 913.50 | | |
| 5-7Q | 5-7P | 905.73 | 903.95 | 405. | 8. | PVC | 0.004 | 343 | 0 | 0.0343 | 0.1303 | 0.6119 | 0.21 | 1.46 | 2.16 | 2.71 | 915.28 | | |
| * AT MH 5-7P | | | | | | | | 745 | 0 | | | | | | | | | | |
| 5-7P | 5-7O | 903.95 | 902.50 | 213. | 8. | PVC | 0.007 | 745 | 0 | 0.0745 | 0.2831 | 0.7615 | 0.37 | 2.14 | 3.12 | 3.38 | 913.15 | B | |
| 5-7O | 5-7N | 902.50 | 901.68 | 219. | 8. | PVC | 0.004 | 745 | 0 | 0.0745 | 0.2831 | 0.5648 | 0.50 | 1.74 | 2.50 | 2.50 | 917.92 | | |
| 5-7N | 5-7M | 901.68 | 900.20 | 281. | 8. | PVC | 0.005 | 745 | 0 | 0.0745 | 0.2831 | 0.6698 | 0.42 | 1.96 | 2.84 | 2.97 | 914.94 | | |
| 5-7M | 5-7L | 900.20 | 898.18 | 338. | 8. | PVC | 0.006 | 745 | 0 | 0.0745 | 0.2831 | 0.7135 | 0.40 | 2.05 | 2.98 | 3.16 | 907.55 | | |
| 5-7L | 5-7K | 898.18 | 894.84 | 300. | 8. | PVC | 0.011 | 745 | 0 | 0.0745 | 0.2831 | 0.9738 | 0.29 | 2.55 | 3.72 | 4.32 | 902.59 | | |
| 5-7K | 5-7J | 894.84 | 894.16 | 201. | 8. | PVC | 0.003 | 745 | 0 | 0.0745 | 0.2831 | 0.5368 | 0.53 | 1.67 | 2.40 | 2.38 | 902.36 | | |
| 5-7J | 5-7I | 894.16 | 893.25 | 201. | 8. | PVC | 0.005 | 745 | 0 | 0.0745 | 0.2831 | 0.6210 | 0.46 | 1.86 | 2.68 | 2.75 | 901.30 | | |
| 5-7I | 5-7H | 893.25 | 891.91 | 285. | 8. | PVC | 0.005 | 745 | 0 | 0.0745 | 0.2831 | 0.6329 | 0.45 | 1.88 | 2.72 | 2.81 | 900.30 | | |
| 5-7H | 5-7G | 891.91 | 890.35 | 314. | 8. | PVC | 0.005 | 745 | 0 | 0.0745 | 0.2831 | 0.6505 | 0.44 | 1.92 | 2.78 | 2.88 | 896.58 | | |
| 5-7G | 5-7F | 890.35 | 888.69 | 300. | 8. | PVC | 0.006 | 745 | 0 | 0.0745 | 0.2831 | 0.6865 | 0.41 | 1.99 | 2.89 | 3.04 | 895.35 | | |
| 5-7F | 5-7E | 888.69 | 886.68 | 304. | 8. | PVC | 0.007 | 762 | 0 | 0.0762 | 0.2896 | 0.7505 | 0.39 | 2.14 | 3.11 | 3.33 | 894.25 | | |
| 5-7E | 5-7D | 886.68 | 885.64 | 201. | 8. | PVC | 0.005 | 787 | 0 | 0.0787 | 0.2991 | 0.6639 | 0.45 | 1.98 | 2.86 | 2.94 | 893.16 | | |
| 5-7D | 5-7C | 880.44 | 869.24 | 252. | 8. | PVC | 0.044 | 829 | 0 | 0.0829 | 0.3150 | 1.9457 | 0.16 | 4.28 | 6.37 | 8.62 | 889.49 | B | |
| 5-7C | 5-7B | 869.08 | 861.69 | 171. | 8. | PVC | 0.043 | 846 | 0 | 0.0846 | 0.3215 | 1.9187 | 0.17 | 4.27 | 6.34 | 8.50 | 873.94 | | |
| 5-7B | 5-7A | 861.69 | 847.60 | 311. | 8. | PVC | 0.045 | 888 | 0 | 0.0888 | 0.3374 | 1.9645 | 0.17 | 4.40 | 6.54 | 8.71 | 867.53 | | |
| 5-7A | 5-7 | 847.60 | 828.58 | 349. | 8. | PVC | 0.054 | 913 | 0 | 0.0913 | 0.3469 | 2.1546 | 0.16 | 4.73 | 7.04 | 9.55 | 855.20 | | |
| * AT MH 5-7 | | | | | | | | 3563 | 10 | | | | | | | | | | |
| 5-7 | 5-6 | 828.58 | 827.21 | 240. | 15. | RCP | 0.006 | 3563 | 10 | 0.3566 | 1.2706 | 2.7337 | 0.46 | 2.38 | 3.38 | 3.45 | 833.78 | | |
| 5-6 | 5-5 | 827.21 | 825.66 | 274. | 15. | RCP | 0.006 | 3563 | 10 | 0.3566 | 1.2706 | 2.7214 | 0.47 | 2.37 | 3.36 | 3.43 | 831.11 | | |

| MANHOLES FROM MH ID | MANHOLES TO MH ID | INVERT ELEV FROM FT | INVERT ELEV TO FT | DIST FT | PIPE DIA IN | PIPE TYP | PIPE SLOPE FT/FT | POPULATION RES | POPULATION N-RES | RATE OF FLOW(MGD) AVERAGE QA | RATE OF FLOW(MGD) PEAK QP | RATE OF FLOW(MGD) CAPACITY QF | PIPE RATIO QP/QF | VELOCITY AVG FPS | VELOCITY PEAK FPS | VELOCITY CAP FPS | UPSTREAM MANHOLE MIN ELEV | COMMENTS NOTE WARNING |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5-5 | 5-4 | 825.66 | 823.08 | 266. | 15. | RCP | 0.010 | 3563 | 10 | 0.3566 | 1.2706 | 3.5633 | 0.36 | 2.87 | 4.11 | 4.49 | 833.76 | |
| 5-4C | 5-4B | 851.55 | 845.46 | 155. | 6. | PVC | 0.039 | 34 | 0 | 0.0034 | 0.0129 | 0.8495 | 0.02 | 1.60 | 2.51 | 6.69 | 861.70 | |
| 5-4B | 5-4A | 845.46 | 839.14 | 151. | 6. | PVC | 0.042 | 68 | 0 | 0.0068 | 0.0258 | 0.8767 | 0.03 | 2.05 | 3.14 | 6.91 | 849.08 | |
| 5-4A | 5-4 | 839.14 | 823.08 | 312. | 6. | PVC | 0.051 | 76 | 0 | 0.0076 | 0.0289 | 0.9723 | 0.03 | 2.28 | 3.49 | 7.66 | 845.38 | |
| * AT MH 5-4 | | | | | | | | 3639 | 10 | | | | | | | | | |
| 5-4 | 5-3 | 823.08 | 820.98 | 220. | 15. | RCP | 0.010 | 3658 | 10 | 0.3659 | 1.3027 | 3.5350 | 0.37 | 2.88 | 4.11 | 4.46 | 831.42 | |
| 5-3C | 5-3B | 870.57 | 851.79 | 279. | 6. | PVC | 0.067 | 42 | 0 | 0.0042 | 0.0160 | 1.1119 | 0.01 | 2.05 | 3.22 | 8.76 | 878.78 | |
| 5-3B | 5-3A | 851.79 | 833.76 | 262. | 6. | PVC | 0.069 | 62 | 0 | 0.0062 | 0.0236 | 1.1242 | 0.02 | 2.35 | 3.65 | 8.86 | 860.43 | |
| 5-3A2 | 5-3A1 | 863.67 | 852.68 | 200. | 6. | PVC | 0.055 | 34 | 0 | 0.0034 | 0.0129 | 1.0046 | 0.01 | 1.79 | 2.82 | 7.92 | 868.57 | |
| 5-3A1 | 5-3A | 852.68 | 833.76 | 303. | 6. | PVC | 0.062 | 59 | 0 | 0.0059 | 0.0224 | 1.0709 | 0.02 | 2.24 | 3.47 | 8.44 | 857.60 | |
| * AT MH 5-3A | | | | | | | | 121 | 0 | | | | | | | | | |
| 5-3A | 5-3 | 833.76 | 820.98 | 372. | 6. | PVC | 0.034 | 138 | 0 | 0.0138 | 0.0524 | 0.7943 | 0.07 | 2.40 | 3.60 | 6.26 | 841.93 | |
| * AT MH 5-3 | | | | | | | | 3794 | 10 | | | | | | | | | |
| 5-3 | 5-2 | 820.98 | 816.03 | 301. | 15. | RCP | 0.016 | 3794 | 10 | 0.3797 | 1.3504 | 4.6399 | 0.29 | 3.53 | 5.07 | 5.85 | 827.01 | |
| 5-2 | 5-1 | 816.03 | 814.31 | 300. | 15. | RCP | 0.006 | 3794 | 10 | 0.3797 | 1.3504 | 2.7397 | 0.49 | 2.43 | 3.44 | 3.45 | 821.05 | |
| 5-1 | LS | 814.31 | 813.56 | 6. | 15. | RCP | 0.125 | 3794 | 10 | 0.3797 | 1.350 | 12.7922 | 0.11 | 7.19 | 10.48 | 16.13 | 819.60 | |
| * AT LIFT STATION # 52380 | | | | 37265 | | | | 3794 | 10 | | | | | | | | | |

* LIFT STATION # 52380 DISCHARGES THROUGH A 10" FORCE MAIN TO THE WET WELL
* INSIDE OF LIFT STATION # 51400 (COMANCHE VILLAGES I & II).
*
*
*

TOTAL NUMBER OF REACHES BELOW 1.2 FPS = 19.
TOTAL NUMBER OF ADVERSE REACHES = 0.
TOTAL NUMBER OF REACHES EXCEEDING PIPE CAPACITY = 0.
TOTAL NUMBER OF REACHES WHICH HAVE FULL PIPE VELOCITIES BELOW 1.5 FPS= 0.
TOTAL NUMBER OF REACHES = 152.

## SUBAREA 2

Subarea 2 contains the Commanche Village II family housing area, located west of Clear Creek Road and north of Copperas Cove Road.

Flows are conveyed northward to Lift Station 51400, where the flows from Comanche Villages I, II, and III combine. A 12-inch force main carries the flow to manhole W-79B8 in Subarea 5.

Average flow velocities below the specified minimum 1.2 FPS occur in 9 of the 79 reaches, but the system contains only VC piping. One reach shows a full pipe velocity slightly below the specified mimimum 1.5 FPS, but is not considered a problem (MH 1-1-16 to 1-1-15 @ 1.46 FPS).

No reconstruction or repairs are required within Subarea 2 unless television inspection shows major pipe damages.

# COMANCHE VILLAGE II

AREA 2 ,AS DEFINED BY THE SANITARY SEWER ANALYSIS, COMPLETED BY BOHANNAN-HUSTON, INC., SEPTEMBER 1984.

**COMMENT COLUMN "NOTES"**

EXCEPT AS NOTED:
> ELEVATIONS WERE OBTAINED THROUGH FIELD SURVEYS
> DISTANCES WERE GENERATED FROM COMPUTER PLOTS

A = INVERT BASED ON REPORT BY FREESE & NICHOLS (4/78)
B = DISTANCE BETWEEN MANHOLES IS SCALED
C = INVERT BASED ON "AS-BUILT" DRAWINGS
D = INVERT BASED ON TOPOGRAPHY & ADJACENT MANHOLE DATA
NA = NOT AVAILABLE
NF = NOT FOUND

**COMMENT COLUMN "WARNINGS"**

W = ZERO OR ADVERSE SLOPE PRESENT (PEAK FLOW MAY EXCEED PIPE CAPACITY)
X = PEAK FLOW EXCEEDS PIPE CAPACITY (LOW VELOCITIES MAY BE PRESENT)
Y = FULL PIPE VELOCITY BELOW 1.5 FPS (AVERAGE VELOCITY MAY ALSO BE LOW)
Z = AVERAGE VELOCITY BELOW 1.2 FPS

FORMER MANHOLE IDENTIFICATION NUMBERS ALSO APPEAR IN THE COMMENT COLUMN UNDER "NOTES"

| MANHOLES FROM MH ID | MANHOLES TO MH ID | INVERT ELEV FROM FT | INVERT ELEV TO FT | DIST FT | PIPE DIA IN | PIPE TYP | PIPE SLOPE FT/FT | POPULATION RES | POPULATION N-RES | RATE OF FLOW(MGD) AVERAGE QA | RATE OF FLOW(MGD) PEAK QP | RATE OF FLOW(MGD) CAPACITY QF | PIPE RATIO QP/QF | VELOCITY AVG FPS | VELOCITY PEAK FPS | VELOCITY CAP FPS | UPSTREAM MANHOLE RIM ELEV | COMMENTS NOTE | WARNING |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 13C2D | 13C2C | 932.97 | 929.05 | 402. | 6. | VCP | 0.010 | 118 | 0 | 0.0118 | 0.0448 | 0.3581 | 0.13 | 1.32 | 1.94 | 2.82 | 937.92 | | |
| 13C2C | 13C2B | 929.05 | 926.79 | 179. | 6. | VCP | 0.013 | 184 | 0 | 0.0184 | 0.0699 | 0.4075 | 0.17 | 1.66 | 2.41 | 3.21 | 934.32 | | |
| 13C2B | 13C2A | 926.79 | 915.11 | 194. | 6. | VCP | 0.060 | 243 | 0 | 0.0243 | 0.0923 | 0.8898 | 0.10 | 3.10 | 4.58 | 7.01 | 931.81 | | |
| 13C2A | 1-1-13C2 | 915.11 | 912.15 | 358. | 6. | VCP | 0.008 | 243 | 0 | 0.0243 | 0.0923 | 0.3297 | 0.28 | 1.52 | 2.22 | 2.60 | 927.55 | | |
| 1-1-26 | 1-1-13C4 | 939.49 | 934.45 | 358. | 6. | VCP | 0.014 | 89 | 0 | 0.0089 | 0.0338 | 0.4303 | 0.08 | 1.37 | 2.05 | 3.39 | 946.00 | | |
| 1-1-13C4 | 1-1-13C3 | 934.45 | 927.31 | 210. | 6. | VCP | 0.034 | 155 | 0 | 0.0155 | 0.0589 | 0.6686 | 0.09 | 2.21 | 3.29 | 5.27 | 940.57 | | |
| 1-1-13C3 | 1-1-13C2 | 927.31 | 922.03 | 236. | 6. | VCP | 0.022 | 199 | 0 | 0.0199 | 0.0756 | 0.5424 | 0.14 | 2.07 | 3.03 | 4.27 | 933.66 | | |
| * AT MH 1-1-13C2 | | | | | | | | 442 | 0 | | | | | | | | | | |
| 1-1-13C2 | 1-1-13C1 | 912.15 | 909.11 | 347. | 6. | VCP | 0.009 | 527 | 0 | 0.0527 | 0.2003 | 0.3394 | 0.59 | 1.94 | 2.77 | 2.67 | 927.93 | B | |
| 13C1A | 1-1-13C1 | 914.64 | 911.83 | 212. | 6. | VCP | 0.013 | 77 | 0 | 0.0077 | 0.0293 | 0.4175 | 0.07 | 1.29 | 1.92 | 3.29 | 921.69 | | |
| * AT MH 1-1-13C1 | | | | | | | | 604 | 0 | | | | | | | | | | |
| 1-1-13C1 | 1-1-13C | 909.11 | 906.50 | 354. | 6. | VCP | 0.007 | 604 | 0 | 0.0604 | 0.2295 | 0.3114 | 0.74 | 1.90 | 2.68 | 2.45 | 919.33 | B | |
| 1-1-13G | 1-1-13F | 931.25 | 927.98 | 362. | 6. | VCP | 0.009 | 133 | 0 | 0.0133 | 0.0505 | 0.3446 | 0.15 | 1.34 | 1.95 | 2.72 | 936.99 | | |
| 1-1-13F | 1-1-13E | 927.98 | 927.02 | 224. | 6. | VCP | 0.004 | 185 | 0 | 0.0185 | 0.0703 | 0.2374 | 0.30 | 1.11 | 1.62 | 1.87 | 933.93 | | Z |
| 1-1-13E | 1-1-13D | 927.02 | 923.65 | 380. | 6. | VCP | 0.009 | 274 | 0 | 0.0274 | 0.1041 | 0.3415 | 0.30 | 1.61 | 2.35 | 2.69 | 936.65 | | |
| 1-1-13D | 1-1-13C | 923.65 | 912.43 | 379. | 8. | VCP | 0.030 | 377 | 0 | 0.0377 | 0.1433 | 1.3437 | 0.11 | 2.66 | 3.92 | 5.96 | 931.97 | | |
| * AT MH 1-1-13C | | | | | | | | 981 | 0 | | | | | | | | | | |
| 1-1-13C | 1-1-13B | 906.50 | 905.96 | 139. | 8. | VCP | 0.004 | 1025 | 0 | 0.1025 | 0.3728 | 0.4867 | 0.77 | 1.71 | 2.37 | 2.16 | 919.68 | B | |
| 1-1-13B | 1-1-13A | 905.96 | 904.37 | 146. | 8. | VCP | 0.011 | 1055 | 0 | 0.1055 | 0.3836 | 0.8150 | 0.47 | 2.49 | 3.55 | 3.61 | 918.62 | | |
| 1-1-13A | 1-1-13 | 904.37 | 902.68 | 242. | 8. | VCP | 0.007 | 1107 | 0 | 0.1107 | 0.4024 | 0.6526 | 0.62 | 2.16 | 3.04 | 2.89 | 915.86 | | |
| 1-1-28 | 1-1-25 | 939.59 | 935.06 | 231. | 6. | VCP | 0.020 | 52 | 0 | 0.0052 | 0.0198 | 0.5078 | 0.04 | 1.30 | 1.97 | 4.00 | 946.00 | | |
| 1-1-25 | 1-1-24 | 935.06 | 931.92 | 370. | 6. | VCP | 0.008 | 155 | 0 | 0.0155 | 0.0589 | 0.3341 | 0.18 | 1.37 | 1.99 | 2.63 | 942.16 | | |
| 1-1-24 | 1-1-23 | 931.92 | 930.54 | 181. | 6. | VCP | 0.008 | 185 | 0 | 0.0185 | 0.0703 | 0.3166 | 0.22 | 1.36 | 2.00 | 2.50 | 937.42 | | |
| 1-1-23 | 1-1-22 | 930.54 | 928.60 | 186. | 6. | VCP | 0.010 | 229 | 0 | 0.0229 | 0.0870 | 0.3703 | 0.23 | 1.62 | 2.38 | 2.92 | 939.01 | | |
| 1-1-22 | 1-1-21 | 928.60 | 922.12 | 260. | 6. | VCP | 0.025 | 295 | 0 | 0.0295 | 0.1121 | 0.5725 | 0.20 | 2.37 | 3.51 | 4.51 | 936.54 | | |
| 1-1-21 | 1-1-20 | 922.12 | 920.37 | 300. | 6. | VCP | 0.006 | 369 | 0 | 0.0369 | 0.1402 | 0.2770 | 0.51 | 1.52 | 2.18 | 2.18 | 928.95 | | |
| 1-1-20 | 1-1-19 | 920.37 | 918.10 | 283. | 6. | VCP | 0.008 | 428 | 0 | 0.0428 | 0.1626 | 0.3248 | 0.50 | 1.77 | 2.55 | 2.56 | 926.44 | | |
| 1-1-19 | 1-1-18 | 918.10 | 915.84 | 348. | 6. | VCP | 0.006 | 531 | 0 | 0.0531 | 0.2018 | 0.2922 | 0.69 | 1.75 | 2.48 | 2.30 | 927.20 | | |
| 1-1-18 | 1-1-17 | 915.84 | 915.22 | 165. | 6. | VCP | 0.004 | 561 | 0 | 0.0561 | 0.2132 | 0.2223 | 0.96 | 1.46 | 1.99 | 1.75 | 929.89 | | Z |
| 1-1-1 | 1-1-16 | 915.22 | 914.62 | 288. | 8. | VCP | 0.002 | 635 | 0 | 0.0635 | 0.2413 | 0.3564 | 0.68 | 1.19 | 1.69 | 1.58 | 927.09 | | |

| MANHOLES FROM MH ID | TO MH ID | INVERT ELEV FROM FT | TO FT | DIST FT | PIPE DIA IN | TYP | SLOPE FT/FT | POPULATION RES | N-RES | RATE OF FLOW(MGD) AVERAGE QA | PEAK QP | CAPACITY QF | PIPE RATIO QP/QF | VELOCITY AVG FPS | PEAK FPS | CAP FPS | UPSTREAM MANHOLE RIM ELEV | COMMENTS NOTE WARNING |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1-1-16 | 1-1-15 | 914.62 | 914.02 | 339. | 8. | VCP | 0.002 | 709 | 0 | 0.0709 | 0.2694 | 0.3285 | 0.82 | 1.16 | 1.62 | 1.46 | 929.69 | Y |
| 1-1-15 | 1-1-14 | 914.02 | 912.09 | 183. | 8. | VCP | 0.011 | 753 | 0 | 0.0753 | 0.2861 | 0.8020 | 0.36 | 2.23 | 3.25 | 3.55 | 923.56 | |
| 1-1-14 | 1-1-13 | 912.09 | 908.76 | 324. | 8. | VCP | 0.010 | 793 | 0 | 0.0793 | 0.3013 | 0.7917 | 0.38 | 2.24 | 3.27 | 3.51 | 919.29 | |
| * AT MH 1-1-13 | | | | | | | | 1900 | 0 | | | | | | | | | |
| 1-1-13 | 1-1-12 | 902.68 | 897.66 | 116. | 8. | VCP | 0.043 | 1900 | 0 | 0.1900 | 0.6862 | 1.6246 | 0.42 | 4.82 | 6.89 | 7.20 | 915.56 | B |
| 1-1-12 | 1-1-11 | 897.66 | 892.52 | 280. | 8. | VCP | 0.018 | 1900 | 0 | 0.1900 | 0.6862 | 1.0581 | 0.65 | 3.55 | 4.98 | 4.69 | 910.71 | |
| 1-1-11 | 1-1-10 | 892.52 | 885.04 | 417. | 8. | VCP | 0.018 | 1900 | 0 | 0.1900 | 0.6862 | 1.0459 | 0.66 | 3.52 | 4.94 | 4.64 | 901.44 | |
| 1-1-10 | 1-1-9 | 883.40 | 882.19 | 124. | 10. | VCP | 0.010 | 1900 | 0 | 0.1900 | 0.6862 | 1.3988 | 0.49 | 2.77 | 3.94 | 3.97 | 889.14 | |
| 1-1-9D | 1-1-9C | 922.16 | 919.63 | 214. | 6. | VCP | 0.012 | 59 | 0 | 0.0059 | 0.0224 | 0.3943 | 0.06 | 1.14 | 1.71 | 3.11 | 927.11 | Z |
| 1-1-9C | 1-1-9B | 919.63 | 907.12 | 410. | 6. | VCP | 0.031 | 177 | 0 | 0.0177 | 0.0673 | 0.6334 | 0.11 | 2.22 | 3.28 | 4.99 | 925.79 | |
| 1-1-9B | 1-1-9A | 907.12 | 891.72 | 365. | 6. | VCP | 0.042 | 273 | 0 | 0.0273 | 0.1037 | 0.7448 | 0.14 | 2.85 | 4.16 | 5.87 | 912.27 | |
| 1-1-9A | 1-1-9 | 891.72 | 882.19 | 220. | 6. | VCP | 0.043 | 317 | 0 | 0.0317 | 0.1205 | 0.7547 | 0.16 | 3.01 | 4.37 | 5.95 | 897.94 | |
| * AT MH 1-1-9 | | | | | | | | 2217 | 0 | | | | | | | | | |
| 1-1-9 | 1-1-8 | 882.19 | 872.20 | 283. | 10. | VCP | 0.035 | 2247 | 0 | 0.2247 | 0.8092 | 2.6604 | 0.30 | 4.59 | 6.62 | 7.55 | 891.87 | |
| T3C2D | 8B13 | 932.97 | 928.17 | 305. | 6. | VCP | 0.016 | 66 | 0 | 0.0066 | 0.0251 | 0.4549 | 0.06 | 1.30 | 1.96 | 3.58 | 937.92 | |
| 8B13 | 8B12 | 928.17 | 923.69 | 177. | 6. | VCP | 0.025 | 110 | 0 | 0.0110 | 0.0418 | 0.5769 | 0.07 | 1.80 | 2.68 | 4.55 | 935.44 | |
| 8B12A | 8B12 | 924.77 | 923.64 | 147. | 6. | VCP | 0.008 | 38 | 0 | 0.0038 | 0.0144 | 0.3179 | 0.05 | 0.85 | 1.29 | 2.51 | 928.38 | Z |
| * AT MH 8B12 | | | | | | | | 148 | 0 | | | | | | | | | |
| 8B12 | 8B11 | 923.45 | 919.13 | 331. | 6. | VCP | 0.013 | 148 | 0 | 0.0148 | 0.0562 | 0.4143 | 0.14 | 1.57 | 2.30 | 3.26 | 931.47 | |
| 1-1-9D | 8B11 | 922.16 | 919.13 | 236. | 6. | VCP | 0.013 | 44 | 0 | 0.0044 | 0.0167 | 0.4109 | 0.04 | 1.06 | 1.62 | 3.24 | 927.11 | Z |
| * AT MH 8B11 | | | | | | | | 192 | 0 | | | | | | | | | |
| 8B11 | 8B10 | 919.13 | 918.03 | 147. | 6. | VCP | 0.007 | 222 | 0 | 0.0222 | 0.0844 | 0.3137 | 0.27 | 1.43 | 2.09 | 2.47 | 926.87 | |
| 8B10 | 8B9 | 918.03 | 915.00 | 220. | 6. | VCP | 0.014 | 251 | 0 | 0.0251 | 0.0954 | 0.4256 | 0.22 | 1.83 | 2.70 | 3.35 | 926.01 | |
| 8B9 | 8B8 | 915.00 | 903.34 | 353. | 6. | VCP | 0.033 | 347 | 0 | 0.0347 | 0.1319 | 0.6590 | 0.20 | 2.75 | 4.06 | 5.19 | 921.80 | |
| 8B8 | 8B7 | 903.34 | 899.15 | 245. | 6. | VCP | 0.017 | 398 | 0 | 0.0398 | 0.1512 | 0.4742 | 0.32 | 2.27 | 3.29 | 3.74 | 910.24 | |
| 8B7 | 8B6 | 899.15 | 898.62 | 164. | 8. | VCP | 0.003 | 398 | 0 | 0.0398 | 0.1512 | 0.4440 | 0.34 | 1.22 | 1.78 | 1.97 | 905.01 | |
| 8B6R | 8B6A | 914.46 | 909.58 | 272. | 6. | VCP | 0.018 | 66 | 0 | 0.0066 | 0.0251 | 0.4857 | 0.05 | 1.36 | 2.05 | 3.83 | 919.76 | |
| 8B6A | 8B6 | 909.58 | 898.62 | 173. | 6. | VCP | 0.063 | 96 | 0 | 0.0096 | 0.0365 | 0.9127 | 0.04 | 2.35 | 3.58 | 7.19 | 916.20 | |
| * AT MH 8B6 | | | | | | | | 494 | 0 | | | | | | | | | |
| 8B6 | 8B5 | 898.56 | 897.12 | 314. | 8. | VCP | 0.005 | 494 | 0 | 0.0494 | 0.1877 | 0.3289 | 0.35 | 1.47 | 2.14 | 2.34 | 911.57 | |
| 8B5 | 8B4 | 897.12 | 895.57 | 377. | 8. | VCP | 0.004 | 583 | 0 | 0.0583 | 0.2215 | 0.5007 | 0.44 | 1.48 | 2.15 | 2.22 | 909.06 | |
| 8B4 | 8B3 | 895.57 | 894.73 | 262. | 8. | VCP | 0.003 | 642 | 0 | 0.0642 | 0.2440 | 0.4422 | 0.55 | 1.40 | 2.00 | 1.96 | 912.07 | |
| 8B3 | 8B2 | 894.73 | 892.46 | 337. | 8. | VCP | 0.007 | 775 | 0 | 0.0775 | 0.2945 | 0.6409 | 0.46 | 1.92 | 2.77 | 2.84 | 905.27 | |
| B2A5 | B2A4 | 900.09 | 896.05 | 232. | 6. | VCP | 0.017 | 59 | 0 | 0.0059 | 0.0224 | 0.4785 | 0.05 | 1.30 | 1.96 | 3.77 | 905.14 | |
| B2A4 | B2A3 | 896.05 | 895.01 | 118. | 6. | VCP | 0.009 | 88 | 0 | 0.0088 | 0.0334 | 0.3404 | 0.10 | 1.17 | 1.72 | 2.68 | 900.81 | Z |
| B2A3 | B2A2 | 895.01 | 892.09 | 201. | 6. | VCP | 0.015 | 132 | 0 | 0.0132 | 0.0502 | 0.4371 | 0.11 | 1.57 | 2.31 | 3.44 | 898.66 | |
| B2A2 | B2A1 | 892.09 | 889.00 | 413. | 6. | VCP | 0.007 | 243 | 0 | 0.0243 | 0.0923 | 0.3137 | 0.29 | 1.47 | 2.14 | 2.47 | 897.44 | |
| B2A1 | B2A | 889.00 | 886.68 | 400. | 6. | VCP | 0.006 | 258 | 0 | 0.0258 | 0.0980 | 0.2762 | 0.36 | 1.36 | 1.99 | 2.18 | 892.96 | |
| B2D | B2C | 902.42 | 900.96 | 184. | 6. | VCP | 0.008 | 44 | 0 | 0.0044 | 0.0167 | 0.3230 | 0.05 | 0.90 | 1.36 | 2.55 | 907.77 | Z |
| B2C | B2B | 900.96 | 893.83 | 215. | 6. | VCP | 0.033 | 88 | 0 | 0.0088 | 0.0334 | 0.6604 | 0.05 | 1.83 | 2.77 | 5.20 | 906.33 | |
| CO | B2B | 894.30 | 893.83 | 148. | 6. | VCP | 0.003 | 15 | 0 | 0.0015 | 0.0057 | 0.2043 | 0.03 | 0.47 | 0.72 | 1.61 | NA | Z |
| * AT MH B2B | | | | | | | | 103 | 0 | | | | | | | | | |
| B2B | B2A | 893.83 | 892.60 | 186. | 6. | VCP | 0.007 | 133 | 0 | 0.0133 | 0.0505 | 0.2949 | 0.17 | 1.20 | 1.74 | 2.32 | 900.82 | |
| * AT MH B2A | | | | | | | | 391 | 0 | | | | | | | | | |
| B2A | 8B2 | 886.68 | 883.96 | 364. | 6. | VCP | 0.007 | 391 | 0 | 0.0391 | 0.1486 | 0.3135 | 0.47 | 1.68 | 2.43 | 2.47 | 900.87 | B |

| MANHOLES FROM MH ID | MANHOLES TO MH ID | INVERT ELEV FROM FT | INVERT ELEV TO FT | DIST FT | DIA IN | PIPE TYP | PIPE SLOPE FT/FT | POPULATION RES | POPULATION N-RES | RATE OF FLOW(MGD) AVERAGE QA | RATE OF FLOW(MGD) PEAK QP | RATE OF FLOW(MGD) CAPACITY QF | PIPE RATIO QP/QF | VELOCITY AVG FPS | VELOCITY PEAK FPS | VELOCITY CAP FPS | UPSTREAM MANHOLE RIM ELEV | COMMENTS NOTE WARNING |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| * AT MH 8B2 | | | | | | | | 1166 | 0 | | | | | | | | | |
| 8B2 | 8B1 | 883.96 | 883.56 | 72. | 8. | VCP | 0.006 | 1166 | 0 | 0.1166 | 0.4236 | 0.5821 | 0.73 | 2.02 | 2.81 | 2.58 | 896.91 | B |
| 8B1 | 1-1-8B | 883.56 | 881.69 | 222. | 8. | VCP | 0.008 | 1166 | 0 | 0.1166 | 0.4236 | 0.7168 | 0.59 | 2.34 | 3.31 | 3.18 | 897.28 | |
| 1-1-8D | 1-1-8C | 914.24 | 900.99 | 399. | 6. | VCP | 0.033 | 114 | 0 | 0.0114 | 0.0433 | 0.6608 | 0.07 | 1.99 | 2.99 | 5.21 | 919.90 | |
| 1-1-8C | 1-1-8B | 900.99 | 881.69 | 324. | 6. | VCP | 0.060 | 203 | 0 | 0.0203 | 0.0771 | 0.8850 | 0.09 | 2.92 | 4.34 | 6.97 | 909.20 | |
| * AT MH 1-1-8B | | | | | | | | 1369 | 0 | | | | | | | | | |
| 1-1-8B | 1-1-8A | 881.69 | 881.22 | 197. | 10. | VCP | 0.002 | 1413 | 0 | 0.1413 | 0.5123 | 0.6916 | 0.74 | 1.54 | 2.14 | 1.96 | 896.49 | |
| 1-1-8A | 1-1-8 | 881.22 | 872.20 | 93. | 10. | VCP | 0.097 | 1442 | 0 | 0.1442 | 0.5227 | 4.4098 | 0.12 | 5.74 | 8.48 | 12.51 | 890.71 | |
| * AT MH 1-1-8 | | | | | | | | 3689 | 0 | | | | | | | | | |
| 1-1-8 | 1-1-7 | 872.20 | 868.53 | 287. | 10. | VCP | 0.013 | 3689 | 0 | 0.3689 | 1.3131 | 1.6012 | 0.82 | 3.69 | 5.06 | 4.54 | 888.19 | |
| 1-1-7 | 1-1-6 | 868.53 | 861.62 | 377. | 10. | VCP | 0.018 | 3689 | 0 | 0.3689 | 1.3131 | 1.9170 | 0.68 | 4.20 | 5.85 | 5.44 | 876.44 | |
| 1-1-6 | 1-1-5 | 861.62 | 853.98 | 429. | 10. | VCP | 0.018 | 3689 | 0 | 0.3689 | 1.3131 | 1.8896 | 0.69 | 4.16 | 5.78 | 5.36 | 868.23 | |
| 1-1-5 | 1-1-5A | 853.98 | 851.42 | 77. | 10. | VCP | 0.033 | 3689 | 0 | 0.3689 | 1.3131 | 2.5818 | 0.51 | 5.20 | 7.33 | 7.32 | 862.58 | |
| 1-1-5A | 1-1-3 | 851.42 | 841.94 | 487. | 10. | VCP | 0.019 | 3689 | 0 | 0.3689 | 1.3131 | 1.9756 | 0.66 | 4.29 | 5.99 | 5.60 | 859.40 | |
| 1-1-3 | 1-1-2 | 841.94 | 832.38 | 366. | 10. | VCP | 0.026 | 3689 | 0 | 0.3689 | 1.3131 | 2.2885 | 0.57 | 4.77 | 6.71 | 6.49 | 862.34 | |
| 1-1-2 | 1-1-1 | 832.38 | 830.34 | 170. | 10. | VCP | 0.012 | 3689 | 0 | 0.3689 | 1.3131 | 1.5511 | 0.85 | 3.61 | 4.93 | 4.40 | 841.91 | |
| 1-1-1 | 1-1 | 830.34 | 829.58 | 74. | 10. | VCP | 0.010 | 3689 | 0 | 0.3689 | 1.3131 | 1.4350 | 0.92 | 3.41 | 4.61 | 4.07 | 837.00 | |

```
*  AT MH 1-1                    20704                  3689     0  (COMANCHE II)
*                               14369                  1023     0  (COMANCHE I)
*                               -----                  ----     -
*                               35073                  4712     0  (TOTAL)
*
* MH 1-1 DISCHARGES TO LIFT STATION # 51400, WHERE IT IS JOINED BY THE FLOW
*      FROM COMANCHE VILLAGE III (FROM LIFT STATION # 52380).
*
*  AT LIFT STATION # 51400
*                               35073                  4712     0  (COMANCHE I & II)
*                               37265                  3794    10  (COMANCHE III)
*                               -----                  ----    --
*                               72338                  8506    10  (TOTAL)
*
*
*
TOTAL NUMBER OF REACHES BELOW 1.2 FPS =     9.
TOTAL NUMBER OF ADVERSE REACHES =     0.
TOTAL NUMBER OF REACHES EXCEEDING PIPE CAPACITY =     0.
TOTAL NUMBER OF REACHES WHICH HAVE FULL PIPE VELOCITIES BELOW 1.5 FPS=     1.
        1-1-16  1-1-15
TOTAL NUMBER OF REACHES =    79.
```

## SUBAREA 3

Subarea 3 consists of the Comanche Village I family housing area, located west of Clear Creek Road and north of Comanche Village II.

As in Subarea II, flows are conveyed to Lift Station 51400, to join those from Comanche Villages II and III, and then pumped through a 12-inch force main to manhole W-79B8 in Subarea 5.

Average flow velocities below the specified minimum 1.2 FPS occur in 15 of the 82 reaches, all of which contain only PVC piping.

No reconstruction of sewer lines or manholes within Subarea 3 is required. Television inspection will show the general pipe conditions within the subarea.

# COMANCHE VILLAGE I

* SOME GRADE CHANGES OCCUR BETWEEN MANHOLES IN THIS AREA. THE LOCATION OF THE
* GRADE CHANGE IS IDENTIFIED BY THE USE OF POINTS (PT-A, PT-B, ETC).
* THE ELEVATIONS AND LOCATIONS OF THESE POINTS WERE OBTAINED FROM AS-BUILT
* DRAWINGS.
* ELEVATIONS OF THE CLEAN-OUTS WERE ALSO OBTAINED FROM AS-BUILT DRAWINGS.
* WHERE TWO OR MORE LINES FROM CLEANOUTS ENTER A SINGLE MANHOLE, THE DIRECTION
* FROM WHICH IT ENTERS IS SHOWN AS FOLLOWS: CO(E), CO(W), ETC.

AREA 3 ,AS DEFINED BY THE SANITARY SEWER ANALYSIS, COMPLETED BY BOHANNAN-HUSTON, INC., SEPTEMBER 1984.

COMMENT COLUMN "NOTES"

EXCEPT AS NOTED:
> ELEVATIONS WERE OBTAINED THROUGH FIELD SURVEYS
> DISTANCES WERE GENERATED FROM COMPUTER PLOTS

A = INVERT BASED ON REPORT BY FREESE & NICHOLS (4/78)
B = DISTANCE BETWEEN MANHOLES IS SCALED
C = INVERT BASED ON "AS-BUILT" DRAWINGS
D = INVERT BASED ON TOPOGRAPHY & ADJACENT MANHOLE DATA
NA = NOT AVAILABLE
NF = NOT FOUND

FORMER MANHOLE IDENTIFICATION NUMBERS ALSO APPEAR IN THE COMMENT COLUMN UNDER "NOTES"

COMMENT COLUMN "WARNINGS"

W = ZERO OR ADVERSE SLOPE PRESENT
(PEAK FLOW MAY EXCEED PIPE CAPACITY)
X = PEAK FLOW EXCEEDS PIPE CAPACITY
(LOW VELOCITIES MAY BE PRESENT)
Y = FULL PIPE VELOCITY BELOW 1.5 FPS
(AVERAGE VELOCITY MAY ALSO BE LOW)
Z = AVERAGE VELOCITY BELOW 1.2 FPS

| MANHOLES FROM MH ID | TO MH ID | INVERT ELEV FROM FT | TO FT | DIST FT | PIPE DIA IN | TYP | SLOPE FT/FT | POPULATION RES | N-RES | RATE OF FLOW(MGD) AVERAGE QA | PEAK QP | CAPACITY QF | PIPE RATIO QP/QF | VELOCITY AVG FPS | PEAK FPS | CAP FPS | UPSTREAM MANHOLE RIM ELEV | COMMENTS NOTE | WARNING |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO | 1-1H | 909.95 | 908.94 | 198. | 6. | PVC | 0.005 | 43 | 0 | 0.0043 | 0.0163 | 0.3061 | 0.05 | 0.86 | 1.30 | 2.41 | NA | | Z |
| 1-1H | PT-A | 908.94 | 908.04 | 70. | 6. | PVC | 0.013 | 54 | 0 | 0.0054 | 0.0205 | 0.4859 | 0.04 | 1.27 | 1.93 | 3.83 | 913.70 | | |
| PT-A | PT-B | 908.04 | 900.04 | 205. | 6. | PVC | 0.039 | 80 | 0 | 0.0080 | 0.0304 | 0.8466 | 0.04 | 2.11 | 3.21 | 6.67 | NA | | |
| PT-B | 1-1G | 900.04 | 899.39 | 56. | 6. | PVC | 0.012 | 80 | 0 | 0.0080 | 0.0304 | 0.4617 | 0.07 | 1.39 | 2.09 | 3.64 | NA | | |
| 1-1G | 1-1F | 899.39 | 888.37 | 335. | 6. | PVC | 0.033 | 124 | 0 | 0.0124 | 0.0471 | 0.7773 | 0.06 | 2.29 | 3.43 | 6.12 | 903.89 | | |
| 1-1F | PT-A | 888.37 | 881.61 | 177. | 6. | PVC | 0.038 | 169 | 0 | 0.0169 | 0.0642 | 0.8375 | 0.08 | 2.65 | 3.96 | 6.60 | 892.24 | | |
| PT-A | 1-1E | 881.61 | 878.26 | 250. | 6. | PVC | 0.013 | 169 | 0 | 0.0169 | 0.0642 | 0.4961 | 0.13 | 1.85 | 2.71 | 3.91 | NA | | |
| CO | 1-1E3 | 904.60 | 903.00 | 206. | 6. | PVC | 0.008 | 40 | 0 | 0.0040 | 0.0152 | 0.3777 | 0.04 | 0.97 | 1.48 | 2.98 | NA | | Z |
| 1-1E3 | PT-A | 903.00 | 897.70 | 120. | 6. | PVC | 0.044 | 64 | 0 | 0.0064 | 0.0243 | 0.9006 | 0.03 | 2.04 | 3.15 | 7.10 | 907.24 | | |
| PT-A | 1-1E2 | 897.70 | 892.04 | 256. | 6. | PVC | 0.022 | 86 | 0 | 0.0086 | 0.0327 | 0.6372 | 0.05 | 1.78 | 2.68 | 5.02 | NA | | |
| 1-1E2 | PT-A | 892.04 | 887.46 | 168. | 6. | PVC | 0.027 | 114 | 0 | 0.0114 | 0.0433 | 0.7076 | 0.06 | 2.09 | 3.13 | 5.58 | 896.69 | | |
| PT-A | 1-1E1 | 887.46 | 885.65 | 138. | 6. | PVC | 0.013 | 126 | 0 | 0.0126 | 0.0479 | 0.4908 | 0.10 | 1.68 | 2.48 | 3.87 | NA | | |
| 1-1E1 | PT-A | 885.65 | 884.25 | 129. | 6. | PVC | 0.011 | 141 | 0 | 0.0141 | 0.0536 | 0.4465 | 0.12 | 1.63 | 2.39 | 3.52 | 890.00 | | |
| PT-A | 1-1E | 884.25 | 878.26 | 144. | 6. | PVC | 0.042 | 153 | 0 | 0.0153 | 0.0581 | 0.8740 | 0.07 | 2.65 | 3.97 | 6.89 | NA | | |
| * AT MH 1-1E | | | | | | | | 322 | 0 | | | | | | | | | | |
| 1-1E | PT-A | 878.26 | 873.56 | 153. | 6. | PVC | 0.031 | 340 | 0 | 0.0340 | 0.1292 | 0.7511 | 0.17 | 3.06 | 4.44 | 5.92 | 882.47 | | |
| PT-A | 1-1D | 873.56 | 871.65 | 210. | 6. | PVC | 0.009 | 340 | 0 | 0.0340 | 0.1292 | 0.4087 | 0.32 | 1.95 | 2.83 | 3.22 | NA | | |
| CO | 1-1D4 | 894.36 | 891.98 | 399. | 6. | PVC | 0.006 | 48 | 0 | 0.0048 | 0.0182 | 0.3310 | 0.06 | 0.94 | 1.42 | 2.61 | NA | | Z |
| 1-1D4 | 1-1D3 | 891.98 | 889.60 | 297. | 6. | PVC | 0.008 | 88 | 0 | 0.0088 | 0.0334 | 0.3836 | 0.09 | 1.27 | 1.88 | 3.02 | 898.48 | | |
| 1-1D3 | PT-A | 889.60 | 881.22 | 210. | 6. | PVC | 0.040 | 88 | 0 | 0.0088 | 0.0334 | 0.8561 | 0.04 | 2.19 | 3.33 | 6.75 | 893.89 | | |
| PT-A | 1-1D2 | 881.22 | 879.05 | 121. | 6. | PVC | 0.018 | 88 | 0 | 0.0088 | 0.0334 | 0.5739 | 0.06 | 1.67 | 2.51 | 4.52 | NA | | |
| * 1-1D2 IS AN IN-LINE CLEANOUT (NOT A MANHOLE) | | | | | | | | | | | | | | | | | | | |
| 1-1D2 | 1-1D1 | 879.05 | 876.84 | 147. | 6. | PVC | 0.015 | 98 | 0 | 0.0098 | 0.0372 | 0.5255 | 0.07 | 1.62 | 2.43 | 4.14 | NA | | |
| CO | 1-1D1 | 882.06 | 876.84 | 133. | 6. | PVC | 0.039 | 31 | 0 | 0.0031 | 0.0118 | 0.8490 | 0.01 | 1.55 | 2.44 | 6.69 | NA | | |
| *AT MH 1-1DA | | | | | | | | 129 | 0 | | | | | | | | | | |
| 1-1D1 | PT-A | 876.84 | 875.20 | 211. | 6. | PVC | 0.008 | 160 | 0 | 0.0160 | 0.0608 | 0.3778 | 0.16 | 1.51 | 2.19 | 2.98 | 881.80 | | |

| MANHOLES FROM MH ID | MANHOLES TO MH ID | INVENT ELEV FROM FT | INVENT ELEV TO FT | DIST FT | PIPE DIA IN | PIPE TYP | PIPE SLOPE FT/FT | POPULATION RES | POPULATION N-RES | RATE OF FLOW(MGD) AVERAGE QA | RATE OF FLOW(MGD) PEAK QP | RATE OF FLOW(MGD) CAPACITY QF | PIPE RATIO QP/QF | VELOCITY AVG FPS | VELOCITY PEAK FPS | VELOCITY CAP FPS | UPSTREAM MANHOLE RIM ELEV | COMMENTS NOTE | WARNING |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PT-A | 1-1D | 875.20 | 871.65 | 98. | 6. | PVC | 0.036 | 160 | 0 | 0.0160 | 0.0608 | 0.8156 | 0.07 | 2.56 | 3.82 | 6.43 | NA | | |
| *AT MH 1-1D | | | | | | | | 500 | 0 | | | | | | | | | | |
| 1-1D | 1-1C2 | 871.65 | 867.31 | 153. | 6. | PVC | 0.028 | 500 | 0 | 0.0500 | 0.1900 | 0.7218 | 0.26 | 3.26 | 4.78 | 5.69 | 878.98 | | |
| 1-1C2 | PT-A | 867.31 | 848.30 | 100. | 6. | PVC | 0.190 | 500 | 0 | 0.0500 | 0.1900 | 1.8685 | 0.10 | 6.47 | 9.56 | 14.72 | 872.52 | | |
| PT-A | 1-1C | 848.30 | 845.17 | 59. | 6. | PVC | 0.053 | 500 | 0 | 0.0500 | 0.1900 | 0.9871 | 0.19 | 4.07 | 6.02 | 7.78 | NA | | |
| CO-8 | PT-A | 878.00 | 874.55 | 200. | 6. | PVC | 0.017 | 22 | 0 | 0.0022 | 0.0084 | 0.5629 | 0.01 | 1.05 | 1.65 | 4.44 | NA | | Z |
| PT-A | 1-1C1 | 874.55 | 870.03 | 182. | 6. | PVC | 0.025 | 34 | 0 | 0.0034 | 0.0129 | 0.6754 | 0.02 | 1.37 | 2.13 | 5.32 | NA | | |
| CO-8W | 1-1C1 | 876.59 | 870.03 | 176. | 6. | PVC | 0.037 | 22 | 0 | 0.0022 | 0.0084 | 0.8274 | 0.01 | 1.36 | 2.16 | 6.52 | NA | | |
| * AT MH 1-1C1 | | | | | | | | 56 | 0 | | | | | | | | | | |
| 1-1C1 | 1-1C | 870.03 | 845.17 | 181. | 6. | PVC | 0.137 | 56 | 0 | 0.0056 | 0.0213 | 1.5882 | 0.01 | 2.87 | 4.51 | 12.52 | 873.90 | | |
| * AT MH 1-1C | | | | | | | | 556 | 0 | | | | | | | | | | |
| 1-1C | 1-1B1 | 845.17 | 841.83 | 328. | 6. | PVC | 0.010 | 556 | 0 | 0.0556 | 0.2113 | 0.4324 | 0.49 | 2.34 | 3.38 | 3.41 | 850.60 | | |
| 1-1B1 | PT-A | 841.83 | 841.34 | 64. | 6. | PVC | 0.008 | 556 | 0 | 0.0556 | 0.2113 | 0.3750 | 0.56 | 2.12 | 3.03 | 2.95 | 852.58 | | |
| PT-A | 1-1B | 841.34 | 836.63 | 163. | 6. | PVC | 0.029 | 556 | 0 | 0.0556 | 0.2113 | 0.7285 | 0.29 | 3.39 | 4.94 | 5.74 | NA | C | |
| 1-1B | 1-1A | 836.63 | 831.91 | 310. | 6. | PVC | 0.015 | 556 | 0 | 0.0556 | 0.2113 | 0.5288 | 0.40 | 2.70 | 3.93 | 4.17 | 841.22 | | |
| 1-1A | 1-1 | 831.91 | 829.58 | 181. | 6. | PVC | 0.013 | 556 | 0 | 0.0556 | 0.2113 | 0.4862 | 0.43 | 2.55 | 3.69 | 3.83 | 842.57 | | |
| CO | 1-12 | 887.66 | 886.03 | 289. | 6. | PVC | 0.006 | 37 | 0 | 0.0037 | 0.0141 | 0.3218 | 0.04 | 0.85 | 1.29 | 2.54 | NA | | Z |
| 1-12 | 1-11 | 886.03 | 873.31 | 234. | 6. | PVC | 0.054 | 67 | 0 | 0.0067 | 0.0255 | 0.9992 | 0.03 | 2.22 | 3.43 | 7.87 | 890.23 | | |
| * MANHOLE 1-11 COULD NOT BE OPENED. | | | | | | | | | | | | | | | | | | | |
| 1-11 | 1-10 | 873.14 | 871.93 | 219. | 10. | PVC | 0.006 | 67 | 0 | 0.0067 | 0.0255 | 1.2439 | 0.02 | 0.93 | 1.41 | 3.53 | 888.32 | C | Z |
| 1-10 | 1-9 | 871.93 | 864.94 | 269. | 10. | PVC | 0.026 | 67 | 0 | 0.0067 | 0.0255 | 2.6975 | 0.01 | 1.56 | 2.49 | 7.65 | 877.13 | | |
| 1-9 | 1-8 | 864.94 | 858.94 | 354. | 10. | PVC | 0.017 | 67 | 0 | 0.0067 | 0.0255 | 2.1786 | 0.01 | 1.35 | 2.14 | 6.18 | 870.96 | | |
| CO-8 | 1-8A1 | 889.50 | 887.43 | 301. | 6. | PVC | 0.007 | 22 | 0 | 0.0022 | 0.0084 | 0.3554 | 0.02 | 0.77 | 1.19 | 2.80 | NA | | Z |
| CO-E | 1-8A1 | 888.12 | 887.43 | 108. | 6. | PVC | 0.006 | 19 | 0 | 0.0019 | 0.0072 | 0.3425 | 0.02 | 0.72 | 1.11 | 2.70 | NA | | Z |
| * AT MH 1-8A1 | | | | | | | | 41 | 0 | | | | | | | | | | |
| 1-8A1 | 1-8A | 887.43 | 877.84 | 221. | 6. | PVC | 0.043 | 72 | 0 | 0.0072 | 0.0274 | 0.8927 | 0.03 | 2.11 | 3.24 | 7.03 | 892.08 | | |
| 1-8A | 1-8 | 877.84 | 862.40 | 153. | 6. | PVC | 0.101 | 72 | 0 | 0.0072 | 0.0274 | 1.3614 | 0.02 | 2.81 | 4.36 | 10.73 | 881.42 | | |
| * AT MH 1-8 | | | | | | | | 139 | 0 | | | | | | | | | | |
| 1-8 | 1-7 | 858.94 | 856.19 | 251. | 10. | PVC | 0.011 | 139 | 0 | 0.0139 | 0.0528 | 1.7516 | 0.03 | 1.48 | 2.22 | 4.97 | 865.40 | | |
| 1-7 | 1-6 | 856.19 | 847.45 | 125. | 10. | PVC | 0.070 | 139 | 0 | 0.0139 | 0.0528 | 4.4249 | 0.01 | 2.77 | 4.37 | 12.55 | 862.15 | | |
| CO | PT-A | 878.66 | 876.07 | 178. | 6. | CI | 0.015 | 47 | 0 | 0.0047 | 0.0179 | 0.4062 | 0.04 | 1.08 | 1.64 | 3.20 | NA | | Z |
| PT-A | 1-6B1 | 876.07 | 870.92 | 234. | 6. | PVC | 0.022 | 47 | 0 | 0.0047 | 0.0179 | 0.6358 | 0.03 | 1.46 | 2.25 | 5.01 | NA | | |
| 1-6B1 | 1-6B | 870.92 | 867.11 | 40. | 6. | PVC | 0.095 | 47 | 0 | 0.0047 | 0.0179 | 1.3226 | 0.01 | 2.40 | 3.77 | 10.42 | 879.27 | | |
| CO | PT-A | 894.93 | 885.55 | 204. | 6. | PVC | 0.046 | 24 | 0 | 0.0024 | 0.0091 | 0.9189 | 0.01 | 1.50 | 2.39 | 7.24 | NA | | |
| PT-A | PT-B | 885.55 | 876.80 | 162. | 6. | PVC | 0.054 | 45 | 0 | 0.0045 | 0.0171 | 0.9960 | 0.02 | 1.95 | 3.04 | 7.85 | NA | | |
| PT-B | 1-6B | 876.80 | 867.11 | 30. | 6. | PVC | 0.323 | 45 | 0 | 0.0045 | 0.0171 | 2.4356 | 0.01 | 3.56 | 5.71 | 19.19 | NA | | |
| * AT MH 1-6B | | | | | | | | 92 | 0 | | | | | | | | | | |
| 1-6B | PT-A | 867.11 | 864.74 | 61. | 6. | PVC | 0.039 | 92 | 0 | 0.0092 | 0.0350 | 0.8447 | 0.04 | 2.20 | 3.34 | 6.66 | 871.21 | | |
| PT-A | 1-6A | 864.74 | 863.02 | 206. | 6. | PVC | 0.008 | 92 | 0 | 0.0092 | 0.0350 | 0.3916 | 0.09 | 1.30 | 1.93 | 3.09 | NA | | |
| CO | PT-A | 890.84 | 877.50 | 216. | 6. | PVC | 0.062 | 35 | 0 | 0.0035 | 0.0133 | 1.0650 | 0.01 | 1.88 | 2.96 | 8.39 | NA | | |
| PT-A | 1-6A | 877.50 | 863.02 | 104. | 6. | PVC | 0.139 | 35 | 0 | 0.0035 | 0.0133 | 1.5991 | 0.01 | 2.47 | 3.94 | 12.60 | NA | | |
| * AT MH 1-6A | | | | | | | | 127 | 0 | | | | | | | | | | |
| 1-6A | PT-A | 863.02 | 858.17 | 57. | 6. | PVC | 0.085 | 127 | 0 | 0.0127 | 0.0483 | 1.2501 | 0.04 | 3.18 | 4.85 | 9.85 | 869.17 | | |
| PT-A | PT-B | 858.17 | 848.38 | 142. | 6. | PVC | 0.069 | 127 | 0 | 0.0127 | 0.0483 | 1.1252 | 0.04 | 2.96 | 4.50 | 8.87 | NA | | |
| PT-B | 1-6 | 848.38 | 847.45 | 100. | 6. | PVC | 0.009 | 127 | 0 | 0.0127 | 0.0483 | 0.4133 | 0.12 | 1.50 | 2.20 | 3.26 | NA | | |

| MANHOLES FROM MH ID | TO MH ID | INVERT ELEV FROM FT | TO FT | DIST FT | DIA IN | PIPE TYP | SLOPE FT/FT | POPULATION RES | N-RES | RATE OF FLOW(MGD) AVERAGE QA | PEAK QP | CAPACITY QF | PIPE RATIO QP/QF | VELOCITY AVG FPS | PEAK FPS | CAP FPS | UPSTREAM MANHOLE RIM ELEV | COMMENTS NOTE | WARNING |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO | 1-6C | 882.84 | 876.12 | 146. | 6. | PVC | 0.046 | 22 | 0 | 0.0022 | 0.0084 | 0.9194 | 0.01 | 1.46 | 2.33 | 7.25 | NA | | |
| 1-6C | 1-6 | 876.12 | 847.45 | 220. | 6. | PVC | 0.130 | 22 | 0 | 0.0022 | 0.0084 | 1.5470 | 0.01 | 2.08 | 3.35 | 12.19 | 881.82 | | |
| * AT MH 1-6 | | | | | | | | 288 | 0 | | | | | | | | | | |
| * MANHOLE 1-6 COULD NOT BE OPENED. | | | | | | | | | | | | | | | | | | | |
| 1-6 | 1-5 | 847.45 | 840.26 | 229. | 10. | PVC | 0.031 | 288 | 0 | 0.0288 | 0.1094 | 2.9652 | 0.04 | 2.68 | 4.00 | 8.41 | 853.79 | C | |
| CO | 1-5H | 893.27 | 892.73 | 254. | 6. | PVC | 0.002 | 31 | 0 | 0.0031 | 0.0118 | 0.1976 | 0.06 | 0.58 | 0.87 | 1.56 | NA | | Z |
| 1-5H | 1-5G | 892.73 | 891.41 | 145. | 6. | PVC | 0.009 | 51 | 0 | 0.0051 | 0.0194 | 0.4089 | 0.05 | 1.11 | 1.68 | 3.22 | 896.55 | | Z |
| 1-5G | PT-A | 890.87 | 886.21 | 185. | 6. | PVC | 0.025 | 71 | 0 | 0.0071 | 0.0270 | 0.6802 | 0.04 | 1.75 | 2.66 | 5.36 | 895.21 | | |
| PT-A | 1-5F | 886.21 | 885.63 | 117. | 6. | PVC | 0.005 | 71 | 0 | 0.0071 | 0.0270 | 0.3017 | 0.09 | 1.00 | 1.49 | 2.38 | NA | | Z |
| 1-5F | 1-5E | 885.63 | 884.51 | 280. | 6. | PVC | 0.004 | 71 | 0 | 0.0071 | 0.0270 | 0.2710 | 0.10 | 0.93 | 1.38 | 2.14 | 892.24 | | Z |
| CO | PT-A | 891.62 | 890.80 | 68. | 6. | PVC | 0.012 | 30 | 0 | 0.0030 | 0.0114 | 0.4706 | 0.02 | 1.03 | 1.59 | 3.71 | NA | | Z |
| PT-A | 1-5E | 890.80 | 884.51 | 25. | 6. | PVC | 0.252 | 30 | 0 | 0.0030 | 0.0114 | 2.1496 | 0.01 | 2.87 | 4.63 | 16.94 | NA | | |
| * AT MH 1-5E | | | | | | | | 101 | 0 | | | | | | | | | | |
| 1-5E | 1-5D | 884.51 | 882.57 | 292. | 6. | PVC | 0.007 | 101 | 0 | 0.0101 | 0.0384 | 0.3493 | 0.11 | 1.24 | 1.83 | 2.75 | 893.24 | | |
| CO | 1-5D | 892.88 | 882.57 | 161. | 6. | PVC | 0.064 | 24 | 0 | 0.0024 | 0.0091 | 1.0845 | 0.01 | 1.68 | 2.68 | 8.55 | NA | | |
| * AT MH 1-5D | | | | | | | | 125 | 0 | | | | | | | | | | |
| 1-5D | 1-5C | 882.57 | 881.48 | 229. | 6. | PVC | 0.005 | 125 | 0 | 0.0125 | 0.0475 | 0.2957 | 0.16 | 1.18 | 1.72 | 2.33 | 889.92 | | Z |
| 1-5C | 1-5B | 881.48 | 878.95 | 381. | 6. | PVC | 0.007 | 156 | 0 | 0.0156 | 0.0593 | 0.3492 | 0.17 | 1.42 | 2.06 | 2.75 | 889.03 | | |
| 1-5B | PT-A | 878.95 | 877.92 | 113. | 8. | PVC | 0.009 | 179 | 0 | 0.0179 | 0.0680 | 0.4812 | 0.08 | 1.57 | 2.35 | 3.91 | 888.62 | | |
| PT-A | PT-B | 877.92 | 872.62 | 93. | 8. | PVC | 0.057 | 179 | 0 | 0.0179 | 0.0680 | 2.2033 | 0.03 | 2.94 | 4.50 | 9.77 | NA | | |
| PT-B | 1-5A | 872.62 | 841.15 | 194. | 8. | PVC | 0.162 | 179 | 0 | 0.0179 | 0.0680 | 3.7173 | 0.02 | 4.18 | 6.51 | 16.48 | NA | | |
| 1-5A | 1-5 | 841.15 | 840.26 | 42. | 8. | PVC | 0.021 | 179 | 0 | 0.0179 | 0.0680 | 1.3435 | 0.05 | 2.10 | 3.11 | 5.96 | 853.17 | | |
| * AT MH 1-5 | | | | | | | | 179 | 0 | | | | | | | | | | |
| 1-5 | 1-4 | 840.26 | 838.71 | 139. | 10. | PVC | 0.011 | 467 | 0 | 0.0467 | 0.1775 | 1.7671 | 0.10 | 2.20 | 3.21 | 5.01 | 852.56 | | |
| 1-4 | 1-3 | 838.71 | 838.08 | 205. | 10. | PVC | 0.003 | 467 | 0 | 0.0467 | 0.1775 | 0.9277 | 0.19 | 1.37 | 2.03 | 2.63 | 846.61 | | |
| 1-3 | 1-2 | 838.08 | 832.42 | 148. | 10. | PVC | 0.038 | 467 | 0 | 0.0467 | 0.1775 | 3.2725 | 0.05 | 3.35 | 4.95 | 9.28 | 845.68 | | |
| 1-2 | 1-1 | 832.42 | 829.58 | 38. | 10. | PVC | 0.075 | 467 | 0 | 0.0467 | 0.1775 | 4.5748 | 0.04 | 4.20 | 6.27 | 12.98 | 837.18 | | |

| | | | | |
|---|---|---|---|---|
| * AT MH 1-1 | 14369 | 1023 | 0 | (COMANCHE I) |
| * | 20704 | 3689 | 0 | (COMANCHE II) |
| * | 35073 | 4712 | 0 | (TOTAL) |
| * | | | | |
| * MH 1-1 DISCHARGES TO LIFT STATION # 51400, WHERE IT IS JOINED BY THE FLOW | | | | |
| * FROM COMANCHE VILLAGE III (FROM LIFT STATION # 52380). | | | | |
| * | | | | |
| * AT LIFT STATION # 51400 | 35073 | 4712 | 0 | (COMANCHE I & II) |
| * | 37265 | 3794 | 10 | (COMANCHE III) |
| * | 72338 | 8506 | 10 | (TOTAL COMANCHE I, II, & III) (AREAS 3, 2, & 1) |
| * | | | | |
| * | | | | |

TOTAL NUMBER OF REACHES BELOW 1.2 FPS = 15.
TOTAL NUMBER OF ADVERSE REACHES = 0.
TOTAL NUMBER OF REACHES EXCEEDING PIPE CAPACITY = 0.
TOTAL NUMBER OF REACHES WHICH HAVE FULL PIPE VELOCITIES BELOW 1.5 FPS= 0.
TOTAL NUMBER OF REACHES = 82.

## SUBAREA 4

Subarea 4, located at the northwest corner of the main cantonment, consists primarily of military barracks and support facilities.

Flows are conveyed generally to the west, then southward to Lift Station 41012 at Battalion Avenue. An 8-inch force main transports the pumped sewage to manhole W-241 in Subarea 5.

Average flow velocities below the specified minimum 1.2 FPS occur in 27 of the 65 reaches. These low velocities are not considered a problem because the system contains VC and some PVC piping. One of the 27 reaches also has a full pipe velocity below the specified mimimum 1.5 FPS, occurring at the beginning of a branch (MH H-97B8D to H-97B8C @ 1.25 FPS).

No reconstruction of lines within Subarea 4 is required. The following repairs are necessary:

| | |
|---|---|
| MH H-46 -- Repair Concrete Collar | $ 150.00 |
| MH H-36B -- Repair Concrete Collar | 150.00 |
| | $ 300.00 |

AREA 4 ,AS DEFINED BY THE SANITARY SEWER ANALYSIS, COMPLETED BY BOHANNAN-HUSTON, INC., SEPTEMBER 1984.

COMMENT COLUMN "NOTES"
**********

EXCEPT AS NOTED:
> ELEVATIONS WERE OBTAINED THROUGH FIELD SURVEYS
> DISTANCES WERE GENERATED FROM COMPUTER PLOTS

A = INVERT BASED ON REPORT BY FREESE & NICHOLS (4/78)
B = DISTANCE BETWEEN MANHOLES IS SCALED
C = INVERT BASED ON "AS-BUILT" DRAWINGS
D = INVERT BASED ON TOPOGRAPHY & ADJACENT MANHOLE DATA
NA = NOT AVAILABLE
NF = NOT FOUND

COMMENT COLUMN "WARNINGS"
**********

W = ZERO OR ADVERSE SLOPE PRESENT
(PEAK FLOW MAY EXCEED PIPE CAPACITY)
X = PEAK FLOW EXCEEDS PIPE CAPACITY
(LOW VELOCITIES MAY BE PRESENT)
Y = FULL PIPE VELOCITY BELOW 1.5 FPS
(AVERAGE VELOCITY MAY ALSO BE LOW)
Z = AVERAGE VELOCITY BELOW 1.2 FPS

FORMER MANHOLE IDENTIFICATION NUMBERS ALSO APPEAR IN THE COMMENT COLUMN UNDER "NOTES"

| MANHOLES FROM MH ID | TO MH ID | INVERT ELEV FROM FT | TO FT | DIST FT | PIPE DIA IN | TYP | SLOPE FT/FT | POPULATION RES | N-RES | RATE OF FLOW(MGD) AVERAGE QA | PEAK QP | CAPACITY QF | PIPE RATIO QP/QF | VELOCITY AVG FPS | PEAK FPS | CAP FPS | UPSTREAM MANHOLE RIM ELEV | COMMENTS NOTE | WARNING |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| H-97B13 | H-97B12 | 931.65 | 928.27 | 340. | 6. | VCP | 0.010 | 0 | 67 | 0.0020 | 0.0076 | 0.3616 | 0.02 | 0.76 | 1.18 | 2.85 | 934.55 | | Z |
| * MANHOLE H-97B12 WAS UNDER MOTOR POOL EQUIPMENT | | | | | | | | | | | | | | | | | | | |
| H-97B12 | H-97B11 | 928.27 | 927.35 | 224. | 8. | VCP | 0.004 | 0 | 100 | 0.0030 | 0.0114 | 0.5005 | 0.02 | 0.60 | 0.94 | 2.22 | 934.13 | C | Z |
| H-97B11 | H-97B10 | 927.35 | 925.97 | 229. | 8. | VCP | 0.006 | 0 | 100 | 0.0030 | 0.0114 | 0.6062 | 0.02 | 0.69 | 1.07 | 2.69 | 934.20 | | Z |
| * MANHOLE H-97B10 WAS UNDER MOTOR POOL EQUIPMENT | | | | | | | | | | | | | | | | | | | |
| H-97B10 | H-97B9 | 925.97 | 925.14 | 198. | 8. | VCP | 0.004 | 0 | 100 | 0.0030 | 0.0114 | 0.5056 | 0.02 | 0.61 | 0.94 | 2.24 | NF | C | Z |
| H-97B9A | H-97B9 | 927.00 | 925.14 | 359. | 8. | VCP | 0.005 | 0 | 100 | 0.0030 | 0.0114 | 0.5621 | 0.02 | 0.65 | 1.02 | 2.49 | 931.51 | | Z |
| * AT MH H-97B9 | | | | | | | | 0 | 200 | | | | | | | | | | |
| H-97B9 | H-97B8 | 925.14 | 924.11 | 260. | 8. | VCP | 0.004 | 0 | 200 | 0.0060 | 0.0228 | 0.4915 | 0.05 | 0.75 | 1.11 | 2.18 | 931.12 | | Z |
| H-97B8D | H-97B8C | 927.68 | 927.32 | 189. | 6. | VCP | 0.002 | 0 | 10 | 0.0003 | 0.0011 | 0.1583 | 0.01 | 0.23 | 0.37 | 1.25 | 931.68 | | Y |
| H-97B8C | H-97B8A | 927.32 | 926.32 | 208. | 8. | VCP | 0.005 | 0 | 10 | 0.0003 | 0.0011 | 0.5415 | 0.00 | 0.30 | 0.50 | 2.40 | 932.12 | | Z |
| * MANHOLE H-97B8A WAS UNDER MOTOR POOL EQUIPMENT | | | | | | | | | | | | | | | | | | | |
| H-97B8A | H-97B8 | 926.26 | 924.11 | 215. | 8. | VCP | 0.010 | 0 | 110 | 0.0033 | 0.0125 | 0.7810 | 0.02 | 0.84 | 1.32 | 3.46 | NF | C | Z |
| * AT MH H-97B8 | | | | | | | | 0 | 310 | | | | | | | | | | |
| * MANHOLE H-97B8 WAS UNDER MOTOR POOL EQUIPMENT | | | | | | | | | | | | | | | | | | | |
| H-97B8 | H-97B6 | 924.11 | 923.32 | 338. | 8. | VCP | 0.002 | 0 | 310 | 0.0093 | 0.0353 | 0.3775 | 0.09 | 0.72 | 1.06 | 1.67 | NF | C | Z |
| * MANHOLE H-97B7 WAS NOT FOUND IN THE FIELD, AND DOES NOT APPEAR ON AS-BUILT DRAWINGS. | | | | | | | | | | | | | | | | | | | |
| H-97B6 | H-97B5 | 923.32 | 922.15 | 322. | 8. | VCP | 0.004 | 0 | 410 | 0.0123 | 0.0467 | 0.4707 | 0.10 | 0.91 | 1.35 | 2.09 | 932.87 | | Z |
| H-97B5 | H-97B4 | 922.15 | 920.85 | 408. | 8. | VCP | 0.003 | 0 | 410 | 0.0123 | 0.0467 | 0.4408 | 0.11 | 0.87 | 1.28 | 1.95 | 929.85 | | Z |
| H-97B4 | H-97B3 | 920.85 | 919.98 | 275. | 8. | VCP | 0.003 | 0 | 510 | 0.0153 | 0.0581 | 0.4393 | 0.13 | 0.93 | 1.36 | 1.95 | 931.35 | | Z |
| H-97B3 | H-97B2 | 919.98 | 918.70 | 265. | 8. | VCP | 0.005 | 0 | 510 | 0.0153 | 0.0581 | 0.5420 | 0.11 | 1.08 | 1.58 | 2.41 | 931.08 | | Z |
| H-97B2 | H-97B1 | 918.70 | 917.50 | 265. | 8. | VCP | 0.005 | 0 | 510 | 0.0153 | 0.0581 | 0.5255 | 0.11 | 1.05 | 1.55 | 2.33 | NF | D | Z |
| H-97B1 | H-97B | 917.50 | 917.36 | 8. | 8. | VCP | 0.018 | 0 | 510 | 0.0153 | 0.0581 | 1.0332 | 0.06 | 1.67 | 2.47 | 4.58 | 923.64 | | |
| H-97C | H-97B | 924.57 | 919.39 | 397. | 8. | VCP | 0.013 | 0 | 100 | 0.0030 | 0.0114 | 0.8921 | 0.01 | 0.89 | 1.41 | 3.95 | 931.73 | | Z |
| * AT MH H-97B | | | | | | | | 0 | 610 | | | | | | | | | | |
| H-97B | H-97A | 912.69 | 911.10 | 273. | 8. | VCP | 0.006 | 0 | 610 | 0.0183 | 0.0695 | 0.5960 | 0.12 | 1.21 | 1.78 | 2.64 | 923.61 | B | |
| * MANHOLE H-97A WAS UNDER MOTOR POOL EQUIPMENT | | | | | | | | | | | | | | | | | | | |
| H-97A | H-97 | 911.10 | 909.90 | 416. | 8. | VCP | 0.003 | 0 | 710 | 0.0213 | 0.0809 | 0.4194 | 0.19 | 0.97 | 1.44 | 1.86 | 917.74 | C | Z |
| H-101A | H-101 | 928.91 | 925.67 | 324. | 8. | VCP | 0.010 | 212 | 0 | 0.0212 | 0.0806 | 0.7810 | 0.10 | 1.53 | 2.26 | 3.46 | 935.33 | | |
| H-101 | H-100 | 925.67 | 921.28 | 164. | 8. | VCP | 0.027 | 212 | 0 | 0.0212 | 0.0806 | 1.2777 | 0.06 | 2.14 | 3.16 | 5.66 | 936.37 | | |
| H-100A | H-100 | 925.04 | 921.28 | 326. | 8. | VCP | 0.012 | 171 | 0 | 0.0171 | 0.0650 | 0.8387 | 0.08 | 1.50 | 2.24 | 3.72 | 931.79 | | |

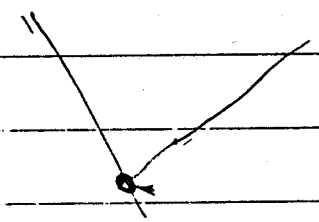
| MANHOLES FROM MH ID | MANHOLES TO MH ID | INVERT ELEV FROM FT | INVERT ELEV TO FT | DIST FT | PIPE DIA IN | PIPE TYP | PIPE SLOPE FT/FT | POPULATION RES | POPULATION N-RES | RATE OF FLOW(MGD) AVERAGE QA | RATE OF FLOW(MGD) PEAK QP | RATE OF FLOW(MGD) CAPACITY QF | PIPE RATIO QP/QF | VELOCITY AVG FPS | VELOCITY PEAK FPS | VELOCITY CAP FPS | UPSTREAM MANHOLE RIM ELEV | COMMENTS NOTE WARNING |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | 383 | 0 | | | | | | | | | |
| * AT MH H-100 | | | | | | | | | | | | | | | | | | |
| H-100 | H-99 | 921.28 | 917.37 | 409. | 8. | VCP | 0.010 | 383 | 0 | 0.0383 | 0.1455 | 0.7636 | 0.19 | 1.76 | 2.61 | 3.38 | 931.82 | |
| H-99 | H-98 | 917.37 | 915.56 | 139. | 8. | VCP | 0.013 | 383 | 0 | 0.0383 | 0.1455 | 0.8912 | 0.16 | 1.97 | 2.92 | 3.95 | 928.29 | |
| H-98 | H-97 | 915.56 | 909.90 | 311. | 8. | VCP | 0.018 | 383 | 150 | 0.0428 | 0.1626 | 1.0535 | 0.15 | 2.29 | 3.40 | 4.67 | 924.59 | |
| | | | | | | | | 383 | 860 | | | | | | | | | |
| * AT MH H-97 | | | | | | | | | | | | | | | | | | |
| H-97 | H-96 | 909.90 | 908.42 | 312. | 8. | VCP | 0.005 | 383 | 860 | 0.0641 | 0.2436 | 0.5379 | 0.45 | 1.60 | 2.32 | 2.38 | 921.20 | |
| H-96B | H-96A | 918.94 | 916.87 | 247. | 8. | VCP | 0.008 | 142 | 0 | 0.0142 | 0.0540 | 0.7149 | 0.08 | 1.27 | 1.89 | 3.17 | 922.19 | |
| H-96A | H-96 | 916.87 | 914.25 | 232. | 8. | VCP | 0.011 | 142 | 0 | 0.0142 | 0.0540 | 0.8299 | 0.07 | 1.40 | 2.10 | 3.68 | 921.52 | |
| | | | | | | | | 525 | 860 | | | | | | | | | |
| * AT MH H-96 | | | | | | | | | | | | | | | | | | |
| H-96 | H-95 | 908.42 | 905.19 | 385. | 8. | VCP | 0.008 | 525 | 860 | 0.0783 | 0.2975 | 0.7153 | 0.42 | 2.08 | 3.02 | 3.17 | 919.05 | |
| H-109 | H-108 | 938.41 | 933.72 | 247. | 8. | VCP | 0.019 | 0 | 200 | 0.0060 | 0.0228 | 1.0761 | 0.02 | 1.27 | 1.97 | 4.77 | 951.11 | Z |
| H-108 | H-107 | 933.72 | 930.79 | 280. | 8. | VCP | 0.010 | 0 | 200 | 0.0060 | 0.0228 | 0.7989 | 0.03 | 1.04 | 1.60 | 3.54 | 939.99 | Z |
| H-106C | H-106B | 936.95 | 932.45 | 322. | 8. | VCP | 0.014 | 0 | 100 | 0.0030 | 0.0114 | 0.9232 | 0.01 | 0.91 | 1.44 | 4.09 | 941.30 | |
| H-106B | H-107 | 932.45 | 929.49 | 117. | 8. | VCP | 0.025 | 0 | 150 | 0.0045 | 0.0171 | 1.2422 | 0.01 | 1.27 | 2.00 | 5.51 | 937.75 | |
| | | | | | | | | 0 | 350 | | | | | | | | | |
| * AT MH H-107 | | | | | | | | | | | | | | | | | | |
| H-107 | H-106A | 929.49 | 925.04 | 184. | 8. | VCP | 0.024 | 0 | 350 | 0.0105 | 0.0399 | 1.2145 | 0.03 | 1.65 | 2.53 | 5.38 | 934.47 | |
| H-106A | H-106 | 925.04 | 915.24 | 384. | 8. | VCP | 0.026 | 0 | 500 | 0.0150 | 0.0570 | 1.2476 | 0.05 | 1.89 | 2.80 | 5.53 | 930.32 | |
| H-106 | H-105 | 915.24 | 913.34 | 150. | 8. | VCP | 0.013 | 0 | 539 | 0.0162 | 0.0614 | 0.8789 | 0.07 | 1.52 | 2.28 | 3.90 | 925.24 | |
| H-105A | H-105 | 916.64 | 913.34 | 309. | 8. | VCP | 0.011 | 0 | 30 | 0.0009 | 0.0034 | 0.8071 | 0.00 | 0.56 | 0.91 | 3.58 | 919.61 | Z |
| | | | | | | | | 0 | 569 | | | | | | | | | |
| * AT MH H-105 | | | | | | | | | | | | | | | | | | |
| H-105 | H-104 | 913.34 | 912.37 | 114. | 8. | VCP | 0.009 | 0 | 569 | 0.0171 | 0.0649 | 0.7204 | 0.09 | 1.35 | 2.00 | 3.19 | 924.11 | |
| H-104A | H-104 | 919.12 | 915.29 | 273. | 8. | VCP | 0.014 | 132 | 0 | 0.0132 | 0.0502 | 0.9250 | 0.05 | 1.48 | 2.19 | 4.10 | 923.32 | |
| | | | | | | | | 132 | 569 | | | | | | | | | |
| * AT MH H-104 | | | | | | | | | | | | | | | | | | |
| H-104 | H-103 | 912.37 | 911.20 | 139. | 8. | VCP | 0.008 | 132 | 569 | 0.0303 | 0.1150 | 0.7165 | 0.16 | 1.57 | 2.34 | 3.18 | 923.19 | B |
| H-103A | H-103 | 916.27 | 912.30 | 274. | 8. | VCP | 0.014 | 156 | 0 | 0.0156 | 0.0593 | 0.9400 | 0.06 | 1.58 | 2.33 | 4.17 | 921.30 | |
| | | | | | | | | 288 | 582 | | | | | | | | | |
| * AT MH H-103 | | | | | | | | | | | | | | | | | | |
| H-103 | H-102 | 911.20 | 905.65 | 350. | 8. | VCP | 0.016 | 288 | 582 | 0.0463 | 0.1758 | 0.9834 | 0.18 | 2.23 | 3.31 | 4.36 | 921.50 | B |
| H-102 | H-95 | 905.65 | 905.19 | 88. | 8. | VCP | 0.005 | 288 | 732 | 0.0508 | 0.1929 | 0.5646 | 0.34 | 1.55 | 2.26 | 2.50 | 917.10 | |
| | | | | | | | | 813 | 1592 | | | | | | | | | |
| * AT MH H-95 | | | | | | | | | | | | | | | | | | |
| H-95 | H-94 | 905.19 | 903.80 | 165. | 8. | VCP | 0.008 | 813 | 1592 | 0.1291 | 0.4684 | 0.7168 | 0.65 | 2.41 | 3.38 | 3.18 | 916.74 | |
| H-94 | H-93 | 903.80 | 900.76 | 329. | 8. | VCP | 0.009 | 813 | 1642 | 0.1306 | 0.4738 | 0.7507 | 0.63 | 2.50 | 3.52 | 3.33 | 915.70 | |
| H-93 | H-92 | 900.76 | 897.41 | 300. | 8. | VCP | 0.011 | 813 | 1792 | 0.1351 | 0.4899 | 0.8253 | 0.59 | 2.70 | 3.81 | 3.06 | 912.20 | |
| CO | CO | 901.00 | 896.80 | 263. | 6. | VCP | 0.016 | 0 | 100 | 0.0030 | 0.0114 | 0.4582 | 0.02 | 1.01 | 1.56 | 3.61 | NF | Z |
| CO | LS | 896.80 | 896.00 | 53. | 6. | VCP | 0.015 | 0 | 100 | 0.0030 | 0.0114 | 0.4455 | 0.03 | 0.99 | 1.53 | 3.51 | NF | Z |

* THE FLOW FROM THE ABOVE TWO LINES ENTERS LIFT STATION (LS) #38020. DISCHARGE
* IS TO THE WEST TO MANHOLE H-97D2. ELEVATIONS AND PIPE SIZES WERE
* OBTAINED FROM AS-BUILT DRAWINGS. MATERIAL IS ASSUMED TO BE VCP.

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| H-95F | H-95E | 908.32 | 901.96 | 232. | 6. | VCP | 0.027 | 0 | 100 | 0.0030 | 0.0114 | 0.6004 | 0.02 | 1.22 | 1.89 | 4.73 | 912.28 | B |
| H-95E | H-95D | 901.96 | 900.26 | 218. | 6. | VCP | 0.008 | 0 | 100 | 0.0030 | 0.0114 | 0.3202 | 0.04 | 0.79 | 1.21 | 2.52 | 915.81 | B Z |
| H-95D | H-95C | 900.26 | 898.44 | 240. | 6. | PVC | 0.008 | 0 | 100 | 0.0030 | 0.0114 | 0.3732 | 0.03 | 0.88 | 1.35 | 2.94 | 913.94 | Z |
| H-95A | H-95B | 906.16 | 902.46 | 240. | 6. | PVC | 0.015 | 0 | 100 | 0.0030 | 0.0114 | 0.5321 | 0.02 | 1.12 | 1.74 | 4.19 | 910.70 | |
| H-95B | H-95C | 902.46 | 898.44 | 342. | 6. | PVC | 0.012 | 0 | 200 | 0.0060 | 0.0228 | 0.4646 | 0.05 | 1.28 | 1.93 | 3.66 | 907.86 | |

| MANHOLES FROM MH ID | TO MH ID | INVERT ELEV FROM FT | TO FT | DIST FT | PIPE DIA IN | TYP | SLOPE FT/FT | POPULATION RES | N-RES | RATE OF FLOW(MGD) AVERAGE QA | PEAK QP | CAPACITY QF | PIPE RATIO QP/QF | VELOCITY AVG FPS | PEAK FPS | CAP FPS | UPSTREAM MANHOLE RIM ELEV | COMMENTS NOTE | WARNING |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| * AT MH H-95C | | | | | | | | 0 | 300 | | | | | | | | | | |
| H-95C | H-92 | 898.44 | 897.41 | 242. | 8. | VCP | 0.004 | 0 | 300 | 0.0090 | 0.0342 | 0.5095 | 0.07 | 0.87 | 1.30 | 2.26 | 910.64 | | Z |
| * AT MH H-92 | | | | | | | | 813 | 2092 | | | | | | | | | | |
| H-92 | H-91 | 897.41 | 894.77 | 238. | 8. | VCP | 0.011 | 813 | 2092 | 0.1441 | 0.5222 | 0.8225 | 0.63 | 2.74 | 3.86 | 3.65 | 910.03 | | |
| H-91 | H-90 | 894.77 | 891.27 | 196. | 10. | VCP | 0.018 | 813 | 2092 | 0.1441 | 0.5222 | 1.8922 | 0.28 | 3.17 | 4.56 | 5.37 | 911.07 | | |
| H-90A | H-90 | 907.72 | 897.45 | 396. | 8. | VCP | 0.026 | 140 | 0 | 0.0140 | 0.0532 | 1.2577 | 0.04 | 1.86 | 2.76 | 5.57 | 913.08 | | |
| * AT MH H-90 | | | | | | | | 953 | 2092 | | | | | | | | | | |
| H-90 | H-89 | 891.27 | 887.31 | 190. | 10. | VCP | 0.021 | 953 | 2092 | 0.1581 | 0.5723 | 2.0442 | 0.28 | 3.44 | 4.97 | 5.80 | 904.67 | | |
| H-89B | H-89A | 909.59 | 901.26 | 260. | 8. | VCP | 0.032 | 162 | 0 | 0.0162 | 0.0616 | 1.3979 | 0.04 | 2.09 | 3.11 | 6.20 | 915.24 | | |
| H-89A | H-89 | 901.26 | 893.71 | 242. | 8. | VCP | 0.031 | 162 | 0 | 0.0162 | 0.0616 | 1.3794 | 0.04 | 2.07 | 3.08 | 6.11 | 913.87 | | |
| * AT MH H-89 | | | | | | | | 1683 | 2242 | | | | | | | | | | |
| H-89 | H-88 | 899.56 | 884.16 | 328. | 10. | VCP | 0.047 | 1683 | 2242 | 0.2356 | 0.8476 | 3.0682 | 0.28 | 5.15 | 7.40 | 8.70 | 902.31 | | |
| H-88B | H-88A | 913.77 | 906.84 | 330. | 8. | VCP | 0.021 | 0 | 100 | 0.0030 | 0.0114 | 1.1317 | 0.01 | 1.05 | 1.66 | 5.02 | 917.99 | | Z |
| H-88A | H-88 | 906.84 | 893.81 | 366. | 8. | VCP | 0.036 | 0 | 200 | 0.0060 | 0.0228 | 1.4735 | 0.02 | 1.57 | 2.46 | 6.53 | 913.52 | | |
| * AT MH H-88 | | | | | | | | 1683 | 2442 | | | | | | | | | | |
| H-88 | H-88C | 884.16 | 882.10 | 177. | 10. | VCP | 0.012 | 1683 | 2442 | 0.2416 | 0.8687 | 1.5276 | 0.57 | 3.17 | 4.47 | 4.33 | 899.56 | B | |
| H-88C | LS | 882.10 | 880.67 | 120. | 10. | VCP | 0.012 | 1683 | 2442 | 0.2416 | 0.8687 | 1.5457 | 0.56 | 3.19 | 4.51 | 4.38 | NA | B | |
| * AT LIFT STATION (LS) 841012 | | | | 15694 | | | | 1683 | 2442 | | | | | | | | | | |

*
*
*
*
* LIFT STATION 841012 DISCHARGES TO THE EAST THROUGH AN 8" FORCE MAIN TO
* MANHOLE W-241 (WEST OF 72ND STREET, SOUTH OF AVENUE "A" AND HOSPITAL
* ROAD). AT THIS MANHOLE THE DISCHARGE FLOWS EAST BY GRAVITY, TO MANHOLE
* W-243, WHERE IS IS JOINED BY THE FLOWS FROM AREA 5. (SEE AREA 5)



TOTAL NUMBER OF REACHES BELOW 1.2 FPS = 27.
TOTAL NUMBER OF ADVERSE REACHES = 0.
TOTAL NUMBER OF REACHES EXCEEDING PIPE CAPACITY = 0.
TOTAL NUMBER OF REACHES WHICH HAVE FULL PIPE VELOCITIES BELOW 1.5 FPS= 1.
H-97BHD H-97H8C
TOTAL NUMBER OF REACHES = 65.

## SUBAREA 5

Subarea 5 consists mainly of the military barracks and support facilities that surround the 1st Cavalry Division Headquarters on the main cantonment.

Flows from Subareas 1, 2, and 3 enter Subarea 5 at manhole W-79B8. Subarea 4 flow enters manhole W-241. Subarea 5 sewage is conveyed to the east, where all flows are routed southeast adjacent to a drainage channel and into manhole J-19 in Subarea 11.

Average flow velocities below the specified minimum 1.2 FPS occur in 47 of the 146 reaches, 13 of which are located where buildings have recently been removed. The remainder are confined to the upstream areas of service branches. Nearly 70% of these involve concrete pipe (CP). Two of the 47 reaches also have full pipe velocities below the specified minimum 1.5 FPS (W98A to W95 @ 1.30 FPS and W94 to W94A @ 1.31 FPS).

It is recommended that grease traps throughout this subarea be regularly cleaned. No reconstruction of sewer lines within Subarea 5 is required unless television inspection indicates significant pipe deterioration. The following minor problems, however, should be corrected:

| | | | |
|---|---|---|---|
| MH W-241 | --- | Frame and cover installed | $ 300.00 |
| MH W-88E1 | --- | Below Ground Level; should be raised approximately 3' | 150.00 |
| MH A-20 | --- | Broken rim replaced | 150.00 |
| MH W-109 | --- | Filled with grease from Mess Hall No. 29006; should be cleaned | ****** |
| | | | $ 600.00 |

* MANHOLES IN THIS AREA CURRENTLY LABELED WITH A PREFIX "W", PREVIOUSLY BEGAN WITH THE PREFIX
* "E", WITH THE EXCEPTION OF MANHOLES W27A THROUGH W27N WHICH PREVIOUSLY BEGAN WITH
* THE PREFIX "A".

AREA 5 ,AS DEFINED BY THE SANITARY SEWER ANALYSIS, COMPLETED BY BOHANNAN-HUSTON, INC., SEPTEMBER 1984.

COMMENT COLUMN "NOTES"
**********

EXCEPT AS NOTED:
> ELEVATIONS WERE OBTAINED THROUGH FIELD SURVEYS
> DISTANCES WERE GENERATED FROM COMPUTER PLOTS

A = INVERT BASED ON REPORT BY FREESE & NICHOLS (4/78)
B = DISTANCE BETWEEN MANHOLES IS SCALED
C = INVERT BASED ON "AS-BUILT" DRAWINGS
D = INVERT BASED ON TOPOGRAPHY & ADJACENT MANHOLE DATA
NA = NOT AVAILABLE
NF = NOT FOUND

COMMENT COLUMN "WARNINGS"
**********

W = ZERO OR ADVERSE SLOPE PRESENT
(PEAK FLOW MAY EXCEED PIPE CAPACITY)
X = PEAK FLOW EXCEEDS PIPE CAPACITY
(LOW VELOCITIES MAY BE PRESENT)
Y = FULL PIPE VELOCITY BELOW 1.5 FPS
(AVERAGE VELOCITY MAY ALSO BE LOW)
Z = AVERAGE VELOCITY BELOW 1.2 FPS

FORMER MANHOLE IDENTIFICATION NUMBERS ALSO APPEAR IN THE COMMENT COLUMN UNDER "NOTES"

| MANHOLES FROM MH ID | MANHOLES TO MH ID | INVERT ELEV FROM FT | INVERT ELEV TO FT | DIST FT | PIPE DIA IN | PIPE TYP | PIPE SLOPE FT/FT | POPULATION RES | POPULATION N-RES | RATE OF FLOW(MGD) AVERAGE QA | RATE OF FLOW(MGD) PEAK QP | RATE OF FLOW(MGD) CAPACITY QF | PIPE RATIO QP/QF | VELOCITY AVG FPS | VELOCITY PEAK FPS | VELOCITY CAP FPS | UPSTREAM MANHOLE RIM ELEV | COMMENTS NOTE WARNING |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| W152A | W152 | 948.18 | 946.45 | 414. | 8. | VCP | 0.004 | 0 | 471 | 0.0141 | 0.0537 | 0.5048 | 0.11 | 1.00 | 1.47 | 2.24 | 954.38 | Z |
| W152 | W153 | 946.45 | 944.75 | 387. | 8. | CP | 0.004 | 0 | 471 | 0.0141 | 0.0537 | 0.4486 | 0.12 | 0.92 | 1.35 | 1.99 | 951.18 | Z |
| W154 | W153 | 949.06 | 944.75 | 477. | 8. | CP | 0.009 | 0 | 26 | 0.0008 | 0.0030 | 0.6434 | 0.00 | 0.46 | 0.75 | 2.85 | 954.81 | Z |
| * AT MH W153 | | | | | | | | 0 | 501 | | | | | | | | | |
| W153 | W148 | 944.75 | 943.70 | 252. | 8. | CP | 0.004 | 0 | 501 | 0.0150 | 0.0571 | 0.4369 | 0.13 | 0.92 | 1.35 | 1.94 | 950.04 | Z |
| W149 | W148 | 947.89 | 943.70 | 312. | 8. | CP | 0.013 | 0 | 0 | 0.0000 | 0.0000 | 0.7843 | 0.00 | 0.00 | 0.00 | 3.48 | 952.89 | |
| * AT MH W148 | | | | | | | | 0 | 501 | | | | | | | | | |
| W148 | W147 | 943.70 | 939.50 | 365. | 8. | CP | 0.012 | 0 | 501 | 0.0150 | 0.0571 | 0.7260 | 0.08 | 1.31 | 1.94 | 3.22 | 947.80 | |
| W147 | W142 | 939.50 | 935.72 | 294. | 8. | CP | 0.013 | 0 | 501 | 0.0150 | 0.0571 | 0.7675 | 0.07 | 1.36 | 2.02 | 3.40 | 944.10 | |
| W144 | W143 | 939.81 | 937.09 | 424. | 6. | CP | 0.006 | 0 | 0 | 0.0000 | 0.0000 | 0.2517 | 0.00 | 0.00 | 0.00 | 1.98 | 944.35 | |
| * AT MH W143 | | | | | | | | 0 | 0 | | | | | | | | | |
| W143 | W142 | 936.65 | 935.72 | 173. | 10. | CP | 0.005 | 0 | 0 | 0.0000 | 0.0000 | 0.8998 | 0.00 | 0.00 | 0.00 | 2.55 | 941.99 | |
| * AT MH W142 | | | | | | | | 0 | 501 | | | | | | | | | |
| W142 | W137 | 935.72 | 934.49 | 254. | 10. | CP | 0.005 | 0 | 501 | 0.0150 | 0.0571 | 0.8540 | 0.07 | 0.93 | 1.38 | 2.42 | 940.81 | Z |
| W139 | W138 | 944.48 | 938.85 | 370. | 8. | CP | 0.015 | 0 | 0 | 0.0000 | 0.0000 | 0.8334 | 0.00 | 0.00 | 0.00 | 3.69 | 950.22 | |
| W138 | W137 | 938.85 | 934.49 | 467. | 8. | CP | 0.009 | 0 | 0 | 0.0000 | 0.0000 | 0.6540 | 0.00 | 0.00 | 0.00 | 2.90 | 944.46 | |
| * AT MH W137 | | | | | | | | 0 | 501 | | | | | | | | | |
| W137 | W136 | 934.49 | 931.61 | 477. | 10. | CP | 0.006 | 0 | 501 | 0.0150 | 0.0571 | 0.9536 | 0.06 | 1.01 | 1.49 | 2.71 | 938.75 | Z |
| W136 | W130 | 931.61 | 930.18 | 256. | 10. | CP | 0.006 | 0 | 501 | 0.0150 | 0.0571 | 0.9172 | 0.06 | 0.98 | 1.45 | 2.60 | 940.69 | Z |
| W132 | W131 | 939.33 | 932.03 | 468. | 8. | CP | 0.016 | 0 | 20 | 0.0006 | 0.0023 | 0.8453 | 0.00 | 0.51 | 0.84 | 3.75 | 944.40 | Z |
| W131 | W130 | 932.03 | 930.18 | 428. | 8. | CP | 0.004 | 0 | 20 | 0.0006 | 0.0023 | 0.4450 | 0.01 | 0.33 | 0.53 | 1.97 | 935.98 | Z |
| * AT MH W130 | | | | | | | | 0 | 521 | | | | | | | | | |
| W130 | W129 | 930.18 | 928.30 | 286. | 10. | CP | 0.007 | 0 | 521 | 0.0156 | 0.0594 | 0.9950 | 0.06 | 1.05 | 1.55 | 2.82 | 937.32 | Z |

| MANHOLES FROM MH ID | MANHOLES TO MH ID | INVERT ELEV FROM FT | INVERT ELEV TO FT | DIST FT | PIPE DIA IN | PIPE TYP | PIPE SLOPE FT/FT | POPULATION RES | POPULATION N-RES | RATE OF FLOW(MGD) AVERAGE QA | RATE OF FLOW(MGD) PEAK QP | RATE OF FLOW(MGD) CAPACITY QF | PIPE RATIO QP/QF | VELOCITY AVG FPS | VELOCITY PEAK FPS | VELOCITY CAP FPS | UPSTREAM MANHOLE RIM ELEV | COMMENTS NOTE WARNING |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| W129 | W79B7 | 928.30 | 926.19 | 271. | 10. | CP | 0.008 | 0 | 521 | 0.0156 | 0.0594 | 1.0828 | 0.05 | 1.11 | 1.64 | 3.07 | 933.45 | Z |
| * 12" C.I. FORCE MAIN FROM LIFT STATION # 51400 DISCHARGES TO MH W-79B8 (CONTAINS ALL FLOW * FROM AREAS 1, 2, & 3 - COMANCHE VILLAGES) | | | | | | | | | | | | | | | | | | |
| * AT MH W79B8 | | | | | | | | 8506 | 10 | | | | | | | | | |
| W79B8 | W79B7 | 928.17 | 926.19 | 247. | 18. | CP | 0.008 | 8506 | 10 | 0.8509 | 2.9128 | 5.2677 | 0.55 | 3.39 | 4.73 | 4.61 | 935.27 | |
| W79B7 | W79B6 | 926.19 | 925.93 | 33. | 18. | CP | 0.008 | 8506 | 531 | 0.8665 | 2.9626 | 5.2225 | 0.57 | 3.39 | 4.71 | 4.57 | 933.39 | |
| W79B6 | W79B5 | 925.93 | 919.98 | 397. | 18. | CP | 0.015 | 8506 | 531 | 0.8665 | 2.9626 | 7.2029 | 0.41 | 4.26 | 5.99 | 6.31 | 932.71 | |
| W79B5 | W79B4 | 919.98 | 912.58 | 341. | 18. | CP | 0.022 | 8506 | 651 | 0.8701 | 2.9740 | 8.6672 | 0.34 | 4.86 | 6.87 | 7.59 | 927.74 | |
| W126 | W125 | 925.58 | 918.23 | 194. | 8. | CP | 0.038 | 0 | 100 | 0.0030 | 0.0114 | 1.3174 | 0.01 | 1.16 | 1.85 | 5.84 | 930.85 | Z |
| W125 | W124 | 918.23 | 916.82 | 298. | 8. | CP | 0.005 | 0 | 100 | 0.0030 | 0.0114 | 0.4656 | 0.02 | 0.58 | 0.89 | 2.06 | 926.28 | Z |
| W124 | W79B4 | 916.82 | 912.58 | 472. | 8. | CP | 0.009 | 0 | 100 | 0.0030 | 0.0114 | 0.6415 | 0.02 | 0.71 | 1.11 | 2.84 | 926.32 | Z |
| * AT MH W79B4 | | | | | | | | 8506 | 751 | | | | | | | | | |
| W79B4 | W79B3 | 912.58 | 908.80 | 540. | 18. | CP | 0.007 | 8506 | 751 | 0.8731 | 2.9835 | 4.9226 | 0.61 | 3.25 | 4.51 | 4.31 | 919.68 | |
| W79B3 | W79B2 | 908.80 | 906.69 | 270. | 18. | CP | 0.008 | 8506 | 751 | 0.8731 | 2.9835 | 5.2012 | 0.57 | 3.38 | 4.71 | 4.55 | 916.03 | |
| W79B2 | W79B1 | 906.69 | 904.54 | 208. | 18. | CP | 0.010 | 8506 | 751 | 0.8731 | 2.9835 | 5.9818 | 0.50 | 3.74 | 5.23 | 5.24 | 920.79 | |
| W79B1 | W79B | 904.54 | 904.30 | 35. | 18. | CP | 0.007 | 8506 | 751 | 0.8731 | 2.9835 | 4.8720 | 0.61 | 3.23 | 4.48 | 4.27 | 912.70 | |
| W210C2 | W210C1 | 952.11 | 950.25 | 299. | 8. | VCP | 0.006 | 0 | 100 | 0.0030 | 0.0114 | 0.6159 | 0.02 | 0.70 | 1.08 | 2.73 | 955.95 | Z |
| W210C1 | W210C | 950.25 | 947.45 | 385. | 8. | VCP | 0.007 | 0 | 150 | 0.0045 | 0.0171 | 0.6660 | 0.03 | 0.84 | 1.29 | 2.95 | 955.69 | Z |
| W210F | W210E | 952.39 | 951.20 | 217. | 10. | VCP | 0.005 | 1000 | 200 | 0.1060 | 0.3854 | 1.0486 | 0.37 | 1.91 | 2.74 | 2.97 | 956.57 | |
| W210E | W210D | 951.20 | 950.37 | 146. | 10. | VCP | 0.006 | 1000 | 200 | 0.1060 | 0.3854 | 1.0676 | 0.36 | 1.93 | 2.78 | 3.03 | 959.46 | |
| W210D | W210C | 950.37 | 947.45 | 418. | 10. | VCP | 0.007 | 1000 | 350 | 0.1105 | 0.4016 | 1.1835 | 0.34 | 2.10 | 3.03 | 3.36 | 957.18 | |
| * AT MH W210C | | | | | | | | 1000 | 350 | | | | | | | | | |
| W210C | W210B | 947.45 | 946.89 | 126. | 10. | VCP | 0.004 | 1000 | 500 | 0.1150 | 0.4178 | 0.9440 | 0.44 | 1.81 | 2.59 | 2.88 | 953.64 | |
| W210B | W210A | 946.89 | 942.89 | 353. | 10. | VCP | 0.011 | 1000 | 500 | 0.1150 | 0.4178 | 1.5073 | 0.28 | 2.52 | 3.64 | 4.28 | 951.04 | |
| W210A | W210 | 942.89 | 938.88 | 49. | 10. | VCP | 0.082 | 1000 | 500 | 0.1150 | 0.4178 | 4.0507 | 0.10 | 5.15 | 7.49 | 11.49 | 949.11 | |
| W219 | W218 | 953.83 | 948.27 | 277. | 8. | VCP | 0.020 | 0 | 50 | 0.0015 | 0.0057 | 1.1064 | 0.01 | 0.82 | 1.33 | 4.90 | 956.84 | Z |
| W218 | W216 | 948.27 | 945.39 | 264. | 8. | VCP | 0.011 | 0 | 50 | 0.0015 | 0.0057 | 0.8157 | 0.01 | 0.67 | 1.07 | 3.62 | 953.79 | Z |
| W216 | W213 | 945.39 | 944.03 | 170. | 8. | VCP | 0.008 | 0 | 63 | 0.0019 | 0.0072 | 0.6985 | 0.01 | 0.65 | 1.03 | 3.10 | 951.81 | Z |
| W213 | W211 | 944.03 | 942.35 | 161. | 8. | VCP | 0.010 | 0 | 93 | 0.0028 | 0.0106 | 0.7978 | 0.01 | 0.81 | 1.27 | 3.54 | 950.78 | Z |
| W211 | W210 | 942.35 | 938.14 | 201. | 8. | VCP | 0.021 | 0 | 133 | 0.0040 | 0.0152 | 1.1302 | 0.01 | 1.15 | 1.81 | 5.01 | 949.89 | Z |
| * AT MH W210 | | | | | | | | 1000 | 633 | | | | | | | | | |
| W210 | W209 | 938.14 | 937.07 | 208. | 10. | VCP | 0.005 | 1000 | 633 | 0.1190 | 0.4322 | 1.0156 | 0.43 | 1.93 | 2.76 | 2.88 | 948.97 | |
| W209 | W207 | 937.07 | 934.35 | 280. | 10. | VCP | 0.010 | 1000 | 683 | 0.1205 | 0.4376 | 1.3956 | 0.31 | 2.42 | 3.50 | 3.96 | 947.73 | |
| W208 | W208A | 938.07 | 937.24 | 109. | 10. | CP | 0.008 | 710 | 350 | 0.0815 | 0.3097 | 1.0709 | 0.29 | 1.79 | 2.63 | 3.04 | 943.83 | |
| W208A | W208B | 937.24 | 936.96 | 45. | 10. | PVC | 0.006 | 710 | 350 | 0.0815 | 0.3097 | 1.3199 | 0.23 | 2.08 | 3.05 | 3.74 | 946.79 | |
| W208B | W207B | 936.96 | 936.00 | 275. | 10. | PVC | 0.003 | 710 | 350 | 0.0815 | 0.3097 | 0.9887 | 0.31 | 1.69 | 2.48 | 2.80 | 946.92 | |
| W207B | W207A | 936.00 | 935.55 | 48. | 10. | PVC | 0.009 | 710 | 350 | 0.0815 | 0.3097 | 1.6203 | 0.19 | 2.40 | 3.55 | 4.60 | 945.42 | |
| W207A | W207 | 935.55 | 934.35 | 165. | 10. | CP | 0.007 | 710 | 350 | 0.0815 | 0.3097 | 1.0465 | 0.30 | 1.76 | 2.58 | 2.97 | 946.33 | |
| * AT MH W207 | | | | | | | | 1710 | 1033 | | | | | | | | | |
| W207 | W206 | 934.35 | 932.54 | 267. | 10. | VCP | 0.007 | 1710 | 1033 | 0.2020 | 0.7288 | 1.1658 | 0.63 | 2.48 | 3.49 | 3.31 | 945.85 | |
| W206 | W205 | 932.54 | 928.65 | 338. | 10. | VCP | 0.012 | 1710 | 1033 | 0.2020 | 0.7288 | 1.5190 | 0.48 | 2.99 | 4.25 | 4.31 | 942.28 | |
| W205 | W204 | 928.65 | 926.85 | 250. | 10. | VCP | 0.007 | 1710 | 1033 | 0.2020 | 0.7288 | 1.2015 | 0.61 | 2.53 | 3.57 | 3.41 | 940.09 | |
| * | MANHOLE W-204 WAS UNDER PAVEMENT. | | | | | | | | | | | | | | | | | A |
| W204 | W203 | 926.85 | 923.98 | 156. | 10. | VCP | 0.018 | 1710 | 1033 | 0.2020 | 0.7288 | 1.9206 | 0.38 | 3.54 | 5.07 | 5.45 | NA | |
| W203 | W202 | 923.98 | 920.68 | 240. | 10. | CP | 0.014 | 1710 | 1033 | 0.2020 | 0.7288 | 1.4390 | 0.51 | 2.88 | 4.08 | 4.08 | 928.90 | |
| W202 | W201 | 920.68 | 918.05 | 405. | 10. | CP | 0.006 | 1710 | 1033 | 0.2020 | 0.7288 | 0.9889 | 0.74 | 2.21 | 3.06 | 2.81 | 931.65 | |
| W201 | W200 | 918.05 | 914.97 | 349. | 10. | CP | 0.008 | 1710 | 1033 | 0.2020 | 0.7288 | 1.0782 | 0.68 | 2.35 | 3.28 | 3.06 | 927.42 | |
| W200 | W243 | 914.97 | 914.68 | 17. | 10. | CP | 0.017 | 1710 | 1033 | 0.2020 | 0.7288 | 1.6027 | 0.45 | 3.11 | 4.43 | 4.55 | 919.52 | |
| * 8" C.I. FORCE MAIN FROM LIFT STATION # 41012 DISCHARGES TO MH W-241 (CONTAINS ALL FLOW * FROM AREA 4) | | | | | | | | | | | | | | | | | | |

| MANHOLES FROM MH ID | MANHOLES TO MH ID | INVERT ELEV FROM FT | INVERT ELEV TO FT | DIST FT | PIPE DIA IN | PIPE TYP | PIPE SLOPE FT/FT | POPULATION RES | POPULATION N-RES | RATE OF FLOW(MGD) AVERAGE QA | RATE OF FLOW(MGD) PEAK QP | RATE OF FLOW(MGD) CAPACITY QF | PIPE RATIO QP/QF | VELOCITY AVG FPS | VELOCITY PEAK FPS | VELOCITY CAP FPS | UPSTREAM MANHOLE RIM ELEV | COMMENTS NOTE | WARNING |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| * AT MH W241 | | | | | | | | 1683 | 2442 | | | | | | | | | | |
| W241 | W241A | 929.03 | 927.09 | 201. | 12. | CP | 0.010 | 1683 | 2442 | 0.2416 | 0.8687 | 1.9605 | 0.44 | 2.62 | 3.74 | 3.86 | NA | A/C | |
| W241A | W242 | 927.09 | 922.47 | 327. | 12. | CP | 0.014 | 1683 | 2442 | 0.2416 | 0.8687 | 2.3720 | 0.37 | 3.00 | 4.31 | 4.67 | 932.45 | | |
| W242 | W243 | 922.47 | 914.43 | 398. | 12. | CP | 0.020 | 1683 | 2442 | 0.2416 | 0.8687 | 2.8363 | 0.31 | 3.41 | 4.91 | 5.59 | 928.32 | | |
| * AT MH W243 | | | | | | | | 3393 | 3475 | | | | | | | | | | |
| W243 | W244 | 914.50 | 911.81 | 385. | 12. | CP | 0.007 | 3393 | 3475 | 0.4436 | 1.5693 | 1.6680 | 0.94 | 2.78 | 3.73 | 3.29 | 919.03 | | |
| W244 | W245 | 911.11 | 909.00 | 278. | 12. | CP | 0.008 | 3393 | 4277 | 0.4676 | 1.6512 | 1.7385 | 0.95 | 2.91 | 3.90 | 3.42 | 917.41 | | |
| W245 | W79 | 908.96 | 905.14 | 300. | 12. | CP | 0.013 | 3393 | 4277 | 0.4676 | 1.6512 | 2.2518 | 0.73 | 3.50 | 4.84 | 4.44 | 917.54 | | |
| W79 | W79A | 905.14 | 904.71 | 73. | 15. | VCP | 0.006 | 3393 | 4277 | 0.4676 | 1.6512 | 3.2041 | 0.52 | 2.88 | 4.07 | 4.04 | 912.04 | | |
| * MANHOLES W-112B WAS FOUND UNDER EQUIPMENT. | | | | | | | | | | | | | | | | | | | |
| W112B | W112A | 945.60 | 944.50 | 109. | 6. | VCP | 0.010 | 0 | 100 | 0.0030 | 0.0114 | 0.3643 | 0.03 | 0.87 | 1.33 | 2.87 | 952.8 | C | Z |
| W112C | W112A | 949.70 | 944.50 | 390. | 8. | VCP | 0.013 | 0 | 100 | 0.0030 | 0.0114 | 0.9018 | 0.01 | 0.90 | 1.42 | 4.00 | NF | C | Z |
| * AT MH W112A | | | | | | | | 0 | 200 | | | | | | | | | | |
| * MANHOLES W-112A WAS FOUND UNDER EQUIPMENT. | | | | | | | | | | | | | | | | | | | |
| W112A | W111 | 944.50 | 941.70 | 354. | 8. | CP | 0.008 | 0 | 200 | 0.0060 | 0.0228 | 0.6019 | 0.04 | 0.86 | 1.28 | 2.67 | 949.8 | C | Z |
| W111 | W110 | 941.70 | 938.02 | 346. | 8. | CP | 0.011 | 0 | 300 | 0.0090 | 0.0342 | 0.6980 | 0.05 | 1.08 | 1.60 | 3.09 | 947.31 | | Z |
| W110 | W109 | 938.02 | 933.28 | 339. | 10. | CP | 0.014 | 0 | 300 | 0.0090 | 0.0342 | 1.4511 | 0.02 | 1.13 | 1.71 | 4.12 | 944.44 | | Z |
| W109E | W109D | 941.82 | 941.24 | 172. | 8. | CP | 0.003 | 172 | 100 | 0.0202 | 0.0768 | 0.3930 | 0.20 | 0.91 | 1.35 | 1.74 | 946.03 | | Z |
| W109D | W109C | 941.24 | 940.68 | 101. | 8. | CP | 0.006 | 302 | 100 | 0.0332 | 0.1262 | 0.5040 | 0.25 | 1.26 | 1.85 | 2.23 | 945.89 | | |
| W109C | W109B | 940.68 | 939.62 | 252. | 8. | CP | 0.004 | 470 | 100 | 0.0500 | 0.1900 | 0.4390 | 0.43 | 1.29 | 1.87 | 1.95 | 944.63 | | |
| W109B1 | W109B | 940.98 | 939.62 | 141. | 6. | CP | 0.010 | 156 | 0 | 0.0156 | 0.0593 | 0.3086 | 0.19 | 1.27 | 1.88 | 2.43 | 946.18 | | |
| * AT MH W109B | | | | | | | | 760 | 100 | | | | | | | | | | |
| W109B | W109A | 939.62 | 937.26 | 231. | 8. | CP | 0.010 | 760 | 100 | 0.0790 | 0.3002 | 0.6841 | 0.44 | 2.02 | 2.93 | 3.03 | 944.77 | | |
| W109A1 | W109A | 939.70 | 937.26 | 121. | 6. | CP | 0.020 | 180 | 0 | 0.0180 | 0.0684 | 0.4463 | 0.15 | 1.76 | 2.56 | 3.52 | 945.45 | | |
| * AT MH W109A | | | | | | | | 1125 | 100 | | | | | | | | | | |
| W109A | W109 | 937.26 | 934.94 | 346. | 8. | CP | 0.007 | 1125 | 350 | 0.1230 | 0.4466 | 0.5542 | 0.81 | 1.98 | 2.73 | 2.46 | 944.39 | | |
| * AT MH W109 | | | | | | | | 1125 | 650 | | | | | | | | | | |
| W109 | W88B5 | 933.28 | 932.48 | 190. | 10. | CP | 0.004 | 1125 | 650 | 0.1320 | 0.4790 | 0.7963 | 0.60 | 1.67 | 2.36 | 2.26 | 943.24 | | |
| W88B5 | W88B4 | 932.48 | 931.37 | 340. | 10. | CP | 0.003 | 1125 | 650 | 0.1320 | 0.4790 | 0.6931 | 0.49 | 1.52 | 2.12 | 1.97 | 941.68 | | |
| W88B4 | W88B3 | 931.37 | 930.04 | 358. | 10. | CP | 0.004 | 1125 | 650 | 0.1320 | 0.4790 | 0.7480 | 0.64 | 1.60 | 2.25 | 2.12 | 940.77 | | |
| W88B3 | W88B2 | 930.04 | 928.63 | 331. | 10. | CP | 0.004 | 1125 | 650 | 0.1320 | 0.4790 | 0.8009 | 0.60 | 1.68 | 2.37 | 2.27 | 942.20 | | |
| W88B2 | W88B | 928.63 | 927.56 | 333. | 10. | CP | 0.003 | 1125 | 650 | 0.1320 | 0.4790 | 0.6956 | 0.69 | 1.52 | 2.12 | 1.97 | 941.13 | | |
| * MANHOLE W-88B1 WAS NOT FOUND IN THE FIELD, AND DOES NOT SHOW ON AS-BUILT DRAWINGS. | | | | | | | | | | | | | | | | | | | |
| W98 | W98A | 947.53 | 946.85 | 107. | 8. | CP | 0.006 | 0 | 200 | 0.0060 | 0.0228 | 0.5396 | 0.04 | 0.80 | 1.18 | 2.39 | 958.41 | | Z |
| W98A | W95 | 946.85 | 946.32 | 282. | 8. | CP | 0.002 | 0 | 200 | 0.0060 | 0.0228 | 0.2934 | 0.08 | 0.53 | 0.78 | 1.30 | 957.6 | C | Z |
| W96 | W95 | 952.50 | 951.27 | 272. | 6. | CP | 0.005 | 0 | 100 | 0.0030 | 0.0114 | 0.2113 | 0.05 | 0.60 | 0.90 | 1.67 | NA | A/C | Z |
| * AT MH W95 | | | | | | | | 0 | 300 | | | | | | | | | | |
| W95 | W94 | 946.32 | 945.02 | 327. | 8. | CP | 0.004 | 0 | 300 | 0.0090 | 0.0342 | 0.4267 | 0.08 | 0.77 | 1.15 | 1.89 | 957.64 | | Z |
| W94 | W94A | 945.02 | 944.73 | 151. | 8. | CP | 0.002 | 0 | 300 | 0.0090 | 0.0342 | 0.2966 | 0.12 | 0.60 | 0.88 | 1.31 | 951.22 | | Z |
| W94A | W88E | 944.73 | 943.25 | 276. | 8. | CP | 0.005 | 0 | 300 | 0.0090 | 0.0342 | 0.4956 | 0.07 | 0.85 | 1.28 | 2.20 | 950.36 | | Z |
| W88E | W88E1 | 943.25 | 942.62 | 193. | 8. | CP | 0.003 | 0 | 300 | 0.0090 | 0.0342 | 0.3867 | 0.09 | 0.72 | 1.07 | 1.71 | 952.95 | | Z |
| W88E1 | W88E2 | 942.62 | 941.56 | 244. | 8. | CP | 0.004 | 0 | 300 | 0.0090 | 0.0342 | 0.4461 | 0.08 | 0.80 | 1.19 | 1.98 | 952.73 | | Z |
| W88E2 | W88D | 941.56 | 937.64 | 241. | 8. | CP | 0.016 | 0 | 300 | 0.0090 | 0.0342 | 0.8632 | 0.04 | 1.25 | 1.86 | 3.83 | 948.38 | | |
| * W-88D1 IS A CLEANOUT | | | | | | | | | | | | | | | | | | | |
| W88D1 | W88D | 940.00 | 937.64 | 244. | 8. | CP | 0.010 | 0 | 50 | 0.0015 | 0.0057 | 0.6656 | 0.01 | 0.58 | 0.93 | 2.95 | NA | A | Z |

| MANHOLES FROM MH ID | TO MH ID | INVERT ELEV FROM FT | TO FT | DIST FT | PIPE DIA IN | TYP | SLOPE FT/FT | POPULATION RES | N-RES | RATE OF FLOW(MGD) AVERAGE QA | PEAK QP | CAPACITY QF | PIPE RATIO QP/QF | VELOCITY AVG FPS | PEAK FPS | CAP FPS | UPSTREAM MANHOLE RIM ELEV | COMMENTS NOTE WARNING |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | 0 | 350 | | | | | | | | | |
| * AT MH W88D | | | | | | | | | | | | | | | | | | |
| | | | | | | | | 0 | 350 | 0.0105 | 0.0399 | 1.1575 | 0.03 | 1.60 | 2.44 | 5.13 | 943.14 | |
| W88D | W88C | 936.04 | 931.36 | 160. | 8. | CP | 0.029 | 0 | 350 | 0.0045 | 0.0171 | 0.4806 | 0.04 | 0.67 | 1.02 | 2.13 | 943.76 | Z |
| W88C1 | W88C | 932.59 | 931.36 | 244. | 8. | CP | 0.005 | 0 | 150 | | | | | | | | | |
| | | | | | | | | 0 | 500 | | | | | | | | | |
| * AT MH W88C | | | | | | | | | | | | | | | | | | |
| | | | | | | | | 0 | 500 | 0.0150 | 0.0570 | 0.8895 | 0.06 | 1.50 | 2.21 | 3.94 | 939.34 | |
| W88C | W88B | 931.36 | 927.56 | 220. | 8. | CP | 0.017 | 0 | 500 | | | | | | | | | |
| | | | | | | | | 1125 | 1150 | | | | | | | | | |
| * AT MH W88B | | | | | | | | | | | | | | | | | | |
| | | | | | | | | 1125 | 1150 | 0.1470 | 0.5327 | 1.3739 | 0.39 | 2.54 | 3.65 | 3.90 | 935.56 | |
| W88B | W88A | 927.56 | 925.73 | 146. | 10. | CP | 0.013 | 1125 | 1150 | 0.0006 | 0.0023 | 0.4055 | 0.01 | 0.31 | 0.50 | 1.80 | 936.83 | Z |
| W108 | W107 | 931.65 | 930.62 | 287. | 8. | CP | 0.004 | 0 | 20 | 0.0006 | 0.0023 | 0.4356 | 0.01 | 0.33 | 0.53 | 1.93 | 937.42 | Z |
| W107 | W104 | 930.62 | 929.51 | 268. | 8. | CP | 0.004 | 0 | 20 | 0.0006 | 0.0023 | 0.4006 | 0.01 | 0.31 | 0.50 | 1.78 | 939.92 | Z |
| W104 | W91 | 929.51 | 928.27 | 354. | 8. | CP | 0.004 | 0 | 20 | 0.0006 | 0.0023 | 0.4143 | 0.01 | 0.31 | 0.51 | 1.84 | 940.42 | Z |
| W91 | W88 | 928.27 | 926.64 | 435. | 8. | CP | 0.004 | 0 | 20 | 0.0006 | 0.0023 | 0.4952 | 0.00 | 0.35 | 0.57 | 2.20 | 938.24 | Z |
| W88 | W88A | 926.64 | 925.73 | 170. | 8. | CP | 0.005 | 0 | 20 | | | | | | | | | |
| | | | | | | | | 1125 | 1170 | | | | | | | | | |
| * AT MH W88A | | | | | | | | | | | | | | | | | | |
| | | | | | | | | 1125 | 1170 | 0.1476 | 0.5349 | 1.2400 | 0.43 | 2.37 | 3.38 | 3.52 | 934.98 | |
| W88A | W87 | 924.86 | 923.40 | 143. | 10. | CP | 0.010 | 1125 | 1170 | 0.1476 | 0.5349 | 1.2632 | 0.42 | 2.40 | 3.43 | 3.58 | NF | |
| W87 | W81 | 923.40 | 920.73 | 252. | 10. | CP | 0.011 | 1125 | 1170 | | | | | | | | | |
| W81F | W81E | 949.15 | 947.20 | 51. | 8. | VCP | 0.038 | 597 | 250 | 0.0672 | 0.2554 | 1.5271 | 0.17 | 3.39 | 5.04 | 6.77 | 954.36 | |
| W81E | W81D | 947.20 | 938.79 | 232. | 8. | VCP | 0.036 | 1218 | 350 | 0.1323 | 0.4800 | 1.4869 | 0.32 | 4.07 | 5.87 | 6.59 | 954.55 | |
| W81D | W81C | 938.79 | 935.26 | 140. | 8. | VCP | 0.025 | 1218 | 350 | 0.1323 | 0.4800 | 1.2401 | 0.39 | 3.58 | 5.14 | 5.50 | 944.13 | |
| W81C | W81B | 935.26 | 932.57 | 230. | 8. | VCP | 0.012 | 1218 | 450 | 0.1353 | 0.4908 | 0.8446 | 0.58 | 2.75 | 3.88 | 3.74 | 941.29 | |
| W81B | W81A | 932.57 | 926.28 | 107. | 8. | VCP | 0.059 | 1218 | 450 | 0.1353 | 0.4908 | 1.8935 | 0.26 | 4.86 | 7.02 | 8.39 | 940.48 | |
| W81A | W81 | 926.28 | 920.73 | 180. | 8. | VCP | 0.031 | 1218 | 450 | 0.1353 | 0.4908 | 1.3713 | 0.36 | 3.87 | 5.57 | 6.08 | 938.78 | |
| W82 | W81 | 927.80 | 922.64 | 316. | 8. | CP | 0.016 | 0 | 106 | 0.0032 | 0.0121 | 0.8649 | 0.01 | 0.89 | 1.40 | 3.83 | 934.66 | Z |
| | | | | | | | | 2343 | 1816 | | | | | | | | | |
| * AT MH W81 | | | | | | | | | | | | | | | | | | |
| | | | | | | | | 2343 | 1816 | 0.2888 | 1.0346 | 2.4009 | 0.43 | 4.60 | 6.55 | 6.81 | 929.59 | B |
| W81 | W79A2 | 920.73 | 918.66 | 72. | 10. | VCP | 0.029 | 2343 | 1816 | 0.2888 | 1.0346 | 1.7720 | 0.58 | 3.70 | 5.22 | 5.03 | 927.84 | |
| W79A2 | W79A1 | 918.66 | 912.74 | 378. | 10. | VCP | 0.016 | 2343 | 1816 | 0.2888 | 1.0346 | 4.5144 | 0.23 | 7.18 | 10.37 | 12.81 | 923.99 | |
| W79A1 | W79A | 912.74 | 904.71 | 79. | 10. | VCP | 0.102 | 2343 | 1816 | | | | | | | | | |
| | | | | | | | | 5736 | 6093 | | | | | | | | | |
| * AT MH W79A | | | | | | | | | | | | | | | | | | |
| | | | | | | | | 5736 | 6093 | 0.7564 | 2.6092 | 3.7072 | 0.70 | 3.67 | 5.06 | 4.67 | 912.01 | |
| W79A | W79B | 904.71 | 904.30 | 52. | 15. | VCP | 0.008 | 5736 | 6093 | | | | | | | | | |
| | | | | | | | | 14242 | 6844 | | | | | | | | | |
| * AT MH W79B | | | | | | | | | | | | | | | | | | |
| | | | | | | | | 14242 | 6844 | 1.6296 | 5.237 | 15.9607 | 0.33 | 5.06 | 7.04 | 7.86 | 911.90 | |
| W79B | R28A27 | 904.30 | 899.08 | 329. | 24. | CP | 0.016 | 14242 | 6844 | 1.6296 | 5.237 | 10.1974 | 0.51 | 3.68 | 5.05 | 5.02 | 908.80 | |
| R28A27 | R28A26 | 899.08 | 896.47 | 403. | 24. | CP | 0.006 | 14242 | 6844 | | | | | | | | | |
| W27N | W27M | 927.79 | 923.59 | 354. | 8. | VCP | 0.012 | 0 | 100 | 0.0030 | 0.0114 | 0.8506 | 0.01 | 0.86 | 1.36 | 3.77 | 936.12 | A27N Z |
| W27M | W27L | 923.59 | 920.03 | 154. | 8. | VCP | 0.023 | 194 | 100 | 0.0224 | 0.0851 | 1.1874 | 0.07 | 2.07 | 3.10 | 5.26 | 933.33 | A27M |
| W27L1 | W27L | 922.96 | 920.03 | 105. | 8. | VCP | 0.028 | 326 | 0 | 0.0326 | 0.1239 | 1.3046 | 0.09 | 2.49 | 3.68 | 5.78 | 931.08 | A27L1 |
| * | | | | | | | | 520 | 100 | | | | | | | | | |
| * AT MH W27L | | | | | | | | | | | | | | | | | | |
| * | | | | | | | | | | | | | | | | | | |
| * | MANHOLE W-27L WAS NOT FOUND IN THE FIELD, AND DOES NOT SHOW ON AS-BUILT DRAWINGS. | | | | | | | | | | | | | | | | | |
| | | | | | | | | 520 | 100 | 0.0550 | 0.2090 | 1.1852 | 0.18 | 2.68 | 3.97 | 5.25 | NA | A27L |
| W27L | W27K | 920.03 | 916.46 | 155. | 8. | VCP | 0.023 | 520 | 200 | 0.0580 | 0.2204 | 0.5149 | 0.43 | 1.51 | 2.19 | 2.28 | 928.83 | A27K |
| W27K | W27J | 916.46 | 915.96 | 115. | 8. | VCP | 0.004 | 520 | 300 | 0.0610 | 0.2318 | 0.5013 | 0.46 | 1.50 | 2.17 | 2.22 | 926.97 | A27J |
| W27J | W27I | 915.31 | 913.81 | 364. | 8. | VCP | 0.004 | | | | | | | | | | | |
| W27I1 | W27I | 924.77 | 922.71 | 440. | 8. | VCP | 0.005 | 436 | 0 | 0.0436 | 0.1657 | 0.5344 | 0.31 | 1.43 | 2.09 | 2.37 | 932.75 | A27I1 |
| | | | | | | | | 956 | 300 | | | | | | | | | |
| * AT MH W27I | | | | | | | | | | | | | | | | | | |
| | | | | | | | | 956 | 300 | 0.1046 | 0.3804 | 0.6400 | 0.59 | 2.09 | 2.96 | 2.84 | 928.77 | A27I |
| W27I | W27H | 913.81 | 913.36 | 67. | 8. | VCP | 0.007 | | | | | | | | | | | |

| MANHOLES FROM MH ID | MANHOLES TO MH ID | INVERT ELEV FROM FT | INVERT ELEV TO FT | DIST FT | DIA IN | PIPE TYP | PIPE SLOPE FT/FT | POPULATION RES | POPULATION N-RES | RATE OF FLOW(MGD) AVERAGE QA | RATE OF FLOW(MGD) PEAK QP | RATE OF FLOW(MGD) CAPACITY QF | PIPE RATIO QP/QF | VELOCITY AVG FPS | VELOCITY PEAK FPS | VELOCITY CAP FPS | UPSTREAM MANHOLE RIM ELEV | COMMENTS NOTE WARNING |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| W27H | W27G | 913.36 | 912.88 | 85. | 10. | VCP | 0.006 | 1152 | 313 | 0.1246 | 0.4523 | 1.0640 | 0.43 | 2.02 | 2.89 | 3.02 | 928.91 | A27H |
| W27G | W27F | 912.88 | 912.12 | 221. | 10. | VCP | 0.003 | 1152 | 363 | 0.1261 | 0.4577 | 0.8304 | 0.55 | 1.70 | 2.41 | 2.36 | 929.10 | A27G |
| W27F | W27E | 912.12 | 910.71 | 306. | 10. | VCP | 0.005 | 1152 | 413 | 0.1276 | 0.4631 | 0.9612 | 0.48 | 1.89 | 2.69 | 2.73 | 927.80 | A27F |
| * | | | | | | | | | | | | | | | | | | |
| * MH W27E IS A CLEAN OUT | | | | | | | | | | | | | | | | | | |
| * | | | | | | | | | | | | | | | | | | |
| W27E | W27D | 910.71 | 910.30 | 90. | 10. | VCP | 0.005 | 1152 | 452 | 0.1288 | 0.4673 | 0.9557 | 0.49 | 1.89 | 2.69 | 2.71 | NA | A27E |
| W27D | W27C | 910.30 | 908.74 | 360. | 10. | VCP | 0.004 | 1152 | 498 | 0.1301 | 0.4723 | 0.9321 | 0.51 | 1.86 | 2.65 | 2.64 | 922.34 | A27D |
| W27C | W27B | 908.74 | 907.22 | 360. | 12. | VCP | 0.004 | 1152 | 498 | 0.1301 | 0.4723 | 1.4962 | 0.32 | 1.81 | 2.61 | 2.95 | 917.38 | A27C |
| W27B | W27A | 907.22 | 905.64 | 299. | 12. | VCP | 0.005 | 1152 | 498 | 0.1301 | 0.4723 | 1.6738 | 0.28 | 1.96 | 2.83 | 3.30 | 914.15 | A27B |
| W27A | R28A26 | 902.87 | 896.47 | 277. | 12. | VCP | 0.023 | 1152 | 498 | 0.1301 | 0.4723 | 3.4999 | 0.13 | 3.29 | 4.84 | 6.89 | 911.54 | A27A |
| | | | | | | | | 15394 | 7342 | | | | | | | | | |
| * AT MH R28A26 | | | | | | | | | | | | | | | | | | |
| R28A26 | R28A25 | 896.47 | 894.22 | 396. | 24. | CP | 0.006 | 15394 | 7342 | 1.7597 | 5.5962 | 9.5512 | 0.59 | 3.59 | 4.89 | 4.70 | 908.28 | |
| R28A25 | R28A24 | 894.22 | 892.01 | 390. | 24. | CP | 0.006 | 15394 | 7342 | 1.7597 | 5.5962 | 9.5384 | 0.59 | 3.59 | 4.88 | 4.70 | 904.32 | |
| R28A24 | R28A23 | 892.01 | 889.67 | 370. | 24. | CP | 0.006 | 15394 | 7342 | 1.7597 | 5.596 | 10.0769 | 0.56 | 3.73 | 5.09 | 4.96 | 904.26 | |
| R28A23 | R28A22 | 889.67 | 887.58 | 347. | 24. | CP | 0.006 | 15394 | 7342 | 1.7597 | 5.5962 | 9.8338 | 0.57 | 3.67 | 5.00 | 4.84 | 901.55 | |
| R28A22 | R28A21 | 887.58 | 886.23 | 223. | 24. | CP | 0.006 | 15394 | 7342 | 1.7597 | 5.5962 | 9.8591 | 0.57 | 3.67 | 5.01 | 4.86 | 898.36 | |
| R28A21 | R28A20 | 886.23 | 884.38 | 330. | 24. | CP | 0.006 | 15394 | 7342 | 1.7597 | 5.5962 | 9.4873 | 0.59 | 3.57 | 4.86 | 4.67 | 893.88 | |
| RA3 | RA2 | 909.14 | 904.88 | 258. | 8. | VCP | 0.017 | 0 | 116 | 0.0035 | 0.0132 | 1.0035 | 0.01 | 1.01 | 1.60 | 4.45 | 917.90 | Z |
| * | MANHOLE R-A2 COULD NOT BE OPENED. | | | | | | | | | | | | | | | | | |
| RA2 | RA1 | 904.88 | 897.35 | 456. | 8. | VCP | 0.017 | 0 | 116 | 0.0035 | 0.0132 | 1.0036 | 0.01 | 1.01 | 1.60 | 4.45 | 912.09 | B/D Z |
| RA1 | R28A20 | 897.35 | 888.31 | 473. | 8. | VCP | 0.019 | 0 | 116 | 0.0035 | 0.0132 | 1.0796 | 0.01 | 1.07 | 1.68 | 4.79 | 900.5 | Z |
| | | | | | | | | 15394 | 7458 | | | | | | | | | |
| * AT MH R28A20 | | | | | | | | | | | | | | | | | | |
| R28A20 | R28A19 | 884.38 | 881.55 | 293. | 24. | CP | 0.010 | 15394 | 7458 | 1.7632 | 5.606 | 12.4531 | 0.45 | 4.34 | 5.97 | 6.13 | 891.52 | B |
| R28A19 | R28A18 | 881.55 | 880.10 | 404. | 24. | CP | 0.004 | 15394 | 7458 | 1.7632 | 5.6057 | 7.5912 | 0.74 | 3.05 | 4.09 | 3.74 | 893.75 | |
| R28A18 | R28A17 | 880.10 | 877.65 | 385. | 24. | CP | 0.006 | 15394 | 7458 | 1.7632 | 5.606 | 10.1080 | 0.55 | 3.74 | 5.10 | 4.98 | 891.35 | |
| R28A17 | R28A16 | 877.65 | 874.93 | 425. | 24. | CP | 0.006 | 15394 | 7458 | 1.7632 | 5.606 | 10.1370 | 0.55 | 3.75 | 5.11 | 4.99 | 889.71 | |
| R28A16 | R28A15 | 874.93 | 872.54 | 607. | 24. | CP | 0.004 | 15394 | 7458 | 1.7632 | 5.6057 | 7.9510 | 0.71 | 3.15 | 4.24 | 3.92 | 887.64 | |
| R28A15 | J19A | 872.54 | 871.52 | 163. | 27. | CP | 0.006 | 15394 | 7458 | 1.7632 | 5.606 | 13.7221 | 0.41 | 3.67 | 5.06 | 5.34 | 883.14 | |

```
*
* FLOW ENTERS AREA 11                    39029
*
*
TOTAL NUMBER OF REACHES BELOW 1.2 FPS =    47.
TOTAL NUMBER OF ADVERSE REACHES =    0.
TOTAL NUMBER OF REACHES EXCEEDING PIPE CAPACITY =    0.
TOTAL NUMBER OF REACHES WHICH HAVE FULL PIPE VELOCITIES BELOW 1.5 FPS=    2.
        W98A    W95
        W94     W94A
TOTAL NUMBER OF REACHES =   146.
```

## SUBAREA 6

Subarea 6, in the southwest corner of the main cantonment, is primarily utilized by daytime personnel.

Average flow velocities below the specified minimum 1.2 FPS occur in 80 of the 115 reaches, 12 of which also have full flow pipe velocities below the specified minimum 1.5 FPS. Insufficient slopes and minimal loading are causing the problems. Nearly 90% of the reaches involve CP.

No reconstruction of sewer lines within Subarea 6 is required. The following minor problems should be corrected:

| | | |
|---|---|---|
| MH F-6 | --- Broken rim needs replacing | $ 150.00 |
| MH HH-15 | --- Beneath pavement; should be raised approximately 0.4' | 100.00 |
| MH HH-29 | --- Below ground level; should be raised approximately 2.5' | 200.00 |
| | | $ 450.00 |

AREA 6 ,AS DEFINED BY THE SANITARY SEWER ANALYSIS, COMPLETED BY BOHANNAN-HUSTON, INC., SEPTEMBER 1984.

COMMENT COLUMN "NOTES"
**********

EXCEPT AS NOTED:
> ELEVATIONS WERE OBTAINED THROUGH FIELD SURVEYS
> DISTANCES WERE GENERATED FROM COMPUTER PLOTS

A = INVERT BASED ON REPORT BY FREESE & NICHOLS (4/78)
B = DISTANCE BETWEEN MANHOLES IS SCALED
C = INVERT BASED ON "AS-BUILT" DRAWINGS
D = INVERT BASED ON TOPOGRAPHY & ADJACENT MANHOLE DATA
NA = NOT AVAILABLE
NF = NOT FOUND

COMMENT COLUMN "WARNINGS"
**********

W = ZERO OR ADVERSE SLOPE PRESENT
(PEAK FLOW MAY EXCEED PIPE CAPACITY)
X = PEAK FLOW EXCEEDS PIPE CAPACITY
(LOW VELOCITIES MAY BE PRESENT)
Y = FULL PIPE VELOCITY BELOW 1.5 FPS
(AVERAGE VELOCITY MAY ALSO BE LOW)
Z = AVERAGE VELOCITY BELOW 1.2 FPS

FORMER MANHOLE IDENTIFICATION NUMBERS ALSO APPEAR IN THE COMMENT COLUMN UNDER "NOTES"

| MANHOLES FROM MH ID | MANHOLES TO MH ID | INVERT ELEV FROM FT | INVERT ELEV TO FT | DIST FT | PIPE DIA IN | PIPE TYP | PIPE SLOPE FT/FT | POPULATION RES | POPULATION N-RES | RATE OF FLOW(MGD) AVERAGE QA | RATE OF FLOW(MGD) PEAK QP | RATE OF FLOW(MGD) CAPACITY QF | PIPE RATIO QP/QF | VELOCITY AVG FPS | VELOCITY PEAK FPS | VELOCITY CAP FPS | UPSTREAM MANHOLE RIM ELEV | COMMENTS NOTE | COMMENTS WARNING |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HH75 | HH74 | 972.00 | 970.65 | 180. | 8. | CP | 0.007 | 0 | 102 | 0.0031 | 0.0116 | 0.5861 | 0.02 | 0.68 | 1.05 | 2.60 | NF | A | Z |
| | | | | | | | | 0 | 328 | | | | | | | | | | |
| *AT MH HH74 | | | | | | | | | | | | | | | | | | | |
| HH74 | HH70 | 970.65 | 967.71 | 151. | 6. | CP | 0.019 | 0 | 328 | 0.0098 | 0.0374 | 0.4385 | 0.09 | 1.44 | 2.13 | 3.46 | 977.02 | | |
| | | | | | | | | 0 | 328 | | | | | | | | | | |
| *AT MH HH70 | | | | | | | | | | | | | | | | | | | |
| HH70 | HH68 | 966.03 | 965.11 | 182. | 6. | CP | 0.005 | 0 | 328 | 0.0098 | 0.0374 | 0.2234 | 0.17 | 0.90 | 1.31 | 1.76 | 975.31 | | Z |
| HH69 | HH68 | 970.00 | 965.11 | 170. | 8. | CP | 0.029 | 0 | 0 | 0.0000 | 0.0000 | 1.1479 | 0.00 | 0.00 | 0.00 | 5.09 | NF | A | |
| | | | | | | | | 0 | 328 | | | | | | | | | | |
| *AT MH HH68 | | | | | | | | | | | | | | | | | | | |
| HH68 | HH66A | 965.11 | 964.17 | 354. | 6. | CP | 0.003 | 0 | 328 | 0.0098 | 0.0374 | 0.1619 | 0.23 | 0.70 | 1.04 | 1.28 | 974.15 | | Y |
| HH66B | HH66A | 966.23 | 964.17 | 399. | 6. | VCP | 0.005 | 0 | 0 | 0.0000 | 0.0000 | 0.2606 | 0.00 | 0.00 | 0.00 | 2.05 | 973.03 | | |
| | | | | | | | | 0 | 328 | | | | | | | | | | |
| *AT MH HH66A | | | | | | | | | | | | | | | | | | | |
| HH66A | HH66 | 964.17 | 963.33 | 104. | 6. | CP | 0.008 | 0 | 328 | 0.0098 | 0.0374 | 0.2824 | 0.13 | 1.06 | 1.55 | 2.23 | 971.18 | | Z |
| HH66 | HH65 | 963.33 | 960.70 | 377. | 8. | SL | 0.007 | 0 | 331 | 0.0099 | 0.0377 | 0.7709 | 0.05 | 1.19 | 1.77 | 3.42 | 970.58 | | Z |
| HH65 | HH64 | 960.70 | 958.96 | 354. | 8. | SL | 0.005 | 0 | 331 | 0.0099 | 0.0377 | 0.6471 | 0.06 | 1.08 | 1.58 | 2.87 | 966.47 | | Z |
| HH64 | HH63 | 958.96 | 957.42 | 423. | 8. | SL | 0.004 | 0 | 331 | 0.0099 | 0.0377 | 0.5569 | 0.07 | 0.95 | 1.43 | 2.47 | 964.58 | | Z |
| HH63 | HH62 | 957.42 | 955.90 | 376. | 8. | SL | 0.004 | 0 | 331 | 0.0099 | 0.0377 | 0.5868 | 0.06 | 0.99 | 1.46 | 2.60 | 964.60 | | Z |
| HH62 | HH61 | 955.50 | 954.59 | 418. | 8. | SL | 0.002 | 0 | 331 | 0.0099 | 0.0377 | 0.4306 | 0.09 | 0.80 | 1.19 | 1.91 | 963.62 | | Z |
| HH61 | HH60 | 954.59 | 948.38 | 535. | 8. | SL | 0.012 | 0 | 331 | 0.0099 | 0.0377 | 0.9944 | 0.04 | 1.42 | 2.11 | 4.41 | 964.52 | | Z |
| HH60 | HH59 | 948.38 | 946.60 | 402. | 8. | SL | 0.004 | 0 | 331 | 0.0099 | 0.0377 | 0.6142 | 0.06 | 1.02 | 1.51 | 2.72 | 953.82 | | Z |
| HH59 | HH58 | 946.60 | 945.08 | 396. | 8. | CP | 0.004 | 0 | 331 | 0.0099 | 0.0377 | 0.4193 | 0.09 | 0.79 | 1.17 | 1.86 | 952.16 | | Z |
| HH58 | HH58A | 945.08 | 944.18 | 198. | 8. | CP | 0.005 | 0 | 381 | 0.0114 | 0.0434 | 0.4563 | 0.10 | 0.87 | 1.29 | 2.02 | 955.26 | | Z |
| HH58C | HH58A | 961.58 | 953.35 | 285. | 6. | VCP | 0.029 | 0 | 40 | 0.0012 | 0.0046 | 0.6162 | 0.01 | 0.92 | 1.47 | 4.86 | 963.50 | | |
| | | | | | | | | 0 | 421 | | | | | | | | | | |
| *AT MH HH58A | | | | | | | | | | | | | | | | | | | |
| HH58A | HH58B | 944.18 | 944.08 | 21. | 12. | PVC | 0.005 | 0 | 421 | 0.0126 | 0.0480 | 1.8776 | 0.03 | 1.05 | 1.58 | 3.70 | 957.15 | | Z |
| HH58B | HH57 | 944.08 | 943.60 | 157. | 12. | PVC | 0.003 | 0 | 431 | 0.0129 | 0.0491 | 1.5047 | 0.03 | 0.91 | 1.36 | 2.96 | 957.06 | | Z |
| HH57 | HH56A | 943.60 | 941.91 | 385. | 12. | CP | 0.004 | 0 | 431 | 0.0129 | 0.0491 | 1.3221 | 0.04 | 0.83 | 1.24 | 2.60 | 959.00 | | Z |
| HH56A | HH56 | 941.91 | 940.67 | 427. | 12. | CP | 0.003 | 0 | 431 | 0.0129 | 0.0491 | 1.0754 | 0.05 | 0.72 | 1.07 | 2.12 | 958.21 | | Z |
| HH56 | HH55 | 940.67 | 939.93 | 446. | 12. | CP | 0.002 | 0 | 431 | 0.0129 | 0.0491 | 0.8128 | 0.06 | 0.60 | 0.88 | 1.60 | 953.22 | | Z |
| HH55 | HH54 | 939.93 | 939.46 | 380. | 12. | CP | 0.001 | 0 | 431 | 0.0129 | 0.0491 | 0.7018 | 0.07 | 0.54 | 0.80 | 1.38 | 950.96 | D | Y |

* MANHOLE HH54 COULD NOT BE OPENED.

| MANHOLES FROM MH ID | MANHOLES TO MH ID | INVERT ELEV FROM FT | INVERT ELEV TO FT | DIST FT | PIPE DIA IN | PIPE TYP | PIPE SLOPE FT/FT | POPULATION RES | POPULATION N-RES | RATE OF FLOW(MGD) AVERAGE QA | RATE OF FLOW(MGD) PEAK QP | RATE OF FLOW(MGD) CAPACITY QF | PIPE RATIO QP/QF | VELOCITY AVG FPS | VELOCITY PEAK FPS | VELOCITY CAP FPS | UPSTREAM MANHOLE RIM ELEV. | COMMENTS NOTE | WARNING |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HH54 | HH53 | 939.46 | 939.07 | 320. | 12. | CP | 0.001 | 0 | 431 | 0.0129 | 0.0491 | 0.6967 | 0.07 | 0.54 | 0.79 | 1.37 | 956.37 | A | Y |
| HH53 | HH52 | 939.07 | 938.56 | 301. | 12. | CP | 0.002 | 0 | 431 | 0.0129 | 0.0491 | 0.8214 | 0.06 | 0.60 | 0.89 | 1.62 | 957.19 | | Z |
| HH52 | HH51 | 938.56 | 938.46 | 154. | 12. | CP | 0.001 | 0 | 491 | 0.0147 | 0.0560 | 0.5084 | 0.11 | 0.44 | 0.66 | 1.00 | 952.32 | | Y |
| HH51 | HH51A | 938.46 | 937.97 | 251. | 12. | CP | 0.002 | 0 | 552 | 0.0166 | 0.0629 | 0.8824 | 0.07 | 0.68 | 1.01 | 1.74 | 951.96 | | Z |
| HH50A | HH50 | 937.84 | 936.29 | 315. | 6. | PVC | 0.005 | 0 | 20 | 0.0006 | 0.0023 | 0.3006 | 0.01 | 0.45 | 0.72 | 2.37 | 943.99 | | Z |
| HH50 | LS4115 | 936.29 | 936.00 | 390. | 8. | CI | 0.001 | 0 | 100 | 0.0030 | 0.0114 | 0.1977 | 0.06 | 0.32 | 0.48 | 0.88 | 942.09 | | Y |
| * | | | | | | | | | | | | | | | | | | | |
| *FROM LIFT STATION 4115 | | | | | | | | 0 | 100 | | | | | | | | | | |
| *AT MH HH49 | | | | | | | | | | | | | | | | | | | |
| HH49 | HH48 | 945.59 | 945.28 | 310. | 8. | CP | 0.001 | 0 | 100 | 0.0030 | 0.0114 | 0.2140 | 0.05 | 0.34 | 0.50 | 0.95 | NF | D | Y |
| HH48 | HH47 | 945.28 | 945.14 | 100. | 8. | CP | 0.001 | 0 | 100 | 0.0030 | 0.0114 | 0.2533 | 0.05 | 0.38 | 0.57 | 1.12 | 954.18 | | Y |
| HH47 | HH46 | 945.14 | 944.16 | 270. | 8. | CP | 0.004 | 0 | 100 | 0.0030 | 0.0114 | 0.4078 | 0.03 | 0.53 | 0.81 | 1.81 | 952.91 | | Z |
| HH46 | HH45 | 944.16 | 943.97 | 188. | 8. | CP | 0.001 | 0 | 100 | 0.0030 | 0.0114 | 0.2152 | 0.05 | 0.34 | 0.51 | 0.95 | NF | D | Y |
| HH45 | HH45A | 943.97 | 943.24 | 202. | 8. | CP | 0.004 | 0 | 100 | 0.0030 | 0.0114 | 0.4069 | 0.03 | 0.53 | 0.81 | 1.80 | 951.77 | D | Z |
| HH45A | HH44 | 943.24 | 942.33 | 216. | 8. | CP | 0.004 | 0 | 100 | 0.0030 | 0.0114 | 0.4393 | 0.03 | 0.55 | 0.85 | 1.95 | 952.06 | | Z |
| HH44 | HH43 | 942.33 | 941.86 | 152. | 8. | CP | 0.003 | 0 | 220 | 0.0066 | 0.0251 | 0.3764 | 0.07 | 0.64 | 0.96 | 1.67 | 951.69 | | Z |
| HH43 | HH42 | 941.89 | 939.90 | 425. | 8. | CP | 0.005 | 0 | 220 | 0.0066 | 0.0251 | 0.4631 | 0.05 | 0.74 | 1.09 | 2.05 | 951.71 | | Z |
| HH42 | HH41 | 939.90 | 939.24 | 187. | 8. | CP | 0.004 | 0 | 240 | 0.0072 | 0.0274 | 0.4021 | 0.07 | 0.69 | 1.03 | 1.78 | 946.75 | | Z |
| HH41 | HH51A | 939.24 | 937.97 | 401. | 8. | CP | 0.003 | 0 | 265 | 0.0080 | 0.0302 | 0.3809 | 0.08 | 0.69 | 1.02 | 1.69 | 949.16 | | Z |
| *AT MH HH51A | | | | | | | | 0 | 817 | | | | | | | | | | |
| HH51A | HH32 | 937.97 | 934.02 | 255. | 12. | CP | 0.015 | 0 | 822 | 0.0247 | 0.0937 | 2.4836 | 0.04 | 1.57 | 2.34 | 4.89 | 948.37 | | |
| HH39 | HH38 | 961.48 | 956.95 | 400. | 8. | CP | 0.011 | 0 | 100 | 0.0030 | 0.0114 | 0.7203 | 0.02 | 0.77 | 1.21 | 3.19 | 967.23 | | Z |
| HH38 | HH37 | 956.95 | 952.94 | 400. | 10. | CP | 0.010 | 0 | 126 | 0.0038 | 0.0144 | 1.2287 | 0.01 | 0.76 | 1.21 | 3.49 | 964.08 | | Z |
| HH40 | HH37 | 958.94 | 952.94 | 400. | 8. | CP | 0.015 | 0 | 50 | 0.0015 | 0.0057 | 0.8289 | 0.01 | 0.68 | 1.09 | 3.67 | 964.47 | | Z |
| *AT MH HH37 | | | | | | | | 0 | 176 | | | | | | | | | | |
| HH37 | HH36 | 952.94 | 947.97 | 258. | 12. | CP | 0.019 | 0 | 176 | 0.0053 | 0.0201 | 2.7697 | 0.01 | 1.02 | 1.59 | 5.46 | 961.28 | | Z |
| HH36 | HH34 | 947.97 | 930.23 | 508. | 12. | CP | 0.019 | 0 | 186 | 0.0056 | 0.0212 | 2.7632 | 0.01 | 1.04 | 1.61 | 5.44 | 954.82 | | Z |
| HH35C | HH35B | 951.15 | 950.74 | 107. | 6. | CP | 0.004 | 0 | 20 | 0.0006 | 0.0023 | 0.1945 | 0.01 | 0.34 | 0.53 | 1.53 | 954.37 | | Z |
| HH35B | HH35A | 950.74 | 950.39 | 88. | 6. | CP | 0.004 | 0 | 20 | 0.0006 | 0.0023 | 0.1982 | 0.01 | 0.34 | 0.54 | 1.56 | 954.10 | | Z |
| HH35A | HH35 | 950.39 | 950.22 | 17. | 6. | CP | 0.010 | 0 | 20 | 0.0006 | 0.0023 | 0.3143 | 0.01 | 0.46 | 0.74 | 2.48 | 953.60 | | Z |
| HH35 | HH34 | 950.22 | 938.23 | 308. | 6. | CP | 0.039 | 0 | 235 | 0.0071 | 0.0268 | 0.6201 | 0.04 | 1.64 | 2.48 | 4.89 | 953.73 | | |
| *AT MH HH34 | | | | | | | | 0 | 421 | | | | | | | | | | |
| HH34 | HH33 | 938.23 | 936.29 | 138. | 12. | CP | 0.014 | 0 | 421 | 0.0126 | 0.0480 | 2.3660 | 0.02 | 1.22 | 1.85 | 4.66 | 945.18 | | Z |
| HH33 | HH32 | 936.29 | 934.02 | 251. | 12. | CP | 0.009 | 0 | 421 | 0.0126 | 0.0480 | 1.8977 | 0.03 | 1.05 | 1.59 | 3.74 | 944.49 | | |
| *AT MH HH32 | | | | | | | | 0 | 1243 | | | | | | | | | | |
| H32 | HH29 | 934.02 | 931.73 | 188. | 12. | CP | 0.012 | 0 | 1248 | 0.0374 | 0.1423 | 2.2024 | 0.06 | 1.65 | 2.44 | 4.34 | 943.20 | | |
| HH31 | HH30 | 937.69 | 936.45 | 346. | 8. | CP | 0.004 | 0 | 30 | 0.0009 | 0.0034 | 0.4052 | 0.01 | 0.35 | 0.56 | 1.80 | 947.99 | | Z |
| HH30 | HH29 | 936.45 | 931.73 | 396. | 8. | CP | 0.012 | 0 | 64 | 0.0019 | 0.0073 | 0.7389 | 0.01 | 0.68 | 1.08 | 3.28 | 943.75 | | Z |
| *AT MH HH29 | | | | | | | | 0 | 1312 | | | | | | | | | | |
| HH29 | HH25 | 931.73 | 925.41 | 461. | 12. | CP | 0.014 | 0 | 1312 | 0.0394 | 0.1496 | 2.3365 | 0.06 | 1.75 | 2.58 | 4.60 | 939.78 | | |
| HH25 | HH14 | 925.41 | 916.74 | 526. | 12. | CP | 0.016 | 0 | 1312 | 0.0394 | 0.1496 | 2.5620 | 0.06 | 1.86 | 2.75 | 5.05 | 932.11 | | |
| HH24 | HH23 | 957.16 | 951.50 | 399. | 8. | CP | 0.014 | 0 | 10 | 0.0003 | 0.0011 | 0.8061 | 0.00 | 0.39 | 0.66 | 3.57 | 962.14 | | Z |
| HH23 | HH21 | 951.50 | 948.47 | 212. | 8. | CP | 0.014 | 0 | 20 | 0.0006 | 0.0023 | 0.8092 | 0.00 | 0.49 | 0.81 | 3.59 | 957.45 | | Z |

| MANHOLES FROM MH ID | MANHOLES TO MH ID | INVERT ELEV FROM FT | INVERT ELEV TO FT | DIST FT | PIPE DIA IN | PIPE TYP | PIPE SLOPE FT/FT | POPULATION RES | POPULATION N-RES | RATE OF FLOW(MGD) AVERAGE QA | RATE OF FLOW(MGD) PEAK QP | RATE OF FLOW(MGD) CAPACITY QF | PIPE RATIO QP/QF | VELOCITY AVG FPS | VELOCITY PEAK FPS | VELOCITY CAP FPS | UPSTREAM MANHOLE RIM ELEV | COMMENTS NOTE | COMMENTS WARNING |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HH22 | HH21 | 956.88 | 948.47 | 562. | 8. | CP | 0.015 | 0 | 38 | 0.0011 | 0.0043 | 0.8280 | 0.01 | 0.62 | 1.00 | 3.67 | 960.38 | | Z |
| *AT MH HH21 | | | | | | | | 0 | 58 | | | | | | | | | | |
| HH21 | HH19 | 948.47 | 945.67 | 204. | 8. | CP | 0.014 | 0 | 96 | 0.0029 | 0.0109 | 0.7929 | 0.01 | 0.81 | 1.28 | 3.51 | 955.62 | | Z |
| HH19 | HH18 | 945.67 | 940.28 | 338. | 8. | CP | 0.016 | 0 | 96 | 0.0029 | 0.0109 | 0.8547 | 0.01 | 0.86 | 1.35 | 3.79 | 951.69 | | Z |
| HH18 | HH17 | 940.87 | 933.87 | 296. | 8. | CP | 0.024 | 0 | 106 | 0.0032 | 0.0121 | 1.0408 | 0.01 | 1.01 | 1.59 | 4.61 | 944.71 | | Z |
| HH17 | HH16 | 933.87 | 924.92 | 398. | 8. | CP | 0.022 | 0 | 146 | 0.0044 | 0.0166 | 1.0150 | 0.02 | 1.10 | 1.72 | 4.50 | 938.43 | | Z |
| HH16 | HH15 | 924.92 | 920.79 | 320. | 8. | CP | 0.013 | 0 | 146 | 0.0044 | 0.0166 | 0.7689 | 0.02 | 0.91 | 1.42 | 3.41 | 930.49 | | Z |
| * | MANHOLE HH15 COULD NOT BE OPENED. | | | | | | | | | | | | | | | | | | |
| HH15 | HH14 | 920.79 | 916.74 | 209. | 8. | CP | 0.019 | 0 | 146 | 0.0044 | 0.0166 | 0.9422 | 0.02 | 1.05 | 1.63 | 4.18 | 928.33 | A | Z |
| *AT MH HH14 | | | | | | | | 0 | 1458 | | | | | | | | | | |
| HH14 | HH11 | 916.74 | 915.72 | 113. | 12. | VCP | 0.009 | 0 | 1558 | 0.0467 | 0.1776 | 2.1876 | 0.08 | 1.77 | 2.59 | 4.31 | 926.34 | | |
| HH11 | HH7 | 915.72 | 912.11 | 504. | 12. | VCP | 0.007 | 0 | 1558 | 0.0467 | 0.1776 | 1.9487 | 0.09 | 1.63 | 2.39 | 3.84 | 925.78 | | |
| HH8A | HH7 | 912.97 | 912.11 | 159. | 8. | CP | 0.005 | 0 | 50 | 0.0015 | 0.0057 | 0.4978 | 0.01 | 0.48 | 0.76 | 2.21 | 920.22 | | Z |
| *AT MH HH7 | | | | | | | | 0 | 1608 | | | | | | | | | | |
| HH7 | HH6A | 912.11 | 909.98 | 178. | 12. | VCP | 0.012 | 0 | 1608 | 0.0482 | 0.1833 | 2.5188 | 0.07 | 1.96 | 2.89 | 4.96 | 921.13 | | |
| HH6A | HH6 | 909.98 | 908.78 | 178. | 12. | VCP | 0.007 | 0 | 1658 | 0.0497 | 0.1890 | 1.8905 | 0.10 | 1.60 | 2.38 | 3.72 | 919.29 | | |
| HH6 | HH6B | 908.78 | 907.91 | 82. | 12. | VCP | 0.011 | 0 | 1758 | 0.0527 | 0.2004 | 2.3718 | 0.08 | 1.94 | 2.84 | 4.67 | 917.47 | | |
| HH6B | HH1 | 907.91 | 904.51 | 322. | 12. | VCP | 0.011 | 0 | 1758 | 0.0527 | 0.2004 | 2.3660 | 0.08 | 1.94 | 2.84 | 4.66 | 917.19 | | |
| G4 | G3 | 921.00 | 916.81 | 388. | 4. | VCP | 0.011 | 0 | 30 | 0.0009 | 0.0034 | 0.1278 | 0.03 | 0.65 | 1.00 | 2.27 | 925.18 | | Z |
| G3 | G2 | 916.81 | 916.08 | 48. | 6. | CP | 0.015 | 0 | 30 | 0.0009 | 0.0034 | 0.3876 | 0.01 | 0.61 | 0.97 | 3.05 | 921.01 | | Z |
| G2 | G1 | 916.08 | 916.06 | 117. | 6. | CP | 0.000 | 0 | 40 | 0.0012 | 0.0046 | 0.0411 | 0.11 | 0.15 | 0.22 | 0.32 | 920.30 | | Y |
| G1 | HH1 | 916.06 | 904.45 | 147. | 6. | CP | 0.079 | 0 | 40 | 0.0012 | 0.0046 | 0.8832 | 0.01 | 1.17 | 1.89 | 6.96 | 919.78 | | Z |
| *AT MH HH1 | | | | | | | | 0 | 1798 | | | | | | | | | | |
| HH1 | J27 | 904.21 | 899.15 | 502. | 12. | VCP | 0.010 | 0 | 1798 | 0.0539 | 0.2050 | 2.3117 | 0.09 | 1.92 | 2.81 | 4.55 | 911.81 | | |
| F28A | F28 | 968.26 | 965.05 | 460. | 8. | CP | 0.007 | 0 | 30 | 0.0009 | 0.0034 | 0.5654 | 0.01 | 0.44 | 0.71 | 2.51 | 971.48 | | Z |
| F28B | F28 | 968.52 | 965.05 | 411. | 8. | CP | 0.008 | 0 | 10 | 0.0003 | 0.0011 | 0.6219 | 0.00 | 0.33 | 0.55 | 2.76 | 974.57 | | Z |
| *AT MH F28 | | | | | | | | 0 | 115 | | | | | | | | | | |
| F28 | F27 | 965.05 | 963.61 | 351. | 8. | CP | 0.004 | 0 | 115 | 0.0035 | 0.0131 | 0.4335 | 0.03 | 0.57 | 0.88 | 1.92 | 970.92 | | Z |
| F27 | F26 | 963.61 | 961.53 | 468. | 8. | CP | 0.004 | 0 | 163 | 0.0049 | 0.0186 | 0.4512 | 0.04 | 0.66 | 0.98 | 2.00 | 970.61 | | Z |
| F26 | F25 | 961.53 | 961.01 | 158. | 8. | CP | 0.003 | 0 | 183 | 0.0055 | 0.0209 | 0.3883 | 0.05 | 0.62 | 0.92 | 1.72 | 968.01 | | Z |
| F25 | F23 | 961.01 | 959.02 | 326. | 8. | CP | 0.006 | 0 | 223 | 0.0067 | 0.0254 | 0.5288 | 0.05 | 0.81 | 1.21 | 2.34 | 968.81 | | Z |
| F24 | F23 | 965.60 | 959.02 | 319. | 8. | CP | 0.021 | 0 | 236 | 0.0071 | 0.0269 | 0.9721 | 0.03 | 1.25 | 1.92 | 4.31 | 970.50 | | |
| *AT MH F23 | | | | | | | | 0 | 459 | | | | | | | | | | |
| F23 | F20 | 959.02 | 958.36 | 75. | 8. | CP | 0.009 | 0 | 459 | 0.0138 | 0.0523 | 0.6349 | 0.08 | 1.16 | 1.72 | 2.81 | 968.67 | | Z |
| F22B | F22A | 966.81 | 965.74 | 430. | 8. | CP | 0.002 | 0 | 240 | 0.0072 | 0.0274 | 0.3376 | 0.08 | 0.61 | 0.91 | 1.50 | 971.15 | | Y |
| F22A | F22 | 965.74 | 965.15 | 241. | 8. | CP | 0.002 | 0 | 360 | 0.0108 | 0.0410 | 0.3349 | 0.12 | 0.69 | 1.02 | 1.48 | 970.07 | | Y |
| F22 | F21 | 965.15 | 961.88 | 285. | 8. | CP | 0.011 | 0 | 480 | 0.0144 | 0.0547 | 0.7250 | 0.08 | 1.29 | 1.92 | 3.21 | 970.24 | | |
| F21 | F20 | 961.88 | 958.36 | 355. | 8. | CP | 0.010 | 0 | 480 | 0.0144 | 0.0547 | 0.6740 | 0.08 | 1.22 | 1.82 | 2.99 | 968.83 | | |
| *AT MH F20 | | | | | | | | 0 | 939 | | | | | | | | | | |
| F20 | F19 | 958.36 | 953.93 | 393. | 8. | CP | 0.011 | 0 | 939 | 0.0282 | 0.1070 | 0.7186 | 0.15 | 1.54 | 2.30 | 3.19 | 967.23 | | |
| F19 | F18 | 953.93 | 949.50 | 419. | 8. | CP | 0.011 | 0 | 939 | 0.0282 | 0.1070 | 0.6959 | 0.15 | 1.51 | 2.25 | 3.08 | 958.71 | | |
| F18A | F18 | 949.69 | 949.50 | 215. | 8. | CP | 0.001 | 0 | 40 | 0.0012 | 0.0046 | 0.2012 | 0.02 | 0.24 | 0.38 | 0.89 | 954.72 | | Y |
| *AT MH F18 | | | | | | | | 0 | 979 | | | | | | | | | | |

| MANHOLES FROM MH ID | MANHOLES TU MH ID | INVERT ELEV FROM FT | INVERT ELEV TU FT | DIST FT | PIPE DIA IN | PIPE TYP | PIPE SLOPE FT/FT | POPULATION RES | POPULATION N-RES | RATE OF FLOW(MGD) AVERAGE QA | RATE OF FLOW(MGD) PEAK QP | RATE OF FLOW(MGD) CAPACITY QF | PIPE RATIO QP/QF | VELOCITY AVG FPS | VELOCITY PEAK FPS | VELOCITY CAP FPS | UPSTREAM MANHOLE RIM ELEV | COMMENTS NOTE WARNING |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| F18 | F17 | 949.50 | 947.52 | 341. | 8. | CP | 0.006 | 0 | 979 | 0.0294 | 0.1116 | 0.5157 | 0.22 | 1.24 | 1.82 | 2.29 | 953.82 | |
| F17 | F16 | 947.52 | 943.63 | 430. | 8. | CP | 0.009 | 0 | 1059 | 0.0318 | 0.1207 | 0.6438 | 0.19 | 1.48 | 2.19 | 2.85 | 954.43 | |
| F16 | F9 | 943.63 | 933.21 | 421. | 8. | CP | 0.025 | 21 | 1148 | 0.0365 | 0.1399 | 1.0648 | 0.13 | 2.24 | 3.28 | 4.72 | 948.49 | |
| F15 | F14 | 954.38 | 951.33 | 418. | 8. | CP | 0.007 | 0 | 100 | 0.0030 | 0.0114 | 0.5781 | 0.02 | 0.67 | 1.04 | 2.56 | 962.61 | Z |
| F14 | F13 | 951.33 | 945.74 | 449. | 8. | CP | 0.012 | 0 | 160 | 0.0048 | 0.0182 | 0.7552 | 0.02 | 0.93 | 1.44 | 3.35 | 957.87 | Z |
| F13 | F10 | 945.74 | 943.82 | 284. | 8. | CP | 0.007 | 0 | 190 | 0.0057 | 0.0217 | 0.5565 | 0.04 | 0.80 | 1.19 | 2.47 | 951.66 | Z |
| F12 | F11 | 954.89 | 949.98 | 324. | 8. | CP | 0.015 | 0 | 70 | 0.0021 | 0.0080 | 0.8332 | 0.01 | 0.76 | 1.20 | 3.69 | 959.60 | Z |
| F11 | F10 | 949.98 | 943.82 | 296. | 8. | CP | 0.021 | 0 | 120 | 0.0036 | 0.0137 | 0.9764 | 0.01 | 1.01 | 1.58 | 4.33 | 959.89 | Z |
| *AT MH F10 | | | | | | | | 0 | 310 | | | | | | | | | |
| F10 | F9 | 943.82 | 933.21 | 423. | 8. | CP | 0.025 | 0 | 350 | 0.0105 | 0.0399 | 1.0719 | 0.04 | 1.52 | 2.27 | 4.75 | 949.89 | |
| *AT MH F9 | | | | | | | | 21 | 1498 | | | | | | | | | |
| F9 | F9A | 933.21 | 926.57 | 305. | 8. | CP | 0.022 | 0 | 1498 | 0.0449 | 0.1708 | 0.9986 | 0.17 | 2.23 | 3.32 | 4.43 | 939.01 | |
| F9D | F9C | 940.51 | 934.65 | 388. | 8. | CP | 0.015 | 0 | 20 | 0.0006 | 0.0023 | 0.8318 | 0.00 | 0.50 | 0.83 | 3.69 | 947.95 | Z |
| F9C | F9B | 934.65 | 927.72 | 396. | 8. | CP | 0.018 | 0 | 20 | 0.0006 | 0.0023 | 0.8954 | 0.00 | 0.53 | 0.87 | 3.97 | 940.14 | Z |
| F9B | F9A | 927.72 | 926.57 | 312. | 8. | CP | 0.004 | 0 | 20 | 0.0006 | 0.0023 | 0.4109 | 0.01 | 0.31 | 0.50 | 1.82 | 931.51 | Z |
| *AT MH F9A | | | | | | | | 21 | 1518 | | | | | | | | | |
| F9A | F6 | 926.57 | 923.13 | 168. | 8. | CP | 0.020 | 0 | 1518 | 0.0455 | 0.1731 | 0.9685 | 0.18 | 2.20 | 3.26 | 4.29 | 931.04 | |
| F8 | F7 | 935.12 | 933.99 | 382. | 8. | CP | 0.003 | 0 | 9 | 0.0003 | 0.0010 | 0.3781 | 0.00 | 0.23 | 0.37 | 1.68 | 939.42 | Z |
| F7 | F6 | 933.99 | 923.13 | 383. | 8. | CP | 0.028 | 0 | 19 | 0.0006 | 0.0022 | 1.1397 | 0.00 | 0.61 | 1.01 | 5.05 | 938.49 | Z |
| *AT MH F6 | | | | | | | | 21 | 1537 | | | | | | | | | |
| F6 | F5 | 923.13 | 920.06 | 141. | 8. | CP | 0.022 | 21 | 1537 | 0.0482 | 0.1832 | 0.9987 | 0.18 | 2.28 | 3.38 | 4.43 | BROKEN | |
| F5 | F4 | 920.06 | 917.82 | 435. | 10. | CP | 0.005 | 21 | 1537 | 0.0482 | 0.1832 | 0.8806 | 0.21 | 1.34 | 1.97 | 2.50 | 924.96 | |
| F4 | F3 | 917.82 | 910.98 | 402. | 10. | CP | 0.017 | 21 | 1537 | 0.0482 | 0.1832 | 1.6007 | 0.11 | 2.03 | 3.02 | 4.54 | 925.08 | |
| F3 | F2 | 910.98 | 906.19 | 400. | 10. | CP | 0.012 | 21 | 1537 | 0.0482 | 0.1832 | 1.3429 | 0.14 | 1.80 | 2.69 | 3.81 | 915.41 | |
| F2 | F11A | 906.19 | 902.78 | 476. | 10. | CP | 0.007 | 21 | 1537 | 0.0482 | 0.1832 | 1.0387 | 0.18 | 1.50 | 2.23 | 2.95 | 911.31 | |
| F11A | J27 | 902.78 | 899.15 | 330. | 21. | CP | 0.011 | 21 | 1537 | 0.0482 | 0.1832 | 9.3082 | 0.02 | 1.56 | 2.36 | 5.99 | NF | D |
| *AT MH J27 | | | | | | | | 21 | 3335 | | | | | | | | | |
| J27 | J26 | 901.00 | 897.13 | 371. | 12. | VC | 0.010 | 21 | 3335 | 0.1022 | 0.3715 | 2.3517 | 0.16 | 2.31 | 3.40 | 4.63 | NA | A/B |

```
*  FLOW FROM AREA 6 JOINS WITH THE FLOW FROM AREA 7 AT MANHOLE J26
*  AT MH J26                    34815                21    3335  (AREA 6)
*                               34101               298   53410  (AREA 7)
*                               =====               ====  =====
*                               68916               3006  6745   (TOTAL)
*
*
*
TOTAL NUMBER OF REACHES BELOW 1.2 FPS =   80.
TOTAL NUMBER OF ADVERSE REACHES =    0.
TOTAL NUMBER OF REACHES EXCEEDING PIPE CAPACITY =    0.
TOTAL NUMBER OF REACHES WHICH HAVE FULL PIPE VELOCITIES BELOW 1.5 FPS=   12.
          HH68     HH66A
          HH55     HH54
          HH54     HH53
          HH52     HH51
          HH50     LS4115
          HH49     HH48
          HH48     HH47
          HH46     HH45
          G2       G1
          F22B     F22A
          F22A     F22
          F18A     F18
TOTAL NUMBER OF REACHES =  115.
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## SUBAREA 7

Subarea 7 is located in the west-central portion of the main cantonment and consists mainly of barracks and support facilities.

Average flow velocities below the specified minimum 1.2 FPS occur in 63 of the 124 reaches. Another has a full pipe velocity slightly below the specified mimimum 1.5 FPS, (MH E-41 to E-35I @ 1.44 FPS). Nearly 80% of the reaches are concrete pipe (CP).

No reconstruction of sewer lines within Subarea 7 is required unless television inspection indicates significant pipe deterioration. However, one reach near the Rod and Gun Club requires attention. Field personnel reported that manholes E-59B1 and E-59B have backed up while downstream manhole E-59 shows little flow, indicating a line blockage between manholes E-59B and E-59. This reach has sufficient slope and the analysis shows no readily apparent cause for the stoppage.

In addition, the following minor problems should be corrected:

| | | |
|---|---|---|
| MH E-21 --- | Under pavement; should be raised | $ 150.00 |
| MH E-35E --- | Below grade; should be raised approximately 0.4' | 100.00 |
| | | $ 250.00 |

AREA 7 ,AS DEFINED BY THE SANITARY SEWER ANALYSIS, COMPLETED BY BOHANNAN-HUSTON, INC., SEPTEMBER 1984.

COMMENT COLUMN "NOTES"
**********

EXCEPT AS NOTED:
> ELEVATIONS WERE OBTAINED THROUGH FIELD SURVEYS
> DISTANCES WERE GENERATED FROM COMPUTER PLOTS

A = INVERT BASED ON REPORT BY FREESE & NICHOLS (4/78)
B = DISTANCE BETWEEN MANHOLES IS SCALED
C = INVERT BASED ON "AS-BUILT" DRAWINGS
D = INVERT BASED ON TOPOGRAPHY & ADJACENT MANHOLE DATA
NA = NOT AVAILABLE
NF = NOT FOUND

COMMENT COLUMN "WARNINGS"
**********

W = ZERO OR ADVERSE SLOPE PRESENT
(PEAK FLOW MAY EXCEED PIPE CAPACITY)
X = PEAK FLOW EXCEEDS PIPE CAPACITY
(LOW VELOCITIES MAY BE PRESENT)
Y = FULL PIPE VELOCITY BELOW 1.5 FPS
(AVERAGE VELOCITY MAY ALSO BE LOW)
Z = AVERAGE VELOCITY BELOW 1.2 FPS

FORMER MANHOLE IDENTIFICATION NUMBERS ALSO APPEAR IN THE COMMENT COLUMN UNDER "NOTES"

| MANHOLES FROM MH ID | MANHOLES TO MH ID | INVERT ELEV FROM FT | INVERT ELEV TO FT | DIST FT | PIPE DIA IN | PIPE TYP | PIPE SLOPE FT/FT | POPULATION RES | POPULATION N-RES | RATE OF FLOW(MGD) AVERAGE QA | RATE OF FLOW(MGD) PEAK QP | RATE OF FLOW(MGD) CAPACITY QF | PIPE RATIO QP/QF | VELOCITY AVG FPS | VELOCITY PEAK FPS | VELOCITY CAP FPS | UPSTREAM MANHOLE RIM ELEV | COMMENTS NOTE | COMMENTS WARNING |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| E59C | E59B | 964.89 | 963.25 | 335. | 8. | PVC | 0.005 | 0 | 45 | 0.0014 | 0.0051 | 0.6458 | 0.01 | 0.55 | 0.88 | 2.86 | 971.29 | | Z |
| E59A2 | E59B1 | 982.95 | 973.61 | 402. | 8. | PVC | 0.023 | 0 | 30 | 0.0009 | 0.0034 | 1.4068 | 0.00 | 0.82 | 1.35 | 6.24 | 991.02 | | Z |
| E59B1 | E59B | 973.61 | 963.25 | 376. | 8. | PVC | 0.028 | 0 | 30 | 0.0009 | 0.0034 | 1.5320 | 0.00 | 0.86 | 1.43 | 6.79 | 982.59 | | Z |
| *AT MH E59B | | | | | | | | 0 | 75 | | | | | | | | | | |
| E59B | E59 | 963.25 | 961.08 | 432. | 8. | CP | 0.005 | 0 | 75 | 0.0023 | 0.0086 | 0.4797 | 0.02 | 0.53 | 0.83 | 2.13 | 969.06 | | Z |
| E59A1 | E59A | 984.81 | 979.61 | 520. | 6. | CP | 0.010 | 0 | 5 | 0.0002 | 0.0006 | 0.3143 | 0.00 | 0.29 | 0.49 | 2.48 | NF | D | Z |
| E59A | E59 | 979.61 | 961.08 | 507. | 6. | CP | 0.037 | 0 | 5 | 0.0002 | 0.0006 | 0.6008 | 0.00 | 0.45 | 0.77 | 4.73 | 989.04 | | Z |
| *AT MH E59 | | | | | | | | 0 | 80 | | | | | | | | | | |
| E59 | E58A | 961.08 | 960.17 | 157. | 8. | CP | 0.006 | 0 | 80 | 0.0024 | 0.0091 | 0.5153 | 0.02 | 0.57 | 0.89 | 2.28 | 968.70 | | Z |
| E58D | E58C | 973.90 | 972.27 | 199. | 6. | PVC | 0.008 | 0 | 60 | 0.0018 | 0.0068 | 0.3879 | 0.02 | 0.77 | 1.20 | 3.06 | 979.96 | | Z |
| E58C | E58B | 972.27 | 969.60 | 400. | 6. | PVC | 0.007 | 0 | 60 | 0.0018 | 0.0068 | 0.3501 | 0.02 | 0.72 | 1.11 | 2.76 | 975.27 | | Z |
| E58B | E58A | 969.60 | 961.62 | 308. | 6. | PVC | 0.026 | 0 | 60 | 0.0018 | 0.0068 | 0.6898 | 0.01 | 1.13 | 1.79 | 5.44 | 974.61 | | Z |
| *AT MH E58A | | | | | | | | 0 | 140 | | | | | | | | | | |
| E58A | E58 | 960.17 | 959.47 | 105. | 8. | CP | 0.007 | 0 | 140 | 0.0042 | 0.0160 | 0.5526 | 0.03 | 0.72 | 1.11 | 2.45 | 967.87 | | Z |
| E58 | E57 | 959.47 | 957.27 | 401. | 8. | CP | 0.005 | 0 | 140 | 0.0042 | 0.0160 | 0.5013 | 0.03 | 0.67 | 1.03 | 2.22 | 969.59 | | Z |
| E57 | E54 | 957.27 | 953.82 | 389. | 8. | CP | 0.009 | 0 | 180 | 0.0054 | 0.0205 | 0.6374 | 0.03 | 0.86 | 1.32 | 2.83 | 965.21 | | Z |
| E54 | E52 | 953.82 | 948.03 | 399. | 8. | CP | 0.015 | 0 | 210 | 0.0063 | 0.0239 | 0.8153 | 0.03 | 1.07 | 1.64 | 3.61 | 959.16 | | Z |
| E56 | E55 | 960.31 | 954.74 | 303. | 8. | CP | 0.018 | 0 | 40 | 0.0012 | 0.0046 | 0.9177 | 0.00 | 0.67 | 1.09 | 4.07 | 965.81 | | Z |
| E55 | E53 | 954.74 | 948.93 | 475. | 8. | CP | 0.012 | 0 | 80 | 0.0024 | 0.0091 | 0.7485 | 0.01 | 0.74 | 1.16 | 3.32 | 961.09 | | Z |
| E62 | E53 | 951.53 | 948.93 | 451. | 8. | CP | 0.006 | 0 | 100 | 0.0030 | 0.0114 | 0.5139 | 0.02 | 0.62 | 0.95 | 2.28 | 957.15 | | Z |
| *AT MH E53 | | | | | | | | 0 | 180 | | | | | | | | | | |
| E53 | E52 | 948.93 | 948.03 | 48. | 8. | CP | 0.019 | 0 | 390 | 0.0117 | 0.0445 | 0.9268 | 0.05 | 1.42 | 2.11 | 4.11 | 954.29 | | |
| *AT MH E52 | | | | | | | | 0 | 390 | | | | | | | | | | |
| E52 | E51 | 948.03 | 945.84 | 369. | 8. | CP | 0.006 | 0 | 390 | 0.0117 | 0.0445 | 0.5214 | 0.09 | 0.96 | 1.43 | 2.31 | 954.13 | | Z |
| E51 | E50A | 945.84 | 944.71 | 159. | 8. | CP | 0.007 | 0 | 390 | 0.0117 | 0.0445 | 0.5706 | 0.08 | 1.02 | 1.52 | 2.53 | 951.46 | | Z |
| E50A | E50 | 944.71 | 943.22 | 210. | 8. | CP | 0.007 | 0 | 490 | 0.0147 | 0.0559 | 0.5701 | 0.10 | 1.10 | 1.62 | 2.53 | NF | D | Z |
| E50 | E42 | 943.22 | 938.32 | 397. | 8. | CP | 0.012 | 0 | 490 | 0.0147 | 0.0559 | 0.7519 | 0.07 | 1.33 | 1.98 | 3.33 | 949.47 | | |

| MANHOLES FROM MH ID | MANHOLES TO MH ID | INVERT ELEV FROM FT | INVERT ELEV TO FT | DIST FT | PIPE DIA IN | PIPE TYP | PIPE SLOPE FT/FT | POPULATION RES | POPULATION N-RES | RATE OF FLOW(MGD) AVERAGE QA | RATE OF FLOW(MGD) PEAK QP | RATE OF FLOW(MGD) CAPACITY QF | PIPE RATIO QP/QF | VELOCITY AVG FPS | VELOCITY PEAK FPS | VELOCITY CAP FPS | UPSTREAM MANHOLE RIM ELEV | COMMENTS NOTE | WARNING |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| E49 | E48 | 953.04 | 945.12 | 430. | 8. | CP | 0.018 | 0 | 110 | 0.0033 | 0.0125 | 0.9186 | 0.01 | 0.94 | 1.48 | 4.07 | 958.67 | | Z |
| E48 | E42 | 945.12 | 938.32 | 370. | 8. | CP | 0.018 | 0 | 150 | 0.0045 | 0.0171 | 0.9176 | 0.02 | 1.04 | 1.62 | 4.07 | NF | D | Z |
| E47 | E46 | 961.60 | 957.70 | 420. | 8. | CP | 0.009 | 0 | 90 | 0.0027 | 0.0103 | 0.6522 | 0.02 | 0.70 | 1.09 | 2.89 | NF | A | Z |
| E46 | E45 | 957.70 | 953.61 | 380. | 8. | CP | 0.011 | 0 | 150 | 0.0045 | 0.0171 | 0.7022 | 0.02 | 0.87 | 1.34 | 3.11 | NF | A | Z |
| E45 | E44 | 953.61 | 946.41 | 348. | 8. | CP | 0.021 | 0 | 150 | 0.0045 | 0.0171 | 0.9735 | 0.02 | 1.08 | 1.69 | 4.32 | 958.51 | | Z |
| E44 | E43 | 946.41 | 940.08 | 400. | 8. | CP | 0.016 | 0 | 150 | 0.0045 | 0.0171 | 0.8514 | 0.02 | 0.99 | 1.53 | 3.77 | 950.74 | | Z |
| E43 | E42 | 940.08 | 938.32 | 391. | 8. | CP | 0.005 | 0 | 150 | 0.0045 | 0.0171 | 0.4541 | 0.04 | 0.65 | 0.96 | 2.01 | 944.61 | | Z |
| *AT MH E42 | | | | | | | | 0 | 790 | | | | | | | | | | |
| E42 | E41 | 938.32 | 937.23 | 228. | 8. | CP | 0.005 | 0 | 790 | 0.0237 | 0.0901 | 0.4680 | 0.19 | 1.08 | 1.60 | 2.07 | 946.38 | | Z |
| E41 | E35I | 937.23 | 937.20 | 13. | 8. | CP | 0.002 | 0 | 790 | 0.0237 | 0.0901 | 0.3250 | 0.28 | 0.84 | 1.23 | 1.44 | 943.39 | | I |
| E35I | E35H | 937.20 | 936.36 | 146. | 8. | CP | 0.006 | 0 | 940 | 0.0282 | 0.1072 | 0.5134 | 0.21 | 1.22 | 1.80 | 2.28 | 943.74 | | |
| E35H | E35F | 936.36 | 933.94 | 325. | 8. | CP | 0.007 | 0 | 940 | 0.0282 | 0.1072 | 0.5840 | 0.18 | 1.33 | 1.98 | 2.59 | 944.61 | D | |
| E35G | E35F | 938.18 | 933.94 | 251. | 6. | VCP | 0.017 | 102 | 0 | 0.0102 | 0.0388 | 0.4713 | 0.08 | 1.53 | 2.27 | 3.71 | 942.15 | | |
| *AT MH E35F | | | | | | | | 143 | 940 | | | | | | | | | | |
| E35F | E35D | 933.94 | 932.73 | 165. | 8. | VCP | 0.007 | 143 | 940 | 0.0425 | 0.1615 | 0.6688 | 0.24 | 1.66 | 2.43 | 2.98 | 943.99 | | |
| E35E | E35D | 938.19 | 932.73 | 249. | 6. | VCP | 0.022 | 163 | 0 | 0.0163 | 0.0619 | 0.5370 | 0.12 | 1.94 | 2.85 | 4.23 | 942.13 | | |
| *AT MH E35D | | | | | | | | 306 | 940 | | | | | | | | | | |
| E35D | E35B | 932.73 | 930.73 | 277. | 8. | VCP | 0.007 | 306 | 940 | 0.0588 | 0.2234 | 0.6636 | 0.34 | 1.81 | 2.65 | 2.94 | 943.33 | | |
| E35C | E35B | 938.65 | 933.80 | 230. | 6. | VCP | 0.021 | 0 | 100 | 0.0030 | 0.0114 | 0.5266 | 0.02 | 1.11 | 1.72 | 4.15 | 942.63 | | Z |
| *AT MH E35B | | | | | | | | 306 | 1040 | | | | | | | | | | |
| E35B | E35A | 930.73 | 928.51 | 240. | 8. | VCP | 0.009 | 306 | 1040 | 0.0618 | 0.2348 | 0.7511 | 0.31 | 2.01 | 2.94 | 3.33 | 939.90 | | |
| E37B | E37A | 936.66 | 932.55 | 176. | 6. | CP | 0.023 | 148 | 0 | 0.0148 | 0.0562 | 0.4802 | 0.12 | 1.74 | 2.56 | 3.78 | 940.56 | | Z |
| E37A | E37 | 932.55 | 930.92 | 386. | 8. | CP | 0.004 | 148 | 0 | 0.0148 | 0.0562 | 0.4398 | 0.13 | 0.92 | 1.35 | 1.95 | 940.63 | | Z |
| E37 | E36 | 930.92 | 929.45 | 462. | 8. | CP | 0.003 | 148 | 0 | 0.0148 | 0.0562 | 0.3818 | 0.15 | 0.82 | 1.22 | 1.69 | 938.63 | | Z |
| E36 | E35 | 929.45 | 927.86 | 313. | 8. | CP | 0.005 | 148 | 30 | 0.0157 | 0.0597 | 0.4824 | 0.12 | 1.00 | 1.47 | 2.14 | 937.53 | | |
| E35 | E35A | 927.86 | 926.15 | 148. | 8. | CP | 0.012 | 148 | 30 | 0.0157 | 0.0597 | 0.7275 | 0.08 | 1.33 | 1.97 | 3.22 | 934.86 | | |
| *AT MH E35A | | | | | | | | 454 | 1070 | | | | | | | | | | |
| E35A | E28 | 926.15 | 923.32 | 221. | 8. | CP | 0.013 | 454 | 1070 | 0.0775 | 0.2945 | 0.7659 | 0.38 | 2.18 | 3.17 | 3.39 | 931.61 | | |
| E34 | E33 | 942.63 | 936.65 | 489. | 8. | CP | 0.013 | 99 | 100 | 0.0129 | 0.0490 | 0.7643 | 0.06 | 1.29 | 1.90 | 3.39 | 948.43 | | |
| E33 | E28 | 936.65 | 923.32 | 463. | 8. | CP | 0.029 | 99 | 180 | 0.0153 | 0.0581 | 1.1484 | 0.05 | 1.79 | 2.66 | 5.09 | 942.54 | | |
| E32 | E31 | 938.92 | 934.81 | 473. | 8. | CP | 0.009 | 81 | 90 | 0.0108 | 0.0410 | 0.6309 | 0.07 | 1.07 | 1.60 | 2.80 | 945.17 | | Z |
| E31 | E30 | 934.81 | 933.18 | 460. | 8. | CP | 0.004 | 162 | 130 | 0.0201 | 0.0764 | 0.4029 | 0.19 | 0.93 | 1.38 | 1.79 | 940.60 | | Z |
| E30 | E29 | 933.18 | 929.68 | 248. | 8. | CP | 0.014 | 162 | 130 | 0.0201 | 0.0764 | 0.8041 | 0.09 | 1.53 | 2.27 | 3.56 | 941.13 | | |
| E29 | E28 | 929.68 | 923.32 | 260. | 8. | CP | 0.024 | 162 | 256 | 0.0239 | 0.0907 | 1.0586 | 0.09 | 1.96 | 2.90 | 4.69 | 937.00 | | |
| *AT MH E28 | | | | | | | | 715 | 1506 | | | | | | | | | | |
| E28 | E27 | 923.32 | 921.50 | 190. | 8. | CP | 0.010 | 715 | 1506 | 0.1167 | 0.4239 | 0.6624 | 0.64 | 2.21 | 3.11 | 2.94 | 930.43 | | |
| E27 | E26 | 921.50 | 916.98 | 315. | 8. | CP | 0.014 | 715 | 1570 | 0.1186 | 0.4308 | 0.8108 | 0.53 | 2.57 | 3.64 | 3.59 | 929.79 | | |
| E26 | E22 | 916.98 | 910.46 | 340. | 8. | CP | 0.019 | 715 | 1570 | 0.1186 | 0.4308 | 0.9373 | 0.46 | 2.85 | 4.06 | 4.15 | 922.49 | | |
| * | MANHOLE E23 COULD NOT BE OPENED. | | | | | | | | | | | | | | | | | | |
| E23 | E24A | 924.40 | 916.17 | 174. | 8. | CP | 0.047 | 0 | 154 | 0.0046 | 0.0176 | 1.4720 | 0.01 | 1.44 | 2.27 | 6.52 | 931.28 | A | |
| E24 | E24A | 921.93 | 916.80 | 410. | 6. | CP | 0.013 | 0 | 30 | 0.0009 | 0.0034 | 0.3515 | 0.01 | 0.57 | 0.91 | 2.77 | 926.09 | | Z |
| *AT MH E24A | | | | | | | | 0 | 184 | | | | | | | | | | |
| E24A | E22 | 916.17 | 910.46 | 129. | 8. | CP | 0.044 | 0 | 184 | 0.0055 | 0.0210 | 1.4240 | 0.01 | 1.49 | 2.34 | 6.31 | 921.75 | | |
| *AT MH E22 | | | | | | | | 715 | 1754 | | | | | | | | | | |

| MANHOLES FROM MH ID | TO MH ID | INVERT ELEV FROM FT | TO FT | DIST FT | DIA IN | PIPE TYP | SLOPE FT/FT | POPULATION RES | N-RES | RATE OF FLOW(MGD) AVERAGE QA | PEAK QP | CAPACITY QF | PIPE RATIO QP/QF | VELOCITY AVG FPS | PEAK FPS | CAP FPS | UPSTREAM MANHOLE RIM ELEV | COMMENTS NOTE | WARNING |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| E22 | E21 | 910.46 | 907.86 | 475. | 10. | CP | 0.005 | 731 | 1774 | 0.1263 | 0.4586 | 0.9079 | 0.51 | 1.81 | 2.57 | 2.58 | 916.03 | | |
| E21 | E12 | 907.86 | 905.91 | 355. | 10. | CP | 0.005 | 731 | 1784 | 0.1266 | 0.4596 | 0.9095 | 0.51 | 1.82 | 2.58 | 2.58 | NF | D | |
| E18F | E18E | 950.34 | 941.95 | 221. | 8. | VCP | 0.038 | 0 | 50 | 0.0015 | 0.0057 | 1.5216 | 0.00 | 1.02 | 1.66 | 6.74 | 953.42 | | Z |
| E18E | E18D | 941.95 | 939.55 | 203. | 8. | VCP | 0.017 | 0 | 50 | 0.0015 | 0.0057 | 1.0107 | 0.01 | 0.77 | 1.25 | 4.48 | 946.98 | | Z |
| E18D | E18C | 938.55 | 932.61 | 327. | 8. | VCP | 0.018 | 0 | 63 | 0.0019 | 0.0072 | 1.0526 | 0.01 | 0.86 | 1.38 | 4.67 | 944.03 | | Z |
| E18C | E18B | 932.61 | 932.05 | 72. | 8. | VCP | 0.008 | 0 | 103 | 0.0031 | 0.0117 | 0.6887 | 0.02 | 0.76 | 1.18 | 3.05 | 938.12 | | Z |
| E18B | E18A | 932.05 | 931.40 | 83. | 8. | VCP | 0.008 | 0 | 103 | 0.0031 | 0.0117 | 0.6911 | 0.02 | 0.76 | 1.18 | 3.06 | 937.70 | | Z |
| E18A | E18 | 931.40 | 927.70 | 164. | 8. | CP | 0.023 | 0 | 103 | 0.0031 | 0.0117 | 1.0166 | 0.01 | 0.98 | 1.55 | 4.51 | 938.51 | | Z |
| E18 | E14 | 927.70 | 917.14 | 326. | 8. | CP | 0.032 | 0 | 128 | 0.0038 | 0.0146 | 1.2181 | 0.01 | 1.19 | 1.88 | 5.40 | 936.03 | | Z |
| E14 | E13 | 917.14 | 912.38 | 360. | 8. | CP | 0.013 | 0 | 133 | 0.0040 | 0.0152 | 0.7783 | 0.02 | 0.89 | 1.39 | 3.45 | 925.84 | | Z |
| E13 | E12 | 912.38 | 905.91 | 502. | 8. | CP | 0.013 | 0 | 133 | 0.0040 | 0.0152 | 0.7684 | 0.02 | 0.89 | 1.38 | 3.41 | 919.36 | | Z |
| *AT MH E12 | | | | | | | | 731 | 1917 | | | | | | | | | | |
| E12 | E11 | 905.91 | 904.40 | 549. | 12. | CP | 0.003 | 731 | 1937 | 0.1312 | 0.4761 | 1.0465 | 0.45 | 1.41 | 2.01 | 2.06 | 911.26 | | |
| E11 | E10 | 904.40 | 902.96 | 261. | 12. | CP | 0.006 | 731 | 1952 | 0.1317 | 0.4777 | 1.4822 | 0.32 | 1.80 | 2.60 | 2.92 | 917.50 | | |
| E76 | E75 | 955.10 | 954.31 | 220. | 8. | CP | 0.004 | 0 | 60 | 0.0018 | 0.0068 | 0.4056 | 0.02 | 0.44 | 0.69 | 1.80 | NF | A | Z |
| E75 | E74 | 954.31 | 951.32 | 300. | 8. | CP | 0.010 | 0 | 90 | 0.0027 | 0.0103 | 0.6757 | 0.02 | 0.72 | 1.12 | 3.00 | 960.47 | | Z |
| E74 | E72 | 951.32 | 949.61 | 198. | 8. | CP | 0.009 | 0 | 90 | 0.0027 | 0.0103 | 0.6290 | 0.02 | 0.68 | 1.07 | 2.79 | 957.42 | | Z |
| E73 | E72 | 952.20 | 949.61 | 345. | 8. | CP | 0.008 | 0 | 30 | 0.0009 | 0.0034 | 0.5864 | 0.01 | 0.45 | 0.73 | 2.60 | 956.88 | | Z |
| *AT MH E72 | | | | | | | | 0 | 120 | | | | | | | | | | |
| E72 | E67D | 949.61 | 946.51 | 304. | 8. | CP | 0.010 | 0 | 130 | 0.0039 | 0.0148 | 0.6835 | 0.02 | 0.81 | 1.26 | 3.03 | 956.35 | | Z |
| E67D | E67C | 946.51 | 942.00 | 342. | 8. | CP | 0.013 | 0 | 130 | 0.0039 | 0.0148 | 0.7772 | 0.02 | 0.89 | 1.38 | 3.45 | 953.04 | | Z |
| E67C | E67B | 942.00 | 936.59 | 339. | 8. | CP | 0.016 | 0 | 130 | 0.0039 | 0.0148 | 0.8550 | 0.02 | 0.94 | 1.47 | 3.79 | 954.70 | | Z |
| E67B | E67A | 936.59 | 931.57 | 339. | 8. | CP | 0.015 | 0 | 130 | 0.0039 | 0.0148 | 0.8236 | 0.02 | 0.92 | 1.44 | 3.65 | 940.71 | | Z |
| E67A | E67 | 931.57 | 927.10 | 230. | 8. | CP | 0.019 | 0 | 160 | 0.0048 | 0.0182 | 0.9436 | 0.02 | 1.09 | 1.68 | 4.18 | 938.72 | | Z |
| E67 | E64 | 927.10 | 921.89 | 252. | 8. | CP | 0.021 | 0 | 165 | 0.0050 | 0.0188 | 0.9732 | 0.02 | 1.11 | 1.73 | 4.31 | 932.71 | | Z |
| E64B | E64A | 928.30 | 925.46 | 130. | 8. | CP | 0.022 | 0 | 20 | 0.0006 | 0.0023 | 1.0004 | 0.00 | 0.57 | 0.94 | 4.43 | 933.69 | | Z |
| E64A | E64 | 925.46 | 921.89 | 141. | 8. | CP | 0.025 | 0 | 30 | 0.0009 | 0.0034 | 1.0770 | 0.00 | 0.68 | 1.12 | 4.77 | 933.18 | | Z |
| *AT MH E64 | | | | | | | | 0 | 195 | | | | | | | | | | |
| E64 | E63 | 921.89 | 912.17 | 351. | 8. | CP | 0.028 | 0 | 210 | 0.0063 | 0.0239 | 1.1263 | 0.02 | 1.33 | 2.06 | 4.99 | 929.21 | | Z |
| E63 | E10 | 912.71 | 908.91 | 480. | 8. | CP | 0.008 | 0 | 210 | 0.0063 | 0.0239 | 0.6022 | 0.04 | 0.87 | 1.30 | 2.67 | 919.51 | | |
| *AT MH E10 | | | | | | | | 731 | 2162 | | | | | | | | | | |
| E10 | E245A | 902.96 | 901.54 | 251. | 12. | CP | 0.006 | 731 | 2162 | 0.1380 | 0.5003 | 1.5010 | 0.33 | 1.84 | 2.66 | 2.96 | 914.96 | | |
| E78B | E78A | 924.75 | 915.96 | 295. | 8. | CP | 0.030 | 0 | 150 | 0.0045 | 0.0171 | 1.1683 | 0.01 | 1.22 | 1.92 | 5.18 | 929.42 | | |
| E78A | E78 | 915.96 | 906.41 | 392. | 8. | CP | 0.024 | 0 | 250 | 0.0075 | 0.0285 | 1.0564 | 0.03 | 1.35 | 2.08 | 4.68 | 919.82 | | |
| E78 | E77 | 904.00 | 902.19 | 430. | 10. | CP | 0.004 | 0 | 288 | 0.0086 | 0.0328 | 0.7962 | 0.04 | 0.75 | 1.11 | 2.26 | 910.46 | | Z |
| E77 | E245A | 902.19 | 901.54 | 385. | 12. | CP | 0.002 | 0 | 288 | 0.0086 | 0.0328 | 0.8200 | 0.04 | 0.53 | 0.79 | 1.62 | 911.41 | | Z |
| *AT MH E245A | | | | | | | | 731 | 2450 | | | | | | | | | | |
| E245A | E8B | 901.54 | 900.67 | 127. | 15. | VCP | 0.007 | 731 | 2450 | 0.1466 | 0.5313 | 3.4554 | 0.15 | 2.16 | 3.17 | 4.36 | 907.98 | | |
| E8B | E247B | 900.67 | 899.74 | 260. | 15. | VCP | 0.004 | 731 | 2450 | 0.1466 | 0.5313 | 2.4968 | 0.21 | 1.72 | 2.50 | 3.15 | 908.26 | | |
| E253 | E252 | 936.18 | 932.12 | 405. | 12. | CP | 0.010 | 322 | 100 | 0.0352 | 0.1338 | 1.9980 | 0.07 | 1.52 | 2.24 | 3.94 | 945.64 | | |
| E252 | E251 | 932.12 | 927.55 | 203. | 12. | CP | 0.023 | 322 | 250 | 0.0397 | 0.1509 | 2.9941 | 0.05 | 2.08 | 3.08 | 5.90 | 940.06 | | |
| * | MANHOLE E251 COULD NOT BE OPENED. | | | | | | | | | | | | | | | | | | |
| E251 | E249 | 927.55 | 914.24 | 591. | 12. | CP | 0.023 | 322 | 300 | 0.0412 | 0.1566 | 2.9947 | 0.05 | 2.10 | 3.11 | 5.90 | 934.46 | D | |
| E249 | E248 | 914.24 | 908.90 | 360. | 12. | CP | 0.015 | 322 | 310 | 0.0415 | 0.1577 | 2.4304 | 0.06 | 1.83 | 2.69 | 4.79 | 923.92 | | |
| E248 | E247 | 908.90 | 907.12 | 120. | 12. | CP | 0.015 | 322 | 310 | 0.0415 | 0.1577 | 2.4304 | 0.06 | 1.83 | 2.69 | 4.79 | NF | D | |
| E247 | E247A | 907.12 | 903.27 | 277. | 12. | CP | 0.014 | 322 | 310 | 0.0415 | 0.1577 | 2.3526 | 0.07 | 1.79 | 2.63 | 4.63 | 913.75 | | |
| E247A | E247B | 903.27 | 899.74 | 250. | 12. | CP | 0.014 | 322 | 310 | 0.0415 | 0.1577 | 2.3713 | 0.07 | 1.80 | 2.65 | 4.67 | 910.15 | | |
| *AT MH E247B | | | | | | | | 1053 | 2760 | | | | | | | | | | |
| E247B | E8 | 899.74 | 898.03 | 146. | 18. | CP | 0.012 | 1053 | 2760 | 0.1881 | 0.6794 | 6.3673 | 0.11 | 2.48 | 3.63 | 5.58 | 906.65 | | |
| E8 | E6 | 897.35 | 896.26 | 290. | 18. | CP | 0.004 | 1053 | 2960 | 0.1941 | 0.7008 | 3.6070 | 0.19 | 1.68 | 2.45 | 3.16 | 905.77 | | |

| MANHOLES FROM MH ID | TO MH ID | INVERT ELEV FROM FT | TO FT | DIST FT | DIA IN | PIPE TYP | SLOPE FT/FT | POPULATION RES | N-RES | RATE OF FLOW(MGD) AVERAGE QA | PEAK QP | CAPACITY QF | PIPE RATIO QP/QF | VELOCITY AVG FPS | PEAK FPS | CAP FPS | UPSTREAM MANHOLE RIM ELEV | COMMENTS NOTE | WARNING |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| E6 | E5 | 896.26 | 896.02 | 57. | 18. | CP | 0.004 | 1053 | 2960 | 0.1941 | 0.7008 | 3.8177 | 0.18 | 1.75 | 2.55 | 3.34 | 902.33 | | |
| E5 | E2 | 896.02 | 894.65 | 427. | 18. | CP | 0.003 | 1053 | 2960 | 0.1941 | 0.7008 | 3.3326 | 0.21 | 1.59 | 2.31 | 2.92 | 901.91 | | |
| E118 | E117 | 909.24 | 908.67 | 40. | 6. | VCP | 0.007 | 281 | 0 | 0.0281 | 0.1068 | 0.3061 | 0.35 | 1.50 | 2.19 | 2.41 | 919.18 | | |
| E117 | E115 | 908.67 | 907.99 | 114. | 6. | VCP | 0.006 | 433 | 0 | 0.0433 | 0.1645 | 0.2801 | 0.59 | 1.60 | 2.29 | 2.21 | 917.68 | | |
| E116 | E115 | 910.82 | 907.99 | 112. | 6. | VCP | 0.025 | 159 | 0 | 0.0159 | 0.0604 | 0.5764 | 0.10 | 2.02 | 2.97 | 4.54 | 917.75 | | |
| *AT MH E115 | | | | | | | | 592 | 0 | | | | | | | | | | |
| E115 | E114 | 907.99 | 907.28 | 79. | 8. | VCP | 0.009 | 592 | 0 | 0.0592 | 0.2250 | 0.7403 | 0.30 | 1.96 | 2.88 | 3.28 | 917.02 | | |
| E114 | E113 | 907.05 | 905.98 | 146. | 8. | VCP | 0.007 | 767 | 0 | 0.0767 | 0.2915 | 0.6686 | 0.44 | 1.97 | 2.86 | 2.96 | 915.98 | | |
| E113 | E109 | 905.98 | 904.46 | 202. | 8. | VCP | 0.008 | 767 | 0 | 0.0767 | 0.2915 | 0.6774 | 0.43 | 1.99 | 2.88 | 3.00 | 915.01 | | |
| E112 | E111 | 906.57 | 905.91 | 136. | 6. | VCP | 0.005 | 326 | 0 | 0.0326 | 0.1239 | 0.2526 | 0.49 | 1.37 | 1.98 | 1.99 | 914.28 | | |
| E111 | E110 | 905.91 | 905.53 | 41. | 6. | VCP | 0.009 | 508 | 0 | 0.0508 | 0.1930 | 0.3491 | 0.55 | 1.96 | 2.81 | 2.75 | 913.85 | | |
| E110 | E109 | 905.53 | 904.30 | 104. | 6. | VCP | 0.012 | 666 | 0 | 0.0666 | 0.2531 | 0.3944 | 0.64 | 2.31 | 3.30 | 3.11 | 913.47 | | |
| *AT MH E109 | | | | | | | | 1433 | 0 | | | | | | | | | | |
| E109 | E108 | 904.22 | 903.10 | 121. | 8. | VCP | 0.009 | 1433 | 0 | 0.1433 | 0.5195 | 0.7513 | 0.69 | 2.57 | 3.59 | 3.33 | 912.62 | | |
| E108 | E105 | 903.10 | 901.77 | 142. | 8. | VCP | 0.009 | 1433 | 0 | 0.1433 | 0.5195 | 0.7558 | 0.69 | 2.58 | 3.61 | 3.35 | NF | D | |
| E107 | E106 | 904.78 | 904.03 | 46. | 8. | VCP | 0.016 | 0 | 150 | 0.0045 | 0.0171 | 0.9972 | 0.02 | 1.10 | 1.71 | 4.42 | 911.46 | | Z |
| E106 | E105 | 904.03 | 901.90 | 109. | 8. | VCP | 0.020 | 0 | 150 | 0.0045 | 0.0171 | 1.0917 | 0.02 | 1.17 | 1.83 | 4.84 | 912.30 | | Z |
| *AT MH E105 | | | | | | | | 1433 | 150 | | | | | | | | | | |
| E105 | E104 | 901.60 | 898.02 | 264. | 10. | VCP | 0.014 | 1433 | 250 | 0.1508 | 0.5463 | 1.6489 | 0.33 | 2.91 | 4.20 | 4.68 | 910.83 | | |
| E104 | E101 | 898.02 | 895.97 | 66. | 10. | VCP | 0.031 | 1433 | 350 | 0.1538 | 0.5571 | 2.4955 | 0.22 | 3.92 | 5.69 | 7.08 | 909.25 | | |
| E103 | E102 | 897.97 | 897.84 | 42. | 8. | VCP | 0.003 | 326 | 0 | 0.0326 | 0.1239 | 0.4344 | 0.29 | 1.13 | 1.65 | 1.93 | 909.99 | | Z |
| E102 | E101 | 897.76 | 896.60 | 174. | 8. | VCP | 0.007 | 499 | 0 | 0.0499 | 0.1896 | 0.6377 | 0.30 | 1.68 | 2.46 | 2.83 | 910.23 | | |
| *AT MH E101 | | | | | | | | 1932 | 350 | | | | | | | | | | |
| E101 | E100 | 895.97 | 895.43 | 148. | 10. | VCP | 0.004 | 1932 | 350 | 0.2037 | 0.7348 | 0.8553 | 0.86 | 1.99 | 2.73 | 2.43 | 908.53 | | |
| E100 | E2 | 895.43 | 894.65 | 215. | 10. | VCP | 0.004 | 1932 | 450 | 0.2067 | 0.7455 | 0.8529 | 0.87 | 2.00 | 2.72 | 2.42 | 906.57 | D | |
| *AT MH E2 | | | | | | | | 2985 | 3410 | | | | | | | | | | |
| E2 | E1 | 894.65 | 893.42 | 394. | 18. | CP | 0.003 | 2985 | 3410 | 0.4008 | 1.4230 | 3.2874 | 0.43 | 1.95 | 2.77 | 2.88 | 903.50 | | |
| E1 | J26 | 893.42 | 892.19 | 389. | 18. | CP | 0.003 | 2985 | 3410 | 0.4008 | 1.4230 | 3.3084 | 0.43 | 1.96 | 2.78 | 2.90 | 903.17 | | |

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*  FLOW FROM AREA 6 JOINS WITH THE FLOW FROM AREA 7 AT MANHOLE J26.
*  AT MH J26                          34815                    21      3335 (AREA 6)
*                                     34101                  2985      3410 (AREA 7)
*                                     ------                 ----      ----
*                                     68916                  3006      6745 (TOTAL)
*
J26      J25      892.62 891.00  402. 21. VC  0.004  3006  6745  0.5030 1.7709 6.4989  0.27  2.48 3.56  4.18  904.20
*
*  FLOWS FROM AREAS 6 & 7 ENTER AREA 10 AT MANHOLE J25
*  AT MH J25                          69318                  3006      6745 (AREAS 6 & 7)
*                                     16905                  1596      7378 (PART OF AREA 10)
*                                     ------                 ----      ----
*                                     86223                  4602     14123
*
*
TOTAL NUMBER OF REACHES BELOW 1.2 FPS =    63.
TOTAL NUMBER OF ADVERSE REACHES =    0.
TOTAL NUMBER OF REACHES EXCEEDING PIPE CAPACITY =    0.
TOTAL NUMBER OF REACHES WHICH HAVE FULL PIPE VELOCITIES BELOW 1.5 FPS=    1.
TOTAL NUMBER OF REACHES =  124.
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## SUBAREA 8

Subarea 8 consists of the Montague Village family housing area, located southwest of the main cantonment and north of West Fort Hood.

Flow is carried to the east, then routed southeast in an 8-inch VC line to manhole L-27 where it joins with flow from Subarea 9 (West Fort Hood). The combined flow is then conveyed to Lift Station 93040 in an 8-inch cast iron pipe and pumped east to manhole L-26 in Subarea 10.

Forty-eight of the 71 reaches show average flow velocities below 1.2 FPS, the problem being generally confined to upper branch regions. Five of these also have full pipe velocities below the specified minimum 1.5 FPS. Nearly 70% of them are concrete pipe (CP).

Field personnel noted standing sewage and/or surcharging in manholes L-42, L-59, and L-73, and plugged lines between manholes L-46 and L-48. These conditions were reported to DFE personnel at the time, and the problem was attended to. Periodic inspection of these areas is recommended to insure proper flow. Although the analysis indicates that these reaches all have average flow velocities below the specified minimum, reconstruction of the lines is not considered feasible.

No reconstruction of sewer lines within Subarea 8 is required unless television inspection indicates significant pipe deterioration.

# MONTAGUE VILLAGE

MH L-76 WAS NOT FOUND IN THE FIELD. AT MH L-77 THERE IS AN 8" PIPE ENTERING FROM THE NORTHEAST (INV= 926.94). AT MH L-97 THERE IS A PIPE ENTERING FROM THE SOUTHWEST (INV= 964.09).

AREA 8 ,AS DEFINED BY THE SANITARY SEWER ANALYSIS, COMPLETED BY BOHANNAN-HUSTON, INC., SEPTEMBER 1984.

COMMENT COLUMN "NOTES"

EXCEPT AS NOTED:
> ELEVATIONS WERE OBTAINED THROUGH FIELD SURVEYS
> DISTANCES WERE GENERATED FROM COMPUTER PLOTS

A = INVERT BASED ON REPORT BY FREESE & NICHOLS (4/78)
B = DISTANCE BETWEEN MANHOLES IS SCALED
C = INVERT BASED ON "AS-BUILT" DRAWINGS
D = INVERT BASED ON TOPOGRAPHY & ADJACENT MANHOLE DATA
NA = NOT AVAILABLE
NF = NOT FOUND

FORMER MANHOLE IDENTIFICATION NUMBERS ALSO APPEAR IN THE COMMENT COLUMN UNDER "NOTES"

COMMENT COLUMN "WARNINGS"

W = ZERO OR ADVERSE SLOPE PRESENT (PEAK FLOW MAY EXCEED PIPE CAPACITY)
X = PEAK FLOW EXCEEDS PIPE CAPACITY (LOW VELOCITIES MAY BE PRESENT)
Y = FULL PIPE VELOCITY BELOW 1.5 FPS (AVERAGE VELOCITY MAY ALSO BE LOW)
Z = AVERAGE VELOCITY BELOW 1.2 FPS

| MANHOLES FROM MH ID | TO MH ID | INVERT ELEV FROM FT | TO FT | DIST FT | DIA IN | PIPE TYP | SLOPE FT/FT | POPULATION RES | N-RES | RATE OF FLOW(MGD) AVERAGE QA | PEAK QP | CAPACITY QF | PIPE RATIO QP/QF | VELOCITY AVG FPS | PEAK FPS | CAP FPS | UPSTREAM MANHOLE RIM ELEV | COMMENTS NOTE | WARNING |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L-87 | L-86 | 980.90 | 978.81 | 113. | 6. | CP | 0.018 | 25 | 0 | 0.0025 | 0.0095 | 0.4274 | 0.02 | 0.91 | 1.41 | 3.37 | 990.36 | | Z |
| L-86 | L-85 | 978.81 | 978.18 | 59. | 6. | CP | 0.011 | 25 | 0 | 0.0025 | 0.0095 | 0.3247 | 0.03 | 0.76 | 1.16 | 2.56 | 988.51 | | Z |
| L-85 | L-84 | 978.18 | 975.86 | 246. | 6. | CP | 0.009 | 25 | 0 | 0.0025 | 0.0095 | 0.3052 | 0.03 | 0.73 | 1.11 | 2.40 | 989.47 | | Z |
| L-84 | L-83 | 975.86 | 971.55 | 378. | 6. | CP | 0.011 | 50 | 5 | 0.0052 | 0.0196 | 0.3356 | 0.06 | 0.98 | 1.47 | 2.64 | 985.79 | | Z |
| L-83 | L-82 | 971.55 | 969.54 | 216. | 6. | CP | 0.009 | 50 | 5 | 0.0052 | 0.0196 | 0.3032 | 0.06 | 0.91 | 1.36 | 2.39 | 975.72 | | Z |
| L-82 | L-81 | 968.95 | 966.33 | 339. | 6. | CP | 0.008 | 50 | 10 | 0.0053 | 0.0201 | 0.2763 | 0.07 | 0.86 | 1.29 | 2.18 | 974.59 | | Z |
| L-89 | L-90 | 977.35 | 972.14 | 121. | 6. | CP | 0.043 | 0 | 5 | 0.0002 | 0.0006 | 0.6521 | 0.00 | 0.48 | 0.81 | 5.14 | 981.22 | | Z |
| L-90 | L-91 | 972.14 | 970.78 | 313. | 8. | VCP | 0.004 | 29 | 5 | 0.0031 | 0.0116 | 0.5148 | 0.02 | 0.62 | 0.96 | 2.28 | 978.28 | | Z |
| L-92 | L-91 | 972.21 | 970.78 | 323. | 8. | VCP | 0.004 | 35 | 0 | 0.0035 | 0.0133 | 0.5196 | 0.03 | 0.65 | 1.01 | 2.30 | 976.34 | | Z |
| * AT MH L-91 | | | | | | | | 64 | 5 | | | | | | | | | | |
| L-91 | L-81 | 970.78 | 965.05 | 419. | 8. | VCP | 0.014 | 92 | 5 | 0.0094 | 0.0355 | 0.9133 | 0.04 | 1.31 | 1.96 | 4.05 | 975.90 | | |
| * AT MH L-81 | | | | | | | | 149 | 15 | | | | | | | | | | |
| L-81 | L-80 | 965.05 | 963.52 | 406. | 8. | VCP | 0.004 | 180 | 15 | 0.0185 | 0.0701 | 0.4794 | 0.15 | 1.02 | 1.53 | 2.13 | 969.39 | | Z |
| L-80 | L-79 | 963.52 | 962.23 | 292. | 8. | VCP | 0.004 | 215 | 15 | 0.0220 | 0.0834 | 0.5191 | 0.16 | 1.14 | 1.70 | 2.30 | 972.62 | | Z |
| L-79 | L-78 | 962.23 | 961.29 | 237. | 8. | CP | 0.004 | 233 | 15 | 0.0238 | 0.0903 | 0.4263 | 0.21 | 1.02 | 1.50 | 1.89 | 971.63 | | Z |
| L-78 | L-77 | 961.29 | 960.01 | 285. | 8. | VCP | 0.004 | 254 | 15 | 0.0259 | 0.0982 | 0.5234 | 0.19 | 1.20 | 1.78 | 2.32 | 971.34 | | |
| L-77 | L-59 | 960.08 | 958.64 | 292. | 8. | VCP | 0.005 | 279 | 15 | 0.0284 | 0.1077 | 0.5484 | 0.20 | 1.28 | 1.89 | 2.43 | 970.16 | | |
| L-57 | L-58 | 960.31 | 959.16 | 272. | 8. | CP | 0.004 | 35 | 0 | 0.0035 | 0.0133 | 0.4401 | 0.03 | 0.58 | 0.89 | 1.95 | 966.41 | | Z |
| L-58 | L-59 | 959.16 | 958.64 | 241. | 8. | CP | 0.002 | 49 | 0 | 0.0049 | 0.0186 | 0.3144 | 0.06 | 0.52 | 0.76 | 1.39 | 962.66 | | Y |
| * AT MH L-59 | | | | | | | | 328 | 15 | | | | | | | | | | |
| L-59 | L-60 | 958.64 | 957.48 | 396. | 8. | VCP | 0.003 | 356 | 15 | 0.0361 | 0.1370 | 0.4227 | 0.32 | 1.14 | 1.67 | 1.87 | 962.17 | | Z |
| L-60 | L-61 | 957.48 | 955.83 | 333. | 8. | VCP | 0.005 | 391 | 15 | 0.0396 | 0.1503 | 0.5497 | 0.27 | 1.41 | 2.07 | 2.44 | 965.73 | | |
| L-93 | L-94 | 974.58 | 973.12 | 409. | 8. | VCP | 0.004 | 42 | 0 | 0.0042 | 0.0160 | 0.4666 | 0.03 | 0.64 | 0.98 | 2.07 | 978.58 | | Z |
| L-94 | L-95 | 973.12 | 966.32 | 387. | 8. | VCP | 0.018 | 70 | 0 | 0.0070 | 0.0266 | 1.0352 | 0.03 | 1.30 | 2.00 | 4.59 | 978.90 | | |
| L-95 | L-96 | 966.32 | 965.06 | 290. | 8. | VCP | 0.004 | 88 | 0 | 0.0088 | 0.0334 | 0.5148 | 0.06 | 0.87 | 1.30 | 2.28 | 971.22 | | Z |

| MANHOLES FROM MH ID | MANHOLES TO MH ID | INVERT ELEV FROM FT | INVERT ELEV TO FT | DIST FT | PIPE DIA IN | PIPE TYP | PIPE SLOPE FT/FT | POPULATION RES | POPULATION N-RES | RATE OF FLOW(MGD) AVERAGE QA | RATE OF FLOW(MGD) PEAK QP | RATE OF FLOW(MGD) CAPACITY QF | PIPE RATIO QP/QF | VELOCITY AVG FPS | VELOCITY PEAK FPS | VELOCITY CAP FPS | UPSTREAM MANHOLE RIM ELEV | COMMENTS NOTE WARNING |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L-96 | L-97 | 965.06 | 964.09 | 214. | 8. | VCP | 0.005 | 105 | 0 | 0.0105 | 0.0399 | 0.5258 | 0.08 | 0.93 | 1.39 | 2.33 | 972.49 | Z |
| L-97 | L-61 | 964.09 | 955.83 | 294. | 8. | VCP | 0.028 | 123 | 0 | 0.0123 | 0.0467 | 1.3090 | 0.04 | 1.83 | 2.79 | 5.80 | 972.69 | |
| * AT MH L-61 | | | | | | | | 514 | 15 | | | | | | | | | |
| L-61 | L-62 | 955.83 | 954.66 | 205. | 8. | VCP | 0.006 | 521 | 15 | 0.0526 | 0.1997 | 0.5900 | 0.34 | 1.62 | 2.36 | 2.62 | 964.04 | |
| L-75 | L-74 | 966.91 | 965.31 | 345. | 8. | CP | 0.005 | 46 | 0 | 0.0046 | 0.0175 | 0.4609 | 0.04 | 0.66 | 0.98 | 2.04 | 971.83 | Z |
| L-74 | L-73 | 965.31 | 962.70 | 372. | 8. | CP | 0.007 | 85 | 0 | 0.0085 | 0.0323 | 0.5669 | 0.06 | 0.92 | 1.36 | 2.51 | 973.82 | Z |
| L-73 | L-66 | 962.70 | 959.87 | 317. | 8. | CP | 0.009 | 120 | 0 | 0.0120 | 0.0456 | 0.6395 | 0.07 | 1.11 | 1.66 | 2.83 | 968.06 | Z |
| L-66 | L-64 | 959.87 | 958.47 | 280. | 8. | CP | 0.005 | 127 | 0 | 0.0127 | 0.0483 | 0.4786 | 0.10 | 0.93 | 1.37 | 2.12 | 962.71 | Z |
| L-65 | L-64 | 959.59 | 958.47 | 280. | 8. | VCP | 0.004 | 42 | 0 | 0.0042 | 0.0160 | 0.4939 | 0.03 | 0.67 | 1.02 | 2.19 | 963.44 | Z |
| * AT MH L-64 | | | | | | | | 180 | 0 | | | | | | | | | |
| L-64 | L-63 | 958.47 | 957.56 | 174. | 8. | VCP | 0.009 | 184 | 0 | 0.0184 | 0.0699 | 0.5648 | 0.12 | 1.17 | 1.72 | 2.50 | 966.90 | Z |
| L-63 | L-62 | 957.56 | 954.66 | 290. | 8. | VCP | 0.010 | 191 | 0 | 0.0191 | 0.0726 | 0.7810 | 0.09 | 1.48 | 2.19 | 3.46 | 964.62 | |
| * AT MH L-62 | | | | | | | | 712 | 15 | | | | | | | | | |
| L-62 | L-50A | 954.66 | 949.45 | 224. | 8. | VCP | 0.023 | 712 | 15 | 0.0717 | 0.2723 | 1.1910 | 0.23 | 2.90 | 4.27 | 5.28 | 961.06 | |
| L-56 | L-51 | 954.43 | 952.05 | 492. | 8. | CP | 0.005 | 0 | 15 | 0.0005 | 0.0017 | 0.4707 | 0.00 | 0.31 | 0.51 | 2.09 | 958.63 | Z |
| L-54 | L-53 | 956.47 | 953.44 | 100. | 6. | CP | 0.030 | 0 | 5 | 0.0002 | 0.0006 | 0.5470 | 0.00 | 0.43 | 0.72 | 4.31 | 960.82 | Z |
| L-53 | L-51 | 953.44 | 952.05 | 159. | 6. | CP | 0.009 | 0 | 15 | 0.0005 | 0.0017 | 0.2938 | 0.01 | 0.40 | 0.65 | 2.32 | 957.99 | Z |
| * AT MH L-51 | | | | | | | | 0 | 30 | | | | | | | | | |
| L-51 | L-50A | 952.05 | 949.45 | 210. | 8. | CP | 0.012 | 0 | 30 | 0.0009 | 0.0034 | 0.7531 | 0.00 | 0.54 | 0.87 | 3.34 | 955.34 | Z |
| * AT MH L-50A | | | | | | | | 719 | 45 | | | | | | | | | |
| L-50A | L-46A | 949.45 | 945.24 | 299. | 8. | VCP | 0.014 | 725 | 45 | 0.0739 | 0.2806 | 0.9267 | 0.30 | 2.46 | 3.60 | 4.11 | 958.20 | |
| L-49A | L-47A | 957.45 | 953.19 | 301. | 8. | CP | 0.014 | 18 | 0 | 0.0018 | 0.0068 | 0.8052 | 0.01 | 0.70 | 1.12 | 3.57 | 962.40 | Z |
| L-48A | L-47A | 960.30 | 953.19 | 143. | 6. | VCP | 0.050 | 4 | 0 | 0.0004 | 0.0015 | 0.8086 | 0.00 | 0.77 | 1.27 | 6.37 | 964.16 | Z |
| * AT MH L-47A | | | | | | | | 25 | 0 | | | | | | | | | |
| L-47A | L-46A | 953.19 | 945.24 | 289. | 8. | CP | 0.028 | 25 | 0 | 0.0025 | 0.0095 | 1.1226 | 0.01 | 0.98 | 1.56 | 4.98 | 962.56 | Z |
| * AT MH L-46A | | | | | | | | 750 | 45 | | | | | | | | | |
| L-46A | L-35 | 945.24 | 938.30 | 301. | 8. | VCP | 0.023 | 750 | 45 | 0.0764 | 0.2901 | 1.1858 | 0.24 | 2.95 | 4.33 | 5.26 | 956.63 | |
| L-67 | L-68 | 952.36 | 949.81 | 200. | 6. | VCP | 0.013 | 32 | 0 | 0.0032 | 0.0122 | 0.4095 | 0.03 | 0.96 | 1.47 | 3.23 | 957.96 | Z |
| L-68 | L-69 | 949.81 | 948.07 | 173. | 6. | VCP | 0.010 | 42 | 0 | 0.0042 | 0.0160 | 0.3637 | 0.04 | 0.96 | 1.46 | 2.87 | 954.91 | Z |
| L-69 | L-70 | 948.07 | 946.33 | 404. | 8. | CP | 0.004 | 70 | 0 | 0.0070 | 0.0266 | 0.4442 | 0.06 | 0.73 | 1.08 | 1.97 | 952.95 | Z |
| L-70 | L-71 | 946.33 | 945.70 | 309. | 8. | CP | 0.002 | 84 | 0 | 0.0084 | 0.0319 | 0.3056 | 0.10 | 0.60 | 0.89 | 1.35 | 951.64 | Y |
| L-71 | L-72 | 945.70 | 944.86 | 318. | 8. | CP | 0.003 | 100 | 0 | 0.0100 | 0.0380 | 0.3479 | 0.11 | 0.69 | 1.02 | 1.54 | 953.81 | Z |
| L-72 | L-35 | 944.86 | 938.30 | 245. | 8. | CP | 0.027 | 100 | 0 | 0.0100 | 0.0380 | 1.1075 | 0.03 | 1.53 | 2.33 | 4.91 | 954.59 | |
| L-50 | L-48 | 965.21 | 958.41 | 252. | 6. | VCP | 0.027 | 0 | 15 | 0.0005 | 0.0017 | 0.5957 | 0.00 | 0.65 | 1.07 | 4.69 | 968.26 | Z |
| L-49 | L-48 | 959.79 | 958.41 | 198. | 6. | CP | 0.007 | 7 | 0 | 0.0007 | 0.0027 | 0.2624 | 0.01 | 0.43 | 0.69 | 2.07 | 965.47 | Z |
| * AT MH L-48 | | | | | | | | 7 | 15 | | | | | | | | | |
| L-48 | L-47 | 958.41 | 957.68 | 198. | 6. | CP | 0.004 | 21 | 15 | 0.0026 | 0.0097 | 0.1908 | 0.05 | 0.53 | 0.80 | 1.50 | 962.21 | Z |
| L-47 | L-46 | 957.68 | 957.11 | 217. | 6. | CP | 0.003 | 46 | 15 | 0.0051 | 0.0192 | 0.1611 | 0.12 | 0.59 | 0.86 | 1.27 | 962.61 | Y |
| L-46 | L-45 | 957.11 | 956.30 | 308. | 8. | CP | 0.003 | 85 | 15 | 0.0090 | 0.0340 | 0.3471 | 0.10 | 0.67 | 0.99 | 1.54 | 963.84 | Z |
| L-45 | L-44 | 956.30 | 955.49 | 316. | 8. | CP | 0.003 | 88 | 15 | 0.0093 | 0.0352 | 0.3427 | 0.10 | 0.67 | 0.99 | 1.52 | 966.80 | Z |
| L-44 | L-43 | 955.49 | 954.19 | 276. | 8. | CP | 0.005 | 116 | 15 | 0.0121 | 0.0458 | 0.4645 | 0.10 | 0.90 | 1.33 | 2.06 | 962.94 | Z |
| L-43 | L-42 | 952.42 | 950.97 | 241. | 8. | CP | 0.006 | 144 | 15 | 0.0149 | 0.0564 | 0.5250 | 0.11 | 1.04 | 1.53 | 2.33 | 961.84 | Z |

| MANHOLES FROM MH ID | MANHOLES TO MH ID | INVERT ELEV FROM FT | INVERT ELEV TO FT | DIST FT | PIPE DIA IN | PIPE TYP | PIPE SLOPE FT/FT | POPULATION RES | POPULATION N-RES | RATE OF FLOW(MGD) AVERAGE QA | RATE OF FLOW(MGD) PEAK QP | RATE OF FLOW(MGD) CAPACITY QF | PIPE RATIO QP/QF | VELOCITY AVG FPS | VELOCITY PEAK FPS | VELOCITY CAP FPS | UPSTREAM MANHOLE RIM ELEV | COMMENTS NOTE | COMMENTS WARNING |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L-42 | L-41 | 950.97 | 950.34 | 276. | 8. | CP | 0.002 | 158 | 15 | 0.0163 | 0.0618 | 0.3234 | 0.19 | 0.75 | 1.11 | 1.43 | 956.37 | | Y |
| L-41 | L-40 | 950.34 | 949.85 | 334. | 8. | CP | 0.001 | 200 | 15 | 0.0205 | 0.0777 | 0.2593 | 0.30 | 0.69 | 1.00 | 1.15 | 958.12 | | Y |
| L-40 | L-39 | 949.85 | 947.50 | 216. | 8. | VCP | 0.011 | 200 | 15 | 0.0205 | 0.0777 | 0.8146 | 0.10 | 1.56 | 2.30 | 3.61 | 960.75 | | |
| L-39 | L-38 | 947.50 | 946.99 | 235. | 8. | VCP | 0.002 | 200 | 15 | 0.0205 | 0.0777 | 0.3638 | 0.21 | 0.87 | 1.28 | 1.61 | NF | A | Z |
| L-38 | L-37 | 946.99 | 943.27 | 339. | 8. | VCP | 0.011 | 200 | 15 | 0.0205 | 0.0777 | 0.8181 | 0.09 | 1.56 | 2.31 | 3.63 | 954.61 | | |
| L-37 | L-36 | 943.27 | 939.97 | 299. | 8. | VCP | 0.011 | 200 | 15 | 0.0205 | 0.0777 | 0.8204 | 0.09 | 1.56 | 2.31 | 3.64 | 950.37 | | |
| L-36 | L-35 | 939.97 | 938.30 | 350. | 8. | VCP | 0.005 | 200 | 15 | 0.0205 | 0.0777 | 0.5394 | 0.14 | 1.15 | 1.71 | 2.39 | 943.92 | | Z |
| * AT MH L-35 | | | | | | | | 1050 | 60 | | | | | | | | | | |
| L-35 | L-34 | 938.30 | 928.41 | 299. | 8. | VCP | 0.033 | 1050 | 60 | 0.1068 | 0.3883 | 1.4203 | 0.27 | 3.70 | 5.34 | 6.30 | 944.77 | | |
| L-34 | L-33 | 928.41 | 921.63 | 216. | 8. | VCP | 0.031 | 1050 | 60 | 0.1068 | 0.3883 | 1.3836 | 0.28 | 3.63 | 5.23 | 6.13 | 935.70 | | |
| L-33 | L-32 | 921.63 | 913.08 | 250. | 8. | VCP | 0.034 | 1050 | 60 | 0.1068 | 0.3883 | 1.4442 | 0.27 | 3.74 | 5.40 | 6.40 | 929.34 | | |
| L-32 | L-31 | 913.08 | 906.16 | 201. | 8. | VCP | 0.034 | 1050 | 60 | 0.1068 | 0.3883 | 1.4490 | 0.27 | 3.75 | 5.42 | 6.42 | 919.99 | | |
| L-31 | L-30 | 906.16 | 894.60 | 198. | 8. | VCP | 0.058 | 1050 | 60 | 0.1068 | 0.3883 | 1.8870 | 0.21 | 4.52 | 6.59 | 8.36 | 912.52 | | |
| L-30 | L-29 | 894.60 | 881.65 | 234. | 8. | VCP | 0.055 | 1050 | 60 | 0.1068 | 0.3883 | 1.8372 | 0.21 | 4.44 | 6.46 | 8.14 | 904.99 | | |
| L-29 | L-28 | 881.65 | 866.73 | 412. | 8. | VCP | 0.036 | 1050 | 60 | 0.1068 | 0.3883 | 1.4861 | 0.26 | 3.82 | 5.52 | 6.59 | 892.10 | | |
| L-28 | L-27 | 866.73 | 864.94 | 165. | 8. | CI | 0.011 | 1050 | 60 | 0.1068 | 0.3883 | 0.7553 | 0.51 | 2.37 | 3.36 | 3.35 | 881.88 | | |

* AT MH L-27

| | | | | |
|---|---|---|---|---|
| 19336 | 1050 | 60 | (MONTAGUE VILLAGE-AREA 8) |
| 31644 | 468 | 1137 | (WEST FORT HOOD-AREA 9) |
| 50980 (TOTAL) | 1518 | 1197 | (TOTAL) |

* FLOW FROM WEST FORT HOOD JOINS THE FLOW FROM MONTAGUE VILLAGE AT MANHOLE L-27, AND IS CONVEYED TO LIFT STATION #93040. THE COMBINED FLOW IS THEN PUMPED THROUGH A 10 INCH FORCE MAIN TO MANHOLE L-26 IN AREA 10.

TOTAL NUMBER OF REACHES BELOW 1.2 FPS = 48.
TOTAL NUMBER OF ADVERSE REACHES = 0.
TOTAL NUMBER OF REACHES EXCEEDING PIPE CAPACITY = 0.
TOTAL NUMBER OF REACHES WHICH HAVE FULL PIPE VELOCITIES BELOW 1.5 FPS= 5.

| | |
|---|---|
| L-58 | L-59 |
| L-70 | L-71 |
| L-47 | L-46 |
| L-42 | L-41 |
| L-41 | L-40 |

TOTAL NUMBER OF REACHES = 71.

## SUBAREA 9

Subarea 9 consists of West Fort Hood and includes the Robert Gray Army Airfield.

Flow is generated from two branches, West Fort Hood and the airfield. These join at manhole L-156 and the sewage is routed northeast to manhole L-27. There it combines with flow from Subarea 8 (Montague Village), enters Lift Station 93040, and is pumped through a 10-inch cast iron force main east to manhole L-26 in Subarea 10.

Average flow velocities below the specified minimum 1.2 FPS occur in 43 of the 110 reaches, two of which also have full pipe velocities below the specified minimum 1.5 FPS (L-196 to L-195 @ 1.24 FPS and L-186 to L-185 @ 1.41 FPS). Nearly 75% of the reaches are of concrete pipe (CP).

No reconstruction of sewer lines within Subarea 9 is required unless television inspection indicates significant pipe deterioration. Field personnel, however, reported overflow conditions at manhole L-201, while downstream manhole L-195 yielded no flow, indicating a line blockage in the reach. In addition, manhole L-102 was reportedly surcharging and manhole L-104 was found clogged. It is recommended that these reaches be inspected for possible blockage or breaks.

The following repairs are necessary:

| | |
|---|---|
| MH L-195 --- Loose rim | $ 100.00 |

* LIFT STATION 90049 (IN BASEMENT OF CONTROL TOWER) DICHARGES INTO MH L-168

AREA 9 ,AS DEFINED BY THE SANITARY SEWER ANALYSIS, COMPLETED BY BOHANNAN-HUSTON, INC., SEPTEMBER 1984.

COMMENT COLUMN "NOTES"
**********

EXCEPT AS NOTED:
> ELEVATIONS WERE OBTAINED THROUGH FIELD SURVEYS
> DISTANCES WERE GENERATED FROM COMPUTER PLOTS

A = INVERT BASED ON REPORT BY FREESE & NICHOLS (4/78)
B = DISTANCE BETWEEN MANHOLES IS SCALED
C = INVERT BASED ON "AS-BUILT" DRAWINGS
D = INVERT BASED ON TOPOGRAPHY & ADJACENT MANHOLE DATA
NA = NOT AVAILABLE
NF = NOT FOUND

COMMENT COLUMN "WARNINGS"
**********

W = ZERO OR ADVERSE SLOPE PRESENT
(PEAK FLOW MAY EXCEED PIPE CAPACITY)
X = PEAK FLOW EXCEEDS PIPE CAPACITY
(LOW VELOCITIES MAY BE PRESENT)
Y = FULL PIPE VELOCITY BELOW 1.5 FPS
(AVERAGE VELOCITY MAY ALSO BE LOW)
Z = AVERAGE VELOCITY BELOW 1.2 FPS

FORMER MANHOLE IDENTIFICATION NUMBERS ALSO APPEAR IN THE COMMENT COLUMN UNDER "NOTES"

| MANHOLES FROM MH ID | TO MH ID | INVERT ELEV FROM FT | TO FT | DIST FT | PIPE DIA IN | TYP | SLOPE FT/FT | POPULATION RES | N-RES | RATE OF FLOW(MGD) AVERAGE QA | PEAK QP | CAPACITY QF | PIPE RATIO QP/QF | VELOCITY AVG FPS | PEAK FPS | CAP FPS | UPSTREAM MANHOLE RIM ELEV | COMMENTS NOTE | WARNING |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L168 | L166 | 1019.90 | 1019.54 | 140. | 8. | VC | 0.003 | 0 | 100 | 0.0030 | 0.0114 | 0.3963 | 0.03 | 0.52 | 0.79 | 1.76 | 1025.56 | | Z |
| L166 | L165 | 1019.54 | 1018.55 | 303. | 8. | VC | 0.003 | 0 | 120 | 0.0036 | 0.0137 | 0.4462 | 0.03 | 0.59 | 0.91 | 1.98 | 1025.99 | | Z |
| L164 | L165 | 1019.54 | 1018.55 | 175. | 8. | VC | 0.006 | 0 | 20 | 0.0006 | 0.0023 | 0.5881 | 0.00 | 0.40 | 0.65 | 2.61 | 1022.69 | | Z |
| *AT MH L165 | | | | | | | | 0 | 140 | | | | | | | | | | |
| L165 | L167 | 1018.55 | 1017.91 | 143. | 8. | VC | 0.004 | 0 | 145 | 0.0044 | 0.0165 | 0.5217 | 0.03 | 0.70 | 1.07 | 2.31 | 1022.69 | | Z |
| L167 | L159 | 1017.91 | 1001.62 | 953. | 10. | VC | 0.017 | 0 | 165 | 0.0050 | 0.0188 | 1.8516 | 0.01 | 1.10 | 1.74 | 5.25 | 1025.25 | | Z |
| L163 | L162 | 1006.22 | 1004.68 | 195. | 8. | VC | 0.008 | 224 | 0 | 0.0224 | 0.0851 | 0.6937 | 0.12 | 1.43 | 2.10 | 3.07 | 1015.44 | | |
| L162 | L161 | 1004.68 | 1003.82 | 204. | 8. | VC | 0.004 | 224 | 50 | 0.0239 | 0.0908 | 0.5066 | 0.18 | 1.15 | 1.70 | 2.25 | 1014.13 | | Z |
| L161 | L160 | 1003.82 | 1003.04 | 203. | 8. | VC | 0.004 | 336 | 50 | 0.0351 | 0.1334 | 0.4842 | 0.28 | 1.25 | 1.82 | 2.15 | 1012.32 | | |
| L160 | L159 | 1003.04 | 1001.62 | 337. | 10. | VC | 0.004 | 336 | 50 | 0.0351 | 0.1334 | 0.9190 | 0.15 | 1.25 | 1.87 | 2.61 | 1011.09 | | |
| *AT MH L159 | | | | | | | | 336 | 21 | | | | | | | | | | |
| L159 | L157 | 1001.62 | 996.04 | 179. | 10. | VC | 0.031 | 336 | 215 | 0.0401 | 0.1522 | 2.5014 | 0.06 | 2.65 | 3.92 | 7.10 | 1007.79 | | |
| L158A | L158 | 1006.58 | 1000.33 | 374. | 6. | VC | 0.017 | 0 | 25 | 0.0008 | 0.0029 | 0.4686 | 0.01 | 0.65 | 1.05 | 3.69 | 1013.68 | | Z |
| L158 | L157 | 1000.33 | 996.04 | 43. | 6. | VC | 0.099 | 0 | 25 | 0.0008 | 0.0029 | 1.1414 | 0.00 | 1.19 | 1.96 | 8.99 | 1004.38 | | Z |
| *AT MH L157 | | | | | | | | 336 | 240 | | | | | | | | | | |
| L157 | L156 | 996.04 | 995.25 | 484. | 10. | VC | 0.002 | 336 | 265 | 0.0416 | 0.1579 | 0.5721 | 0.28 | 0.94 | 1.38 | 1.62 | 1002.67 | | Z |
| L202 | L201 | 1080.49 | 1073.00 | 272. | 8. | CP | 0.057 | 0 | 50 | 0.0015 | 0.0057 | 1.6152 | 0.00 | 1.06 | 1.73 | 7.16 | 1096.39 | 32 | Z |
| L201 | L200 | 1073.00 | 1071.94 | 380. | 8. | CP | 0.003 | 0 | 50 | 0.0015 | 0.0057 | 0.3575 | 0.02 | 0.38 | 0.60 | 1.58 | 1085.47 | 31 | Z |
| L200 | L199 | 1071.94 | 1068.26 | 420. | 8. | CP | 0.009 | 0 | 50 | 0.0015 | 0.0057 | 0.6335 | 0.01 | 0.57 | 0.90 | 2.81 | 1077.84 | 30 | Z |
| L199 | L198 | 1068.26 | 1058.84 | 578. | 8. | CP | 0.016 | 0 | 50 | 0.0015 | 0.0057 | 0.8641 | 0.01 | 0.70 | 1.12 | 3.83 | 1071.41 | 29 | Z |
| L198 | L197 | 1058.84 | 1048.13 | 375. | 8. | CP | 0.029 | 0 | 50 | 0.0015 | 0.0057 | 1.1438 | 0.00 | 0.84 | 1.36 | 5.07 | 1065.64 | 28 | Z |
| L197 | L196 | 1048.13 | 1042.00 | 319. | 8. | CP | 0.019 | 0 | 50 | 0.0015 | 0.0057 | 0.9382 | 0.01 | 0.74 | 1.18 | 4.16 | 1051.53 | 27 | Z |
| L196 | L195 | 1042.00 | 1041.41 | 346. | 8. | CP | 0.002 | 0 | 50 | 0.0015 | 0.0057 | 0.2795 | 0.02 | 0.33 | 0.51 | 1.24 | 1048.73 | 26 | Y |
| L195 | L194 | 1041.41 | 1036.40 | 460. | 8. | CP | 0.011 | 0 | 50 | 0.0015 | 0.0057 | 0.7063 | 0.01 | 0.61 | 0.97 | 3.13 | 1046.48 | 25 | Z |
| L194 | L193 | 1036.40 | 1033.22 | 355. | 8. | CP | 0.009 | 0 | 100 | 0.0030 | 0.0114 | 0.6406 | 0.02 | 0.71 | 1.11 | 2.84 | 1041.84 | 24 | Z |
| L193 | L191 | 1033.22 | 1029.97 | 368. | 8. | CP | 0.009 | 0 | 125 | 0.0038 | 0.0143 | 0.6361 | 0.02 | 0.76 | 1.18 | 2.82 | 1038.57 | 23 | Z |
| L192 | L191 | 1037.82 | 1029.97 | 256. | 8. | VCP | 0.031 | 0 | 53 | 0.0016 | 0.0060 | 1.3681 | 0.00 | 0.97 | 1.57 | 6.06 | 1044.27 | 14 | Z |
| *AT MH L191 | | | | | | | | 0 | 178 | | | | | | | | | | |
| L191 | L190 | 1029.97 | 1022.41 | 299. | 8. | CP | 0.025 | 0 | 203 | 0.0061 | 0.0231 | 1.0771 | 0.02 | 1.28 | 1.98 | 4.77 | 1035.07 | 13 | |
| L190 | L185 | 1022.41 | 1018.57 | 277. | 8. | CP | 0.014 | 0 | 203 | 0.0061 | 0.0231 | 0.7972 | 0.03 | 1.04 | 1.60 | 3.53 | 1033.76 | 22 | Z |

| MANHOLES FROM MH ID | TO MH ID | INVERT ELEV FROM FT | TO FT | DIST FT | PIPE DIA IN | TYP | SLOPE FT/FT | POPULATION RES | N-RES | RATE OF FLOW(MGD) AVERAGE QA | PEAK QP | CAPACITY QF | PIPE RATIO QP/QF | VELOCITY AVG FPS | PEAK FPS | CAP FPS | UPSTREAM MANHOLE RIM ELEV | COMMENTS NOTE | WARNING |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L189 | L188 | 1028.33 | 1026.19 | 345. | 8. | CP | 0.006 | 0 | 120 | 0.0036 | 0.0137 | 0.5334 | 0.03 | 0.67 | 1.03 | 2.36 | 1032.13 | 20 | Z |
| L188 | L187 | 1026.19 | 1019.69 | 162. | 8. | CP | 0.040 | 98 | 120 | 0.0134 | 0.0509 | 1.3570 | 0.04 | 1.93 | 2.88 | 6.01 | 1031.97 | 12 | |
| L187 | L186 | 1019.69 | 1018.81 | 182. | 8. | CP | 0.005 | 98 | 160 | 0.0146 | 0.0555 | 0.4712 | 0.12 | 0.96 | 1.41 | 2.09 | 1032.52 | 11 | Z |
| L186 | L185 | 1018.81 | 1018.58 | 104. | 8. | CP | 0.002 | 98 | 160 | 0.0146 | 0.0555 | 0.3186 | 0.17 | 0.72 | 1.06 | 1.41 | 1031.42 | 10 | Y |
| *AT MH L185 | | | | | | | | 98 | 363 | | | | | | | | | | |
| L185 | L184 | 1018.58 | 1018.12 | 155. | 8. | CP | 0.003 | 98 | 363 | 0.0207 | 0.0786 | 0.3692 | 0.21 | 0.88 | 1.30 | 1.64 | 1031.22 | 9 | Z |
| L184 | L176 | 1018.12 | 1017.23 | 177. | 8. | CP | 0.005 | 98 | 363 | 0.0207 | 0.0786 | 0.4803 | 0.16 | 1.06 | 1.58 | 2.13 | 1031.69 | 8 | Z |
| L183 | L182 | 1025.56 | 1025.18 | 94. | 8. | CP | 0.004 | 0 | 64 | 0.0019 | 0.0073 | 0.4303 | 0.02 | 0.47 | 0.74 | 1.91 | 1031.81 | 19 | Z |
| L182 | L181 | 1025.18 | 1024.46 | 197. | 8. | CP | 0.004 | 0 | 128 | 0.0038 | 0.0146 | 0.4096 | 0.04 | 0.57 | 0.87 | 1.82 | 1035.80 | 18 | Z |
| L181 | L180 | 1024.46 | 1023.16 | 356. | 8. | CP | 0.004 | 0 | 168 | 0.0050 | 0.0192 | 0.4091 | 0.05 | 0.62 | 0.93 | 1.81 | 1034.41 | 17 | Z |
| L180 | L179 | 1023.16 | 1021.90 | 310. | 8. | CP | 0.004 | 0 | 232 | 0.0070 | 0.0264 | 0.4314 | 0.06 | 0.72 | 1.06 | 1.91 | 1029.43 | 16 | Z |
| L179 | L176 | 1021.90 | 1017.23 | 197. | 8. | CP | 0.024 | 0 | 232 | 0.0070 | 0.0264 | 1.0418 | 0.03 | 1.30 | 2.01 | 4.62 | 1030.45 | 15 | |
| L178 | L176 | 1026.06 | 1017.23 | 146. | 8. | CP | 0.060 | 34 | 0 | 0.0034 | 0.0129 | 1.6634 | 0.01 | 1.41 | 2.26 | 7.37 | 1030.71 | 21 | |
| *AT MH L176 | | | | | | | | 132 | 595 | | | | | | | | | | |
| L176 | L175 | 1017.23 | 1016.74 | 163. | 8. | CP | 0.003 | 132 | 595 | 0.0311 | 0.1180 | 0.3713 | 0.32 | 1.00 | 1.46 | 1.65 | 1031.18 | 7 | Z |
| L175 | L174 | 1016.74 | 1015.71 | 254. | 8. | CP | 0.004 | 132 | 595 | 0.0311 | 0.1180 | 0.4311 | 0.27 | 1.11 | 1.62 | 1.91 | 1030.44 | 6 | Z |
| L174 | L173 | 1015.71 | 1010.85 | 395. | 8. | CP | 0.012 | 132 | 595 | 0.0311 | 0.1180 | 0.7511 | 0.16 | 1.64 | 2.44 | 3.33 | 1029.66 | 5 | |
| L173D | L173B | 1017.67 | 1016.19 | 230. | 6. | CP | 0.006 | 0 | 26 | 0.0008 | 0.0030 | 0.2522 | 0.01 | 0.44 | 0.69 | 1.99 | 1019.87 | 37 | Z |
| * | LIFT STATION 90012 DISCHARGES TO MH L-1738 | | | | | | | | | | | | | | | | | | |
| L173B | L173A | 1016.19 | 1013.94 | 246. | 6. | CP | 0.009 | 0 | 73 | 0.0022 | 0.0083 | 0.3008 | 0.03 | 0.69 | 1.06 | 2.37 | 1021.37 | 35 | Z |
| L173A | L173 | 1013.94 | 1010.85 | 126. | 6. | CP | 0.025 | 0 | 83 | 0.0025 | 0.0095 | 0.4920 | 0.02 | 1.00 | 1.56 | 3.88 | 1021.94 | 34 | Z |
| *AT MH L173 | | | | | | | | 132 | 678 | | | | | | | | | | |
| L173 | L155A | 1010.85 | 1009.47 | 464. | 8. | CP | 0.003 | 132 | 698 | 0.0341 | 0.1297 | 0.3693 | 0.35 | 1.02 | 1.49 | 1.64 | 1023.32 | 4 | Z |
| L155 | L155A | 1019.08 | 1009.47 | 161. | 8. | CP | 0.060 | 0 | 30 | 0.0009 | 0.0034 | 1.6536 | 0.00 | 0.91 | 1.51 | 7.33 | 1023.48 | 4A2 | Z |
| *AT MH L155A | | | | | | | | 132 | 728 | | | | | | | | | | |
| L155A | L156A | 1009.47 | 1008.79 | 151. | 8. | CP | 0.005 | 132 | 728 | 0.0350 | 0.1332 | 0.4542 | 0.29 | 1.19 | 1.74 | 2.01 | 1022.35 | 8 | Z |
| L156A | L156 | 1008.79 | 995.25 | 522. | 8. | CP | 0.026 | 132 | 728 | 0.0350 | 0.1332 | 1.0899 | 0.12 | 2.25 | 3.30 | 4.83 | 1014.04 | | |
| *AT MH L156 | | | | | | | | 468 | 993 | | | | | | | | | | |
| L156 | L152A | 995.25 | 994.36 | 277. | 10. | CP | 0.003 | 468 | 993 | 0.0766 | 0.2910 | 0.6952 | 0.42 | 1.30 | 1.88 | 1.97 | 999.35 | 4A5 | |
| L153 | L152 | 1007.52 | 1001.83 | 366. | 8. | CP | 0.016 | 0 | 100 | 0.0030 | 0.0114 | 0.8445 | 0.01 | 0.86 | 1.35 | 3.74 | 1018.88 | 4A4 | Z |
| L152 | L152A | 1001.83 | 994.36 | 382. | 8. | CP | 0.020 | 0 | 100 | 0.0030 | 0.0114 | 0.9466 | 0.01 | 0.93 | 1.47 | 4.20 | 1006.85 | | Z |
| *AT MH L152A | | | | | | | | 468 | 1113 | | | | | | | | | | |
| L152A | L152B | 994.36 | 993.41 | 244. | 10. | CP | 0.004 | 468 | 1127 | 0.0806 | 0.3063 | 0.7654 | 0.40 | 1.41 | 2.05 | 2.17 | 1000.43 | 4A6 | |
| L152B | L151 | 993.41 | 992.89 | 123. | 10. | CP | 0.004 | 468 | 1127 | 0.0806 | 0.3063 | 0.7966 | 0.38 | 1.45 | 2.11 | 2.26 | 996.11 | | |
| L151 | L150 | 992.89 | 990.51 | 782. | 12. | CP | 0.003 | 468 | 1127 | 0.0806 | 0.3063 | 1.1001 | 0.28 | 1.26 | 1.86 | 2.17 | 1004.36 | 4A7 | |
| L150 | L149 | 990.51 | 889.30 | 569. | 12. | CP | 0.178 | 468 | 1127 | 0.0806 | 0.3063 | 8.4140 | 0.04 | 5.26 | 7.85 | 16.58 | 1001.95 | 4A8 | |
| L149B | L149A | 1002.77 | 999.66 | 331. | 6. | VCP | 0.009 | 0 | 10 | 0.0003 | 0.0011 | 0.3515 | 0.00 | 0.40 | 0.65 | 2.77 | 1011.60 | 8 | Z |
| L149A | L149 | 999.66 | 989.30 | 270. | 6. | VCP | 0.038 | 0 | 10 | 0.0003 | 0.0011 | 0.7104 | 0.00 | 0.64 | 1.07 | 5.00 | 1011.42 | | Z |
| *AT MH L149 | | | | | | | | 468 | 1137 | | | | | | | | | | |
| * | | | | | | | | | | | | | | | | | | | |
| * | THIS REACH CARRIES FLOW FROM WEST FT. HOOD TO THE LIFT STATION * | | | | | | | | | | | | | | | | | | |
| * | | | | | | | | | | | | | | | | | | | |
| L149 | L148 | 989.30 | 987.12 | 621. | 10. | VCP | 0.004 | 468 | 1137 | 0.0809 | 0.3075 | 0.8392 | 0.37 | 1.51 | 2.19 | 2.38 | 995.90 | 4A9 | |
| L148 | L147 | 987.62 | 984.19 | 430. | 10. | VCP | 0.008 | 468 | 1137 | 0.0809 | 0.3075 | 1.2648 | 0.24 | 2.01 | 2.95 | 3.59 | 992.67 | 4A10 | |
| L147 | L146 | 984.19 | 977.12 | 270. | 10. | VCP | 0.026 | 468 | 1137 | 0.0809 | 0.3075 | 2.2913 | 0.13 | 3.05 | 4.56 | 6.50 | 987.14 | 8 | |
| L146 | L145 | 977.12 | 969.32 | 287. | 10. | VCP | 0.027 | 468 | 1137 | 0.0809 | 0.3075 | 2.3327 | 0.13 | 3.09 | 4.62 | 6.62 | 982.51 | | |
| L145 | L144 | 969.32 | 965.05 | 170. | 10. | VCP | 0.025 | 468 | 1137 | 0.0809 | 0.3075 | 2.2441 | 0.14 | 3.01 | 4.49 | 6.37 | 975.79 | 8 | |
| L144 | L143 | 965.05 | 956.06 | 335. | 10. | VCP | 0.027 | 468 | 1137 | 0.0809 | 0.3075 | 2.3196 | 0.13 | 3.08 | 4.60 | 6.58 | 974.42 | 8 | |

| MANHOLES FROM MH ID | TO MH ID | INVERT ELEV FROM FT | TO FT | DIST FT | DIA IN | PIPE TYP | SLOPE FT/FT | POPULATION RES | N-RES | RATE OF FLOW(MGD) AVERAGE QA | PEAK QP | CAPACITY QF | PIPE RATIO QP/QF | VELOCITY AVG FPS | PEAK FPS | CAP FPS | UPSTREAM MANHOLE RIM ELEV | COMMENTS NOTE WARNING |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L143 | L142 | 956.06 | 953.63 | 190. | 10. | VCP | 0.013 | 468 | 1137 | 0.0809 | 0.3075 | 1.5998 | 0.19 | 2.37 | 3.51 | 4.54 | 964.41 | |
| L142 | L141 | 953.63 | 950.82 | 221. | 10. | VCP | 0.013 | 468 | 1137 | 0.0809 | 0.3075 | 1.5964 | 0.19 | 2.37 | 3.50 | 4.53 | 958.84 | |
| L141 | L140 | 950.82 | 946.00 | 401. | 10. | VCP | 0.012 | 468 | 1137 | 0.0809 | 0.3075 | 1.5531 | 0.20 | 2.32 | 3.43 | 4.41 | 957.82 | |
| L140 | L139 | 946.00 | 944.83 | 300. | 10. | VCP | 0.004 | 468 | 1137 | 0.0809 | 0.3075 | 0.8840 | 0.35 | 1.56 | 2.28 | 2.51 | 953.40 | A |
| L139 | L138 | 944.83 | 943.88 | 291. | 10. | VCP | 0.003 | 468 | 1137 | 0.0809 | 0.3075 | 0.8097 | 0.38 | 1.47 | 2.14 | 2.30 | 955.03 | |
| L138 | L137 | 943.88 | 940.78 | 231. | 10. | VCP | 0.013 | 468 | 1137 | 0.0809 | 0.3075 | 1.6411 | 0.19 | 2.41 | 3.58 | 4.66 | 949.13 | |
| L137 | L136 | 940.78 | 938.41 | 184. | 10. | VCP | 0.013 | 468 | 1137 | 0.0809 | 0.3075 | 1.6062 | 0.19 | 2.38 | 3.52 | 4.56 | 947.22 | |
| L136 | L135 | 938.41 | 935.34 | 314. | 10. | VCP | 0.010 | 468 | 1137 | 0.0809 | 0.3075 | 1.3995 | 0.22 | 2.16 | 3.18 | 3.97 | 942.93 | |
| L135 | L134 | 935.34 | 932.06 | 329. | 10. | VCP | 0.010 | 468 | 1137 | 0.0809 | 0.3075 | 1.4147 | 0.22 | 2.18 | 3.21 | 4.01 | 941.19 | |
| L134 | L133 | 932.06 | 930.54 | 250. | 10. | VCP | 0.006 | 468 | 1137 | 0.0809 | 0.3075 | 1.1051 | 0.28 | 1.83 | 2.67 | 3.14 | 938.67 | |
| L133 | L132 | 930.54 | 929.05 | 256. | 10. | VCP | 0.006 | 468 | 1137 | 0.0809 | 0.3075 | 1.0807 | 0.28 | 1.80 | 2.64 | 3.07 | 937.57 | |
| L132 | L131 | 929.05 | 927.79 | 265. | 10. | VCP | 0.005 | 468 | 1137 | 0.0809 | 0.3075 | 0.9755 | 0.32 | 1.67 | 2.45 | 2.77 | 933.71 | |
| L131 | L130 | 927.79 | 926.27 | 244. | 10. | VCP | 0.006 | 468 | 1137 | 0.0809 | 0.3075 | 1.1171 | 0.28 | 1.84 | 2.69 | 3.17 | 936.06 | |
| L130 | L129 | 926.27 | 925.24 | 188. | 10. | VCP | 0.005 | 468 | 1137 | 0.0809 | 0.3075 | 1.0492 | 0.29 | 1.76 | 2.58 | 2.98 | 938.30 | |
| L129 | L128 | 925.24 | 923.77 | 275. | 10. | VCP | 0.005 | 468 | 1137 | 0.0809 | 0.3075 | 1.0345 | 0.30 | 1.75 | 2.56 | 2.93 | 933.02 | |
| L128 | L127 | 923.77 | 922.24 | 267. | 10. | VCP | 0.006 | 468 | 1137 | 0.0809 | 0.3075 | 1.0719 | 0.29 | 1.79 | 2.62 | 3.04 | 931.53 | B |
| L127 | L126 | 922.24 | 920.11 | 382. | 10. | VCP | 0.006 | 468 | 1137 | 0.0809 | 0.3075 | 1.0580 | 0.29 | 1.77 | 2.60 | 3.00 | 928.33 | |
| L126 | L125 | 920.11 | 917.97 | 365. | 10. | VCP | 0.006 | 468 | 1137 | 0.0809 | 0.3075 | 1.0837 | 0.28 | 1.80 | 2.65 | 3.07 | 926.56 | |
| L125 | L124 | 917.97 | 914.61 | 223. | 10. | VCP | 0.015 | 468 | 1137 | 0.0809 | 0.3075 | 1.7376 | 0.18 | 2.51 | 3.73 | 4.93 | 924.00 | |
| L124 | L123 | 914.61 | 911.57 | 200. | 10. | VCP | 0.015 | 468 | 1137 | 0.0809 | 0.3075 | 1.7472 | 0.18 | 2.52 | 3.74 | 4.96 | 922.97 | |
| L123 | L122 | 911.57 | 908.50 | 361. | 10. | VCP | 0.009 | 468 | 1137 | 0.0809 | 0.3075 | 1.3066 | 0.24 | 2.06 | 3.02 | 3.71 | 918.60 | |
| L122 | L121 | 908.50 | 907.31 | 353. | 10. | VCP | 0.003 | 468 | 1137 | 0.0809 | 0.3075 | 0.8216 | 0.37 | 1.48 | 2.16 | 2.33 | 915.77 | |
| L121 | L120 | 907.31 | 906.13 | 409. | 10. | VCP | 0.003 | 468 | 1137 | 0.0809 | 0.3075 | 0.7609 | 0.40 | 1.41 | 2.04 | 2.16 | 919.37 | |
| L120 | L119 | 906.13 | 902.60 | 211. | 10. | VCP | 0.017 | 468 | 1137 | 0.0809 | 0.3075 | 1.8312 | 0.17 | 2.61 | 3.87 | 5.19 | 915.09 | |
| L119 | L118 | 902.60 | 898.98 | 214. | 10. | VCP | 0.017 | 468 | 1137 | 0.0809 | 0.3075 | 1.8408 | 0.17 | 2.62 | 3.89 | 5.22 | 908.68 | |
| L118 | L117 | 898.98 | 894.75 | 245. | 10. | VCP | 0.017 | 468 | 1137 | 0.0809 | 0.3075 | 1.8621 | 0.17 | 2.64 | 3.92 | 5.28 | 904.22 | |
| L117 | L116 | 894.75 | 888.57 | 239. | 10. | VCP | 0.026 | 468 | 1137 | 0.0809 | 0.3075 | 2.2763 | 0.14 | 3.04 | 4.54 | 6.46 | 901.28 | |
| L116 | L115 | 888.57 | 887.60 | 204. | 10. | VCP | 0.005 | 468 | 1137 | 0.0809 | 0.3075 | 0.9760 | 0.32 | 1.68 | 2.45 | 2.77 | 900.64 | |
| L115 | L114 | 887.60 | 887.16 | 207. | 10. | VCP | 0.002 | 468 | 1137 | 0.0809 | 0.3075 | 0.6525 | 0.47 | 1.26 | 1.82 | 1.85 | 898.49 | |
| L114 | L113 | 887.16 | 886.08 | 318. | 10. | VCP | 0.003 | 468 | 1137 | 0.0809 | 0.3075 | 0.8254 | 0.37 | 1.49 | 2.17 | 2.34 | 901.41 | |
| L113 | L112 | 886.08 | 885.15 | 318. | 10. | VCP | 0.003 | 468 | 1137 | 0.0809 | 0.3075 | 0.7661 | 0.40 | 1.41 | 2.05 | 2.17 | 900.18 | |
| L112 | L111 | 885.15 | 883.91 | 396. | 10. | VCP | 0.003 | 468 | 1137 | 0.0809 | 0.3075 | 0.7925 | 0.39 | 1.45 | 2.10 | 2.25 | 897.05 | |
| L111 | L110 | 883.91 | 883.24 | 229. | 10. | VCP | 0.003 | 468 | 1137 | 0.0809 | 0.3075 | 0.7660 | 0.40 | 1.41 | 2.05 | 2.17 | 892.29 | |
| L110 | L109 | 883.24 | 882.35 | 306. | 10. | VCP | 0.003 | 468 | 1137 | 0.0809 | 0.3075 | 0.7638 | 0.40 | 1.41 | 2.05 | 2.17 | 891.00 | |
| L109 | L108 | 882.35 | 881.38 | 310. | 10. | VCP | 0.003 | 468 | 1137 | 0.0809 | 0.3075 | 0.7920 | 0.39 | 1.45 | 2.10 | 2.25 | 893.79 | |
| L108 | L107 | 881.38 | 880.44 | 310. | 10. | VCP | 0.003 | 468 | 1137 | 0.0809 | 0.3075 | 0.7799 | 0.39 | 1.43 | 2.08 | 2.21 | 888.83 | |
| L107 | L106 | 880.44 | 879.30 | 403. | 10. | VCP | 0.003 | 468 | 1137 | 0.0809 | 0.3075 | 0.7527 | 0.41 | 1.39 | 2.02 | 2.14 | 888.87 | |
| L106 | L105 | 879.30 | 878.63 | 215. | 10. | VCP | 0.003 | 468 | 1137 | 0.0809 | 0.3075 | 0.7904 | 0.39 | 1.44 | 2.10 | 2.24 | 888.90 | A/B |
| L105 | L104 | 878.63 | 878.26 | 210. | 10. | VCP | 0.002 | 468 | 1137 | 0.0809 | 0.3075 | 0.5941 | 0.52 | 1.18 | 1.69 | 1.69 | 888.23 | Z |
| L104 | L103 | 878.26 | 877.43 | 172. | 10. | VCP | 0.005 | 468 | 1137 | 0.0809 | 0.3075 | 0.9839 | 0.31 | 1.68 | 2.47 | 2.79 | 889.54 | |
| L103 | L102 | 877.43 | 876.70 | 255. | 10. | VCP | 0.003 | 468 | 1137 | 0.0809 | 0.3075 | 0.7576 | 0.41 | 1.40 | 2.03 | 2.15 | 888.33 | B |
| L102 | L101 | 876.70 | 875.80 | 310. | 10. | VCP | 0.003 | 468 | 1137 | 0.0809 | 0.3075 | 0.7630 | 0.40 | 1.41 | 2.04 | 2.16 | 887.53 | A/B |
| L101 | L100 | 875.80 | 868.01 | 310. | 10. | VCP | 0.025 | 468 | 1137 | 0.0809 | 0.3075 | 2.2446 | 0.14 | 3.01 | 4.49 | 6.37 | 884.17 | B |
| L100 | L99 | 868.01 | 867.23 | 195. | 10. | VCP | 0.004 | 468 | 1137 | 0.0809 | 0.3075 | 0.8956 | 0.34 | 1.58 | 2.30 | 2.54 | 881.31 | B |
| L99 | L98 | 867.23 | 866.13 | 250. | 10. | VCP | 0.004 | 468 | 1137 | 0.0809 | 0.3075 | 0.9392 | 0.33 | 1.63 | 2.38 | 2.66 | 873.77 | B |
| L98 | L27 | 866.13 | 864.94 | 250. | 10. | VCP | 0.005 | 468 | 1137 | 0.0809 | 0.3075 | 0.9769 | 0.31 | 1.68 | 2.45 | 2.77 | 872.65 | B |
| * | | | | | | | | | | | | | | | | | | |
| * FLOW FROM WEST FORT HOOD JOINS THE FLOW FROM MONTAGUE VILLAGE | | | | | | | | | | | | | | | | | | |
| * AT MANHOLE L27, AND IS CONVEYED TO LIFT STATION #93040. | | | | | | | | | | | | | | | | | | |
| * | | | | | | | | | | | | | | | | | | |
| L27 | L893040 | 864.94 | 864.00 | 40. | 10. | VCP | 0.024 | 1518 | 1197 | 0.1877 | 0.6780 | 2.1706 | 0.31 | 3.77 | 5.44 | 6.16 | 870.14 | |
| * | | | | | | | | | | | | | | | | | | |
| * AT LIFT STATION #93040 | | | | | | | | | | | | | | | | | | |
| * | | | | | 19336 | | | | 1050 | 60 | (MONTAGUE VILLAGE) | | | | | | | |
| * | | | | | 31644 | | | | 468 | 1137 | (WEST FORT HOOD) | | | | | | | |
| * | | | | | ===== | | | | ==== | ==== | | | | | | | | |
| * | | | | | 50980 | | | | 1518 | 1197 | (TOTAL) | | | | | | | |
| * | | | | | | | | | | | | | | | | | | |
| * | | | | | | | | | | | | | | | | | | |
| * THE COMBINED FLOW IS THEN PUMPED THROUGH A 10 INCH FORCE MAIN | | | | | | | | | | | | | | | | | | |
| * TO MANHOLE L26 IN AREA 10. | | | | | | | | | | | | | | | | | | |
| * | | | | | | | | | | | | | | | | | | |
| * | | | | | | | | | | | | | | | | | | |
| * | | | | | | | | | | | | | | | | | | |

TOTAL NUMBER OF REACHES BELOW 1.2 FPS = 43.
TOTAL NUMBER OF ADVERSE REACHES = 0.
TOTAL NUMBER OF REACHES EXCEEDING PIPE CAPACITY = 0.
TOTAL NUMBER OF REACHES WHICH HAVE FULL PIPE VELOCITIES BELOW 1.5 FPS= 2.
L196 L195
L186 L185
TOTAL NUMBER OF REACHES = 110.

## SUBAREA 10

Subarea 10, in the southern portion of the main cantonment, receives flows from the kindergarten, Central Texas College, Metroplex Hospital (all south of U.S. Highway 190), and Darnell Army Hospital, as well as the outflows from Subareas 6,7,8, and 9.

Discharges from Lift Station 93040 (Montague Village and West Fort Hood) and from the Central Texas College lift station enter Subarea 10 at manhole L-26. The flows are conveyed to the east, then north across U.S. 190 to manhole D-9, joining the flows from Metroplex Hospital and the kindergarten. All flow is routed north to manhole J-25, to combine with that of Subareas 5 and 6, and then on to manhole J-19 in Subarea 11, picking up the Darnell Army Hospital wastes along the way.

Average flow velocities below the specified minimum 1.2 FPS occur in 19 of the 60 reaches, specifically in branches with minimal loadings. One reach on the Metroplex Hospital line also has a full pipe velocity below the specified minimum 1.5 FPS (D-35A to D-34A @ 1.23 FPS). These low velocities are not considered problems since the system is VC pipe.

Peak flow will exceed pipe capacity in 7 reaches under present conditions. However, a project is currently under bid to disconnect Central Texas College from the Fort Hood sanitary sewer system by October,1985. The reduction of flow will be sufficient to enable the present lines to handle the future peak loads.

No reconstruction of sewer lines within Subarea 10 is required unless television inspection indicates significant pipe damage. The following manholes require attention:

| | | |
|---|---|---|
| MH D-7 | --- Broken concrete lid needs replacement | $ 150.00 |
| MH D-9 | --- Broken concrete rim needs replacement | 150.00 |
| MH J-10 | --- Install new concrete collar | 150.00 |
| MH J-23 | --- Complete rebuilding | 1,625.00 |
| MH J-25 | --- Complete rebuilding | 1,625.00 |
| MH J-27 | --- Beneath pavement; should be raised | 150.00 |
| | | $3,850.00 |

| | | |
|---|---|---|
| * FLOW FROM LIFT STATION # 93040 | 1518 | 1197 (AREAS 8 & 9) |
| * FLOW FROM LIFT STATION | 0 | 5900 |
| * (CENTRAL TEXAS COLLEGE) | ---- | ---- |
| * AT MH L26 | 1518 | 7097 |

AREA 10, AS DEFINED BY THE SANITARY SEWER ANALYSIS, COMPLETED BY BOHANNAN-HUSTON, INC., SEPTEMBER 1984.

COMMENT COLUMN "NOTES"
**********

EXCEPT AS NOTED:
> ELEVATIONS WERE OBTAINED THROUGH FIELD SURVEYS
> DISTANCES WERE GENERATED FROM COMPUTER PLOTS

A = INVERT BASED ON REPORT BY FREESE & NICHOLS (4/78)
B = DISTANCE BETWEEN MANHOLES IS SCALED
C = INVERT BASED ON "AS-BUILT" DRAWINGS
D = INVERT BASED ON TOPOGRAPHY & ADJACENT MANHOLE DATA
NA = NOT AVAILABLE
NF = NOT FOUND

COMMENT COLUMN "WARNINGS"
**********

W = ZERO OR ADVERSE SLOPE PRESENT (PEAK FLOW MAY EXCEED PIPE CAPACITY)
X = PEAK FLOW EXCEEDS PIPE CAPACITY (LOW VELOCITIES MAY BE PRESENT)
Y = FULL PIPE VELOCITY BELOW 1.5 FPS (AVERAGE VELOCITY MAY ALSO BE LOW)
Z = AVERAGE VELOCITY BELOW 1.2 FPS

FORMER MANHOLE IDENTIFICATION NUMBERS ALSO APPEAR IN THE COMMENT COLUMN UNDER "NOTES"

| MANHOLES FROM MH ID | MANHOLES TO MH ID | INVERT ELEV FROM FT | INVERT ELEV TO FT | DIST FT | PIPE DIA IN | PIPE TYP | PIPE SLOPE FT/FT | POPULATION RES | POPULATION N-RES | RATE OF FLOW(MGD) AVERAGE QA | RATE OF FLOW(MGD) PEAK QP | RATE OF FLOW(MGD) CAPACITY QF | PIPE RATIO QP/QF | VELOCITY AVG FPS | VELOCITY PEAK FPS | VELOCITY CAP FPS | UPSTREAM MANHOLE RIM ELEV | COMMENTS NOTE | COMMENTS WARNING |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L26 | L24 | 970.96 | 968.28 | 345. | 12. | VC | 0.008 | 1518 | 7097 | 0.3647 | 1.2986 | 2.0299 | 0.64 | 3.03 | 4.24 | 4.00 | 977.32 | | |
| L24 | L23 | 968.28 | 965.34 | 350. | 12. | VC | 0.008 | 1518 | 7097 | 0.3647 | 1.2986 | 2.1091 | 0.62 | 3.11 | 4.37 | 4.16 | 977.51 | | |
| L23 | L22 | 965.34 | 962.64 | 350. | 12. | VC | 0.008 | 1518 | 7097 | 0.3647 | 1.2986 | 2.0217 | 0.64 | 3.02 | 4.22 | 3.98 | 973.52 | | |
| L22 | L21 | 962.64 | 959.79 | 350. | 12. | VC | 0.008 | 1518 | 7097 | 0.3647 | 1.2986 | 2.0766 | 0.63 | 3.08 | 4.31 | 4.09 | 968.25 | | |
| L21 | L20 | 959.79 | 955.97 | 401. | 12. | VC | 0.010 | 1518 | 7097 | 0.3647 | 1.2986 | 2.2483 | 0.58 | 3.26 | 4.58 | 4.43 | 966.45 | | |
| L20 | L19 | 955.97 | 953.59 | 425. | 12. | VC | 0.006 | 1518 | 7097 | 0.3647 | 1.2986 | 1.7222 | 0.75 | 2.69 | 3.73 | 3.39 | 967.31 | | |
| L19 | L18 | 953.59 | 952.45 | 376. | 12. | VC | 0.003 | 1518 | 7097 | 0.3647 | 1.2986 | 1.2678 | 1.02 | 2.16 | 2.86 | 2.50 | 963.42 | | X |
| L18 | L17 | 952.45 | 952.11 | 196. | 12. | VC | 0.002 | 1518 | 7097 | 0.3647 | 1.2986 | 0.9596 | 1.35 | 1.76 | 2.56 | 1.89 | 961.17 | | X |
| L17 | L16 | 952.11 | 951.74 | 251. | 12. | VC | 0.001 | 1518 | 7097 | 0.3647 | 1.2986 | 0.8846 | 1.47 | 1.66 | 2.56 | 1.74 | 963.69 | | X |
| L16 | L15A | 951.74 | 951.20 | 242. | 12. | VC | 0.002 | 1518 | 7097 | 0.3647 | 1.2986 | 1.0876 | 1.19 | 1.93 | 2.56 | 2.14 | 962.08 | | X |
| L15A | D9 | 951.20 | 946.73 | 247. | 12. | VC | 0.018 | 1518 | 7097 | 0.3647 | 1.2986 | 3.1000 | 0.42 | 4.09 | 5.83 | 6.11 | NA | A | |
| * FLOW FROM METROPLEX HOSPITAL | | | | | | | | 78 | 261 | | | | | | | | | | |
| D39A | D38A | 968.97 | 966.05 | 644. | 8. | VC | 0.005 | 78 | 261 | 0.0156 | 0.0594 | 0.5258 | 0.11 | 1.06 | 1.56 | 2.33 | 972.44 | | Z |
| D38A | D37A | 966.05 | 963.66 | 633. | 8. | VC | 0.004 | 78 | 261 | 0.0156 | 0.0594 | 0.4797 | 0.12 | 0.99 | 1.46 | 2.13 | 973.52 | | Z |
| D37A | D36A | 963.66 | 961.28 | 801. | 8. | VC | 0.003 | 78 | 261 | 0.0156 | 0.0594 | 0.4257 | 0.14 | 0.90 | 1.34 | 1.89 | 974.94 | | Z |
| D36A | D35A | 961.28 | 956.40 | 799. | 8. | VC | 0.006 | 78 | 261 | 0.0156 | 0.0594 | 0.6101 | 0.10 | 1.17 | 1.73 | 2.70 | 976.34 | | Y |
| D35A | D34A | 956.40 | 955.54 | 685. | 8. | VC | 0.001 | 78 | 261 | 0.0156 | 0.0594 | 0.2767 | 0.21 | 0.66 | 0.98 | 1.23 | 979.63 | | Z |
| D38 | D37 | 971.04 | 969.96 | 159. | 8. | VC | 0.007 | 0 | 20 | 0.0006 | 0.0023 | 0.6430 | 0.00 | 0.42 | 0.69 | 2.85 | 974.01 | | Z |
| D37 | D36 | 969.96 | 967.82 | 174. | 8. | VC | 0.012 | 0 | 20 | 0.0006 | 0.0023 | 0.8651 | 0.00 | 0.52 | 0.85 | 3.83 | 974.77 | | Z |
| D36 | D35 | 967.82 | 966.11 | 170. | 8. | VC | 0.010 | 0 | 20 | 0.0006 | 0.0023 | 0.7822 | 0.00 | 0.48 | 0.79 | 3.47 | 973.90 | | Z |
| D35 | NONE | 966.11 | 955.00 | 160. | 8. | VC | 0.069 | 0 | 20 | 0.0006 | 0.0023 | 2.0579 | 0.00 | 0.92 | 1.55 | 9.12 | 971.10 | | Z |
| * FLOW FROM KINDERGARTEN AREA ENTERS SYSTEM BETWEEN MANHOLES D34A AND D31 (NO MH) | | | | | | | | | | | | | | | | | | | |
| * MANHOLES D31A, D32, D33, & D34 WERE FOUND ABANDONED. | | | | | | | | | | | | | | | | | | | |
| D34A | D31 | 955.54 | 953.46 | 990. | 8. | VC | 0.002 | 78 | 281 | 0.0162 | 0.0617 | 0.3580 | 0.17 | 0.80 | 1.19 | 1.59 | 971.53 | B | Z |
| D31 | D12A | 953.46 | 952.24 | 688. | 10. | VC | 0.002 | 78 | 281 | 0.0162 | 0.0617 | 0.5965 | 0.10 | 0.75 | 1.09 | 1.69 | 968.01 | | Z |
| D12A | D12 | 951.50 | 949.10 | 375. | 10. | VC | 0.006 | 78 | 281 | 0.0162 | 0.0617 | 1.1329 | 0.05 | 1.16 | 1.72 | 3.21 | 960.30 | | Z |
| D12 | D11 | 949.10 | 948.24 | 279. | 10. | VC | 0.003 | 78 | 281 | 0.0162 | 0.0617 | 0.7857 | 0.08 | 0.90 | 1.33 | 2.23 | 957.84 | | Z |
| D11 | D10 | 948.24 | 947.90 | 209. | 10. | VC | 0.002 | 78 | 281 | 0.0162 | 0.0617 | 0.5709 | 0.11 | 0.73 | 1.06 | 1.62 | 961.24 | | Z |
| D10 | D9 | 947.90 | 946.73 | 430. | 10. | VC | 0.003 | 78 | 281 | 0.0162 | 0.0617 | 0.7386 | 0.08 | 0.87 | 1.27 | 2.10 | NA | A/B | Z |

| MANHOLES FROM MH ID | TO MH ID | INVERT ELEV FROM FT | TO FT | DIST FT | PIPE DIA IN | TYP | SLOPE FT/FT | POPULATION RES | N-RES | RATE OF FLOW(MGD) AVERAGE QA | PEAK QP | CAPACITY QF | PIPE RATIO QP/QF | VELOCITY AVG FPS | PEAK FPS | CAP FPS | UPSTREAM MANHOLE RIM ELEV | COMMENTS NOTE | WARNING |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | 1596 | 7378 | | | | | | | | | | |
| * AT MH D9 | | | | | | | | | | | | | | | | | | | |
| D9 | D8 | 946.73 | 938.80 | 553. | 12. | VC | 0.014 | 1596 | 7378 | 0.3809 | 1.3546 | 2.7579 | 0.49 | 3.82 | 5.39 | 5.43 | 957.29 | | |
| D8 | D7 | 938.80 | 934.76 | 500. | 12. | VC | 0.008 | 1596 | 7378 | 0.3809 | 1.3546 | 2.0690 | 0.65 | 3.11 | 4.34 | 4.08 | 943.94 | | |
| D7 | D6 | 934.76 | 925.99 | 513. | 12. | VC | 0.017 | 1596 | 7378 | 0.3809 | 1.3546 | 3.0103 | 0.45 | 4.06 | 5.76 | 5.93 | 938.08 | | |
| * OVERFLOW DRAIN FROM ELEVATED WATER STORAGE TANK # 4655 | | | | | | | | | | | | | | | | | | | |
| L9A | D6 | 945.13 | 928.24 | 491. | 6. | CP | 0.034 | 0 | 0 | 0.0000 | 0.0000 | 0.5827 | 0.00 | 0.00 | 0.00 | 4.59 | 949.64 | | |
| | | | | | | | | 1596 | 7378 | | | | | | | | | | |
| * AT MH D6 | | | | | | | | | | | | | | | | | | | |
| D6 | D5 | 925.99 | 916.47 | 498. | 12. | VC | 0.019 | 1596 | 7378 | 0.3809 | 1.3546 | 3.1843 | 0.43 | 4.23 | 6.01 | 6.27 | 933.54 | | |
| D5 | D4 | 916.47 | 912.72 | 479. | 12. | VC | 0.008 | 1596 | 7378 | 0.3809 | 1.3546 | 2.0364 | 0.67 | 3.08 | 4.29 | 4.01 | 926.70 | | |
| D4 | D3 | 912.72 | 911.70 | 297. | 12. | VC | 0.003 | 1596 | 7378 | 0.3809 | 1.3546 | 1.3494 | 1.00 | 2.29 | 2.67 | 2.66 | 922.15 | X | |
| D45 | D44 | 938.16 | 935.87 | 385. | 6. | VC | 0.006 | 0 | 0 | 0.0000 | 0.0000 | 0.2798 | 0.00 | 0.00 | 0.00 | 2.20 | 941.71 | | |
| D44 | D43 | 935.87 | 932.94 | 397. | 6. | VC | 0.007 | 0 | 0 | 0.0000 | 0.0000 | 0.3116 | 0.00 | 0.00 | 0.00 | 2.46 | 941.69 | | |
| D43 | D42A | 932.94 | 922.20 | 331. | 6. | VC | 0.032 | 0 | 0 | 0.0000 | 0.0000 | 0.6533 | 0.00 | 0.00 | 0.00 | 5.15 | 939.74 | | |
| D42A | D42 | 922.20 | 921.74 | 69. | 6. | VC | 0.007 | 0 | 0 | 0.0000 | 0.0000 | 0.2951 | 0.00 | 0.00 | 0.00 | 2.33 | 928.24 | | |
| D42 | D3 | 921.74 | 911.70 | 373. | 6. | VC | 0.027 | 0 | 0 | 0.0000 | 0.0000 | 0.5950 | 0.00 | 0.00 | 0.00 | 4.69 | 927.81 | | |
| | | | | | | | | 1596 | 7378 | | | | | | | | | | |
| * AT MH D3 | | | | | | | | | | | | | | | | | | | |
| D3 | D2 | 911.70 | 910.73 | 396. | 12. | VC | 0.002 | 1596 | 7378 | 0.3809 | 1.3546 | 1.1395 | 1.19 | 2.02 | 2.67 | 2.24 | 924.75 | X | |
| D2 | D1 | 910.73 | 909.70 | 367. | 12. | VC | 0.003 | 1596 | 7378 | 0.3809 | 1.3546 | 1.2191 | 1.11 | 2.13 | 2.67 | 2.40 | 923.17 | X | |
| D1 | D1A | 909.70 | 908.50 | 111. | 12. | VC | 0.011 | 1596 | 7378 | 0.3809 | 1.3546 | 2.3991 | 0.56 | 3.46 | 4.87 | 4.73 | 920.50 | | |
| D1A | J25 | 908.50 | 891.00 | 416. | 12. | VC | 0.042 | 1596 | 7378 | 0.3809 | 1.3546 | 4.7205 | 0.29 | 5.58 | 8.03 | 9.30 | 912.66 | | |
| * FLOWS FROM AREAS 6 & 7 ENTER AREA 10 AT MANHOLE J25 | | | | | | | | | | | | | | | | | | | |
| * AT MH J25 | | | | | | | | | | | | | | | | | | | |
| * | | | | 69318 | | | | 3006 | 6745 | (AREAS 6 & 7) | | | | | | | | | |
| * | | | | 16905 | | | | 1596 | 7378 | (PART OF AREA 10) | | | | | | | | | |
| * | | | | 86223 | | | | 4602 | 14123 | (TOTAL) | | | | | | | | | |
| J25 | J24 | 891.38 | 890.26 | 409. | 21. | VC | 0.003 | 4602 | 14123 | 0.8839 | 3.0177 | 5.3616 | 0.56 | 2.55 | 3.55 | 3.45 | 904.34 | | |
| J24 | J23 | 890.26 | 888.20 | 411. | 21. | VC | 0.005 | 4656 | 14247 | 0.8930 | 3.0466 | 7.2485 | 0.42 | 3.17 | 4.45 | 4.66 | 906.04 | | |
| J23 | J22A | 888.80 | 887.44 | 180. | 21. | VC | 0.008 | 4656 | 14247 | 0.8930 | 3.0466 | 8.9012 | 0.34 | 3.66 | 5.18 | 5.73 | 898.42 | B | |
| J22D | J22B | 898.60 | 891.70 | 194. | 12. | VC | 0.036 | 62 | 318 | 0.0157 | 0.0598 | 4.3465 | 0.01 | 1.98 | 3.02 | 8.56 | 900.72 | | |
| J22B | J22A | 891.70 | 887.74 | 331. | 12. | VC | 0.012 | 62 | 318 | 0.0157 | 0.0598 | 2.5199 | 0.02 | 1.37 | 2.07 | 4.96 | 900.75 | | |
| | | | | | | | | 5005 | 15089 | | | | | | | | | | |
| * AT MH J22A | | | | | | | | | | | | | | | | | | | |
| J22A | J22 | 887.46 | 885.31 | 233. | 21. | VC | 0.009 | 5005 | 15089 | 0.9532 | 3.2360 | 9.8369 | 0.33 | 4.01 | 5.67 | 6.33 | 896.34 | B | |
| J22 | J21A | 885.31 | 884.18 | 96. | 21. | VC | 0.012 | 5005 | 15214 | 0.9569 | 3.248 | 11.1363 | 0.29 | 4.38 | 6.21 | 7.16 | 893.05 | | |
| J21A | J21B | 884.18 | 883.87 | 57. | 21. | VC | 0.005 | 5005 | 15214 | 0.9569 | 3.2477 | 7.5719 | 0.43 | 3.33 | 4.68 | 4.87 | 893.35 | | |
| J21F | J21E | 905.01 | 902.56 | 81. | 8. | VC | 0.030 | 0 | 26 | 0.0008 | 0.0030 | 1.3582 | 0.00 | 0.76 | 1.26 | 6.02 | 910.12 | B | Z |
| J21E | J21D | 902.56 | 895.72 | 349. | 8. | VC | 0.020 | 0 | 26 | 0.0008 | 0.0030 | 1.0935 | 0.00 | 0.66 | 1.08 | 4.85 | 908.27 | | Z |
| J21D | J21C | 895.72 | 888.21 | 353. | 8. | VC | 0.021 | 0 | 26 | 0.0008 | 0.0030 | 1.1384 | 0.00 | 0.68 | 1.11 | 5.05 | 903.22 | | Z |
| J21C | J21B | 888.21 | 883.87 | 222. | 8. | VC | 0.020 | 0 | 26 | 0.0008 | 0.0030 | 1.0909 | 0.00 | 0.66 | 1.08 | 4.84 | 897.13 | | Z |
| | | | | | | | | 5005 | 15240 | | | | | | | | | | |
| * AT MH J21B | | | | | | | | | | | | | | | | | | | |
| J21B | J21 | 883.87 | 881.10 | 257. | 21. | VC | 0.011 | 5005 | 15240 | 0.9577 | 3.250 | 10.6349 | 0.31 | 4.24 | 6.01 | 6.84 | 892.47 | | |
| J21 | J20A | 881.10 | 879.79 | 174. | 21. | VC | 0.008 | 5305 | 15241 | 0.9877 | 3.3439 | 8.8854 | 0.38 | 3.77 | 5.30 | 5.72 | 889.16 | B | |
| J20A | J20 | 879.79 | 877.60 | 270. | 21. | VC | 0.008 | 5305 | 15241 | 0.9877 | 3.3439 | 9.2227 | 0.36 | 3.87 | 5.45 | 5.93 | 888.69 | B | |
| J20 | J19C | 877.60 | 876.19 | 275. | 21. | CP | 0.005 | 5305 | 15241 | 0.9877 | 3.3439 | 6.3549 | 0.53 | 2.97 | 4.14 | 4.09 | 883.89 | B | |
| J19C | J19B | 876.19 | 875.69 | 235. | 21. | CP | 0.002 | 5305 | 15241 | 0.9877 | 3.3439 | 4.0955 | 0.82 | 2.17 | 2.94 | 2.63 | 883.09 | | |
| J19B | J19 | 875.69 | 875.14 | 102. | 21. | CP | 0.005 | 5305 | 15241 | 0.9877 | 3.3439 | 6.5307 | 0.51 | 3.03 | 4.22 | 4.20 | 882.73 | | |
| * FLOW FROM AREA 10 ENTERS AREA 11 AT MANHOLE J19 | | | | | | | | | | | | | | | | | | | |
| * AT MH J19 | | | | | | | | | | | | | | | | | | | |

| MANHOLES FROM MH ID | TO MH ID | INVERT ELEV FROM FT | TO FT | DIST FT | PIPE DIA IN | TYP | SLOPE FT/FT | POPULATION RES | N-RES | RATE OF FLOW(MGD) AVERAGE QA | PEAK QP | CAPACITY QF | PIPE RATIO QP/QF | VELOCITY AVG FPS | PEAK FPS | CAP FPS | UPSTREAM MANHOLE RIM ELEV | COMMENTS NOTE WARNING |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| * | | | | 141432 | | | | 5305 | 15241 | (AREAS 6 - 10) | | | | | | | | |
| * | | | | 9514 | | | | 175 | 792 | | | | | | | | | |
| * | | | | 150946 | | | | 5480 | 16033 | (TOTAL) | | | | | | | | |
| * | | | | | | | | | | | | | | | | | | |
| * | | | | | | | | | | | | | | | | | | |
| * | | | | | | | | | | | | | | | | | | |

TOTAL NUMBER OF REACHES BELOW 1.2 FPS = 19.
TOTAL NUMBER OF ADVERSE REACHES = 0.
TOTAL NUMBER OF REACHES EXCEEDING PIPE CAPACITY = 7.

| | |
|---|---|
| L19 | L18 |
| L18 | L17 |
| L17 | L16 |
| L16 | L15A |
| D4 | D3 |
| D3 | D2 |
| D2 | D1 |

TOTAL NUMBER OF REACHES WHICH HAVE FULL PIPE VELOCITIES BELOW 1.5 FPS= 1.

| | |
|---|---|
| D35A | D34A |

TOTAL NUMBER OF REACHES = 60.

## SUBAREA 11

Subarea 11, south of Central Avenue both east and west of Hood Road, is a relatively small system. Service connections include the Post Headquarters building, Poxon guest house, and enlisted mens club.

Sewage is carried southward to manhole J-19, joins the flows from Subareas 6 through 10, then moves southeast to manhole J-19A to combine with the flows of Subareas 1 through 5. All flow (from Subareas 1 through 11) is then transported via 27-inch CP to manhole R28A in Subarea 13.

Average flow velocities below the specified minimum 1.2 FPS occur in 15 of the 50 reaches. Nearly 75% of these reaches are of concrete pipe (CP).

The analysis indicates an adverse grade in the reach between manholes R28A1 and R28A. No problems have been reported by field personnel and, since the reach is only 22 feet in length, replacement is not recommended.

No reconstruction of sewer lines within Area 11 is required. However, the following two manholes require attention:

| | | |
|---|---|---|
| MH C-20 --- Below grade; should be raised 1.0' | $ | 150.00 |
| MH C-6 --- Broken rim replaced | | 150.00 |
| | $ | 300.00 |

AREA 11,AS DEFINED BY THE SANITARY SEWER ANALYSIS, COMPLETED BY BOHANNAN-HUSTON, INC., SEPTEMBER 1984.

COMMENT COLUMN "NOTES"
**********

EXCEPT AS NOTED:
> ELEVATIONS WERE OBTAINED THROUGH FIELD SURVEYS
> DISTANCES WERE GENERATED FROM COMPUTER PLOTS

A = INVERT BASED ON REPORT BY FREESE & NICHOLS (4/78)
B = DISTANCE BETWEEN MANHOLES IS SCALED
C = INVERT BASED ON "AS-BUILT" DRAWINGS
D = INVERT BASED ON TOPOGRAPHY & ADJACENT MANHOLE DATA
NA = NOT AVAILABLE
NF = NOT FOUND

COMMENT COLUMN "WARNINGS"
**********

W = ZERO OR ADVERSE SLOPE PRESENT
(PEAK FLOW MAY EXCEED PIPE CAPACITY)
X = PEAK FLOW EXCEEDS PIPE CAPACITY
(LOW VELOCITIES MAY BE PRESENT)
Y = FULL PIPE VELOCITY BELOW 1.5 FPS
(AVERAGE VELOCITY MAY ALSO BE LOW)
Z = AVERAGE VELOCITY BELOW 1.2 FPS

FORMER MANHOLE IDENTIFICATION NUMBERS ALSO APPEAR IN THE COMMENT COLUMN UNDER "NOTES"

| MANHOLES FROM MH ID | MANHOLES TO MH ID | INVERT ELEV FROM FT | INVERT ELEV TO FT | DIST FT | PIPE DIA IN | PIPE TYP | PIPE SLOPE FT/FT | POPULATION RES | POPULATION N-RES | RATE OF FLOW(MGD) AVERAGE QA | RATE OF FLOW(MGD) PEAK QP | RATE OF FLOW(MGD) CAPACITY QF | PIPE RATIO QP/QF | VELOCITY AVG FPS | VELOCITY PEAK FPS | VELOCITY CAP FPS | UPSTREAM MANHOLE RIM ELEV | COMMENTS NOTE | COMMENTS WARNING |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C26 | C25 | 944.67 | 940.08 | 478. | 8. | CP | 0.010 | 0 | 0 | 0.0000 | 0.0000 | 0.6632 | 0.00 | 0.00 | 0.00 | 2.94 | 950.70 | | |
| C25 | C25A | 940.08 | 939.25 | 78. | 8. | CP | 0.011 | 46 | 0 | 0.0046 | 0.0175 | 0.6990 | 0.03 | 0.87 | 1.34 | 3.10 | 945.27 | | Z |
| C25A | C22A | 939.25 | 937.62 | 302. | 8. | CP | 0.005 | 46 | 0 | 0.0046 | 0.0175 | 0.4971 | 0.04 | 0.69 | 1.06 | 2.20 | 946.70 | | Z |
| C23 | C22 | 948.48 | 940.52 | 479. | 8. | CP | 0.017 | 21 | 93 | 0.0049 | 0.0186 | 0.8728 | 0.02 | 1.03 | 1.60 | 3.87 | 954.06 | | Z |
| C22 | C22A | 940.52 | 937.62 | 157. | 8. | CP | 0.019 | 21 | 133 | 0.0061 | 0.0231 | 0.9213 | 0.03 | 1.15 | 1.77 | 4.08 | 946.90 | | Z |
| * AT MH C22A | | | | | | | | 64 | 133 | | | | | | | | | | |
| C22A | C21 | 937.62 | 932.82 | 302. | 8. | CP | 0.016 | 67 | 200 | 0.0127 | 0.0483 | 0.8538 | 0.06 | 1.38 | 2.04 | 3.78 | 943.70 | | Z |
| C24 | C21 | 936.20 | 932.82 | 297. | 8. | CP | 0.011 | 0 | 106 | 0.0032 | 0.0121 | 0.7226 | 0.02 | 0.79 | 1.23 | 3.20 | 942.66 | | |
| * AT MH C21 | | | | | | | | 67 | 306 | | | | | | | | | | |
| C21 | C20 | 932.82 | 927.80 | 227. | 8. | CP | 0.022 | 67 | 306 | 0.0159 | 0.0603 | 1.0074 | 0.06 | 1.66 | 2.45 | 4.47 | 938.66 | | |
| C20 | C13 | 927.80 | 922.16 | 308. | 8. | CP | 0.018 | 67 | 350 | 0.0172 | 0.0654 | 0.9156 | 0.07 | 1.60 | 2.38 | 4.06 | 934.49 | | |
| C19 | C18 | 936.90 | 934.99 | 345. | 8. | CP | 0.006 | 0 | 85 | 0.0026 | 0.0097 | 0.5036 | 0.02 | 0.58 | 0.90 | 2.23 | 942.40 | | Z |
| C18 | C13 | 934.99 | 922.16 | 400. | 8. | CP | 0.032 | 0 | 140 | 0.0042 | 0.0160 | 1.2119 | 0.01 | 1.22 | 1.93 | 5.37 | 941.20 | | |
| C17 | C17A | 934.42 | 933.01 | 127. | 8. | VCP | 0.011 | 0 | 100 | 0.0030 | 0.0114 | 0.8214 | 0.01 | 0.84 | 1.33 | 3.64 | 940.99 | B | Z |
| C17A | C14 | 933.01 | 930.20 | 327. | 8. | VCP | 0.009 | 0 | 155 | 0.0047 | 0.0177 | 0.7236 | 0.02 | 0.89 | 1.38 | 3.21 | 938.96 | | Z |
| C16 | C15 | 927.66 | 925.72 | 281. | 8. | VCP | 0.007 | 0 | 40 | 0.0012 | 0.0046 | 0.6493 | 0.01 | 0.53 | 0.86 | 2.88 | 930.76 | | Z |
| C15 | C14 | 925.72 | 924.40 | 418. | 8. | VCP | 0.003 | 0 | 125 | 0.0038 | 0.0143 | 0.4388 | 0.03 | 0.59 | 0.91 | 1.94 | 930.88 | | Z |
| * AT MH C14 | | | | | | | | 0 | 280 | | | | | | | | | | |
| C14 | C13 | 924.40 | 922.16 | 531. | 8. | VCP | 0.004 | 0 | 296 | 0.0089 | 0.0337 | 0.5074 | 0.07 | 0.86 | 1.29 | 2.25 | 934.45 | | Z |
| * AT MH C13 | | | | | | | | 67 | 780 | | | | | | | | | | |
| C13 | C10 | 922.16 | 916.23 | 404. | 8. | CP | 0.015 | 67 | 792 | 0.0305 | 0.1158 | 0.8204 | 0.14 | 1.73 | 2.59 | 3.64 | 931.27 | | |
| C12 | C11 | 920.81 | 917.77 | 153. | 6. | CP | 0.020 | 0 | 0 | 0.0000 | 0.0000 | 0.4436 | 0.00 | 0.00 | 0.00 | 3.50 | 926.33 | | |
| C11 | C10 | 917.77 | 916.23 | 279. | 8. | CP | 0.006 | 0 | 0 | 0.0000 | 0.0000 | 0.5031 | 0.00 | 0.00 | 0.00 | 2.23 | 922.64 | | |
| * AT MH C10 | | | | | | | | 67 | 792 | | | | | | | | | | |
| C10 | C10A | 916.23 | 915.93 | 20. | 8. | CP | 0.015 | 67 | 792 | 0.0305 | 0.1158 | 0.8386 | 0.14 | 1.76 | 2.63 | 3.72 | 924.69 | | |
| C10A | C6B | 915.93 | 908.04 | 440. | 8. | VCP | 0.018 | 67 | 792 | 0.0305 | 0.1158 | 1.0458 | 0.11 | 2.09 | 3.08 | 4.64 | 924.73 | B | |
| C9 | C8 | 927.72 | 924.13 | 352. | 6. | CP | 0.010 | 3 | 0 | 0.0003 | 0.0011 | 0.3175 | 0.00 | 0.37 | 0.61 | 2.50 | 930.66 | | Z |

| MANHOLES FROM MH ID | MANHOLES TO MH ID | INVERT ELEV FROM FT | INVERT ELEV TO FT | DIST FT | PIPE DIA IN | PIPE TYP | PIPE SLOPE FT/FT | POPULATION RES | POPULATION N-RES | RATE OF FLOW(MGD) AVERAGE QA | RATE OF FLOW(MGD) PEAK QP | RATE OF FLOW(MGD) CAPACITY QF | PIPE RATIO QP/QF | VELOCITY AVG FPS | VELOCITY PEAK FPS | VELOCITY CAP FPS | UPSTREAM MANHOLE RIM ELEV | COMMENTS NOTE WARNING |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C8 | C7 | 924.13 | 922.75 | 402. | 8. | CP | 0.003 | 6 | 0 | 0.0006 | 0.0023 | 0.3964 | 0.01 | 0.31 | 0.49 | 1.76 | 929.18 | Z |
| C7 | C6 | 922.75 | 909.70 | 452. | 8. | CP | 0.029 | 8 | 0 | 0.0008 | 0.0030 | 1.1505 | 0.00 | 0.69 | 1.13 | 5.10 | 929.95 | Z |
| C6 | C6B | 909.70 | 908.04 | 121. | 8. | VCP | 0.014 | 8 | 0 | 0.0008 | 0.0030 | 0.9147 | 0.00 | 0.59 | 0.96 | 4.05 | 913.50 | B Z |
| | | | | | | | | 75 | 792 | | | | | | | | | |
| * AT MH C6B | | | | | | | | | | | | | | | | | | |
| C6B | C5A | 900.04 | 900.15 | 372. | 8. | VCP | 0.215 | 175 | 792 | 0.0413 | 0.1568 | 3.6191 | 0.04 | 5.38 | 8.01 | 16.04 | 912.60 | B |
| C5A | C4A | 900.15 | 892.27 | 348. | 8. | VCP | 0.023 | 175 | 792 | 0.0413 | 0.1568 | 1.1752 | 0.13 | 2.49 | 3.65 | 5.21 | 904.47 | B |
| C4A | C3A | 892.27 | 887.18 | 402. | 8. | VCP | 0.013 | 175 | 792 | 0.0413 | 0.1568 | 0.8788 | 0.18 | 1.99 | 2.95 | 3.90 | 896.87 | B |
| C3A | C2A | 887.18 | 882.23 | 400. | 8. | VCP | 0.012 | 175 | 792 | 0.0413 | 0.1568 | 0.8689 | 0.18 | 1.98 | 2.93 | 3.85 | 891.01 | |
| C2A | J19 | 882.23 | 866.64 | 315. | 8. | VCP | 0.049 | 175 | 792 | 0.0413 | 0.1568 | 1.7369 | 0.09 | 3.26 | 4.83 | 7.70 | 886.84 | |
| * FLOW FROM AREA 10 ENTERS AREA 11 AT MANHOLE J-19 | | | | | | | | | | | | | | | | | | |
| * AT MH J-19 | | | | | | | | | | | | | | | | | | |
| * | | | | 141432 | | | | 5305 | 15241 | (AREAS 6-10) | | | | | | | | |
| * | | | | 9514 | | | | 175 | 792 | (AREA 11) | | | | | | | | |
| * | | | | 150946 | | | | 5480 | 16033 | (TOTAL) | | | | | | | | |
| J19 | J19A | 875.14 | 873.52 | 65. | 21. | CI | 0.025 | 4818 | 10602 | 0.7999 | 2.749 | 15.0233 | 0.18 | 5.13 | 7.37 | 9.66 | 883.96 | |
| * FLOW FROM AREAS 1 - 5 ENTER AREA 11 AT MANHOLE J-19A | | | | | | | | | | | | | | | | | | |
| * AT MH J-19A | | | | | | | | | | | | | | | | | | |
| * | | | | 127661 | | | | 15394 | 7458 | (AREAS 1-5) | | | | | | | | |
| * | | | | 151011 | | | | 5480 | 16033 | (AREA 11) | | | | | | | | |
| * | | | | 278672 | | | | 20874 | 23491 | (TOTAL) | | | | | | | | |
| J19A | J18A | 871.98 | 870.50 | 287. | 27. | CP | 0.005 | 20874 | 23491 | 2.7922 | 8.167 | 12.4569 | 0.66 | 3.91 | 5.17 | 4.85 | 883.19 | B |
| J18A | R28A13 | 870.50 | 868.94 | 390. | 27. | CP | 0.004 | 20874 | 23491 | 2.7922 | 8.167 | 10.9695 | 0.74 | 3.57 | 4.68 | 4.27 | 880.71 | |
| R28A13 | R28A12 | 868.90 | 866.93 | 507. | 27. | CP | 0.004 | 20874 | 23491 | 2.7922 | 8.167 | 10.8166 | 0.76 | 3.53 | 4.62 | 4.21 | 879.09 | |
| R28A12 | R28A11 | 866.81 | 865.60 | 362. | 27. | CP | 0.003 | 20874 | 23491 | 2.7922 | 8.167 | 10.0295 | 0.81 | 3.35 | 4.35 | 3.90 | 879.23 | |
| R28A11 | R28A10 | 865.60 | 864.14 | 188. | 27. | CP | 0.008 | 20874 | 23491 | 2.7922 | 8.167 | 15.2868 | 0.53 | 4.53 | 6.04 | 5.95 | 873.73 | B |
| R28A10 | R28A9 | 864.14 | 862.51 | 371. | 27. | CP | 0.004 | 20874 | 23491 | 2.7922 | 8.167 | 11.4983 | 0.71 | 3.69 | 4.85 | 4.47 | 871.30 | B |
| R28A9E | R28A9D | 904.46 | 888.22 | 574. | 8. | VC | 0.028 | 0 | 0 | 0.0000 | 0.0000 | 1.3138 | 0.00 | 0.00 | 0.00 | 5.82 | 908.67 | |
| R28A9D | R28A9C | 888.22 | 880.76 | 201. | 8. | VC | 0.037 | 0 | 0 | 0.0000 | 0.0000 | 1.5035 | 0.00 | 0.00 | 0.00 | 6.66 | 892.30 | |
| R28A9C | R28A9B | 880.76 | 870.60 | 395. | 8. | VC | 0.026 | 0 | 0 | 0.0000 | 0.0000 | 1.2519 | 0.00 | 0.00 | 0.00 | 5.55 | 884.86 | |
| R28A9B | R28A9 | 870.80 | 862.51 | 391. | 8. | VC | 0.021 | 0 | 0 | 0.0000 | 0.0000 | 1.1365 | 0.00 | 0.00 | 0.00 | 5.04 | 875.01 | |
| * AT MH R28A9 | | | | | | | | 20301 | 18560 | | | | | | | | | |
| R28A9 | R28A8 | 862.51 | 861.00 | 440. | 27. | CP | 0.003 | 20874 | 23491 | 2.7922 | 8.167 | 10.1624 | 0.80 | 3.38 | 4.39 | 3.95 | 871.68 | |
| R28A8 | R28A7 | 861.00 | 859.53 | 408. | 27. | CP | 0.004 | 20874 | 23491 | 2.7922 | 8.167 | 10.4123 | 0.78 | 3.44 | 4.48 | 4.05 | 869.05 | A/B |
| R28A7 | R28A6 | 859.45 | 858.23 | 287. | 27. | CP | 0.004 | 20874 | 23491 | 2.7922 | 8.167 | 11.3102 | 0.72 | 3.65 | 4.79 | 4.40 | 866.41 | B |
| R28A6 | R28A5 | 858.23 | 857.07 | 282. | 27. | CP | 0.004 | 20874 | 23491 | 2.7922 | 8.167 | 11.1256 | 0.73 | 3.61 | 4.73 | 4.33 | 867.31 | B |
| R28A5 | R28A4 | 857.07 | 855.93 | 300. | 27. | CP | 0.004 | 20874 | 23491 | 2.7922 | 8.167 | 10.6935 | 0.76 | 3.50 | 4.58 | 4.16 | 865.22 | B |
| R28A4 | R28A3 | 855.93 | 854.60 | 398. | 27. | CP | 0.003 | 20874 | 23491 | 2.7922 | 8.167 | 10.0279 | 0.81 | 3.35 | 4.35 | 3.90 | 864.25 | B |
| R28A3 | R28A2 | 854.60 | 852.84 | 400. | 27. | CP | 0.004 | 20874 | 23491 | 2.7922 | 8.167 | 11.5065 | 0.71 | 3.70 | 4.86 | 4.48 | 866.27 | B |
| R28A2 | R28A1 | 852.84 | 851.09 | 399. | 27. | VC | 0.004 | 20874 | 23491 | 2.7922 | 8.167 | 13.2558 | 0.62 | 4.09 | 5.42 | 5.16 | 862.50 | B |
| R28A1 | R28A | 851.09 | 851.31 | 22. | 27. | VC | -.010 | 20874 | 23491 | 2.7922 | 8.167 | | | | | | 860.13 | W |
| * FLOW FROM AREA 11 ENTERS AREA 13 AT MANHOLE R28A | | | | | | | | | | | | | | | | | | |
| * AT MH R28A | | | | | | | | | | | | | | | | | | |
| * | | | | 278672 | | | | 20874 | 23491 | (AREAS 1-11) | | | | | | | | |
| * | | | | 73924 | | | | 6515 | 2991 | (AREAS 12 & 13) | | | | | | | | |
| * | | | | 352596 | | | | 27389 | 26482 | (TOTAL) | | | | | | | | |

TOTAL NUMBER OF REACHES BELOW 1.2 FPS = 15.
TOTAL NUMBER OF ADVERSE REACHES = 1.
R28A1 R28A
TOTAL NUMBER OF REACHES EXCEEDING PIPE CAPACITY = 0.
TOTAL NUMBER OF REACHES WHICH HAVE FULL PIPE VELOCITIES BELOW 1.5 FPS= 0.
TOTAL NUMBER OF REACHES = 50.

## SUBAREA 12

Subarea 12 consists of the majority of McNair Village and the western two-thirds of Chaffee Village, both family housing areas. Flows are directed generally to the east and south to manhole R-29, joined there by the flow from Subarea 13.

Fifty-four of the 109 reaches, all with minimal loadings, show average flow velocities below the minimum 1.2 FPS. Nearly 75% of them are concrete pipe. Two also have full pipe velocities below the minimum 1.5 FPS (H70 to J15A @ 1.20 FPS and J14 to J13 @ 1.40 FPS).

No reconstruction of sewer lines within Subarea 12 is required.

MC NAIR AND CHAFFEE VILLAGES
**********

* LINE H4A TO H4 IS A DRAIN LINE FROM SWIMMING POOL BUILDING #112.

AREA 12,AS DEFINED BY THE SANITARY SEWER ANALYSIS, COMPLETED BY BOHANNAN-HUSTON, INC., SEPTEMBER 1984.

COMMENT COLUMN "NOTES"
**********

EXCEPT AS NOTED:
> ELEVATIONS WERE OBTAINED THROUGH FIELD SURVEYS
> DISTANCES WERE GENERATED FROM COMPUTER PLOTS

A = INVERT BASED ON REPORT BY FREESE & NICHOLS (4/78)
B = DISTANCE BETWEEN MANHOLES IS SCALED
C = INVERT BASED ON "AS-BUILT" DRAWINGS
D = INVERT BASED ON TOPOGRAPHY & ADJACENT MANHOLE DATA
NA = NOT AVAILABLE
NF = NOT FOUND

FORMER MANHOLE IDENTIFICATION NUMBERS ALSO APPEAR IN THE COMMENT COLUMN UNDER "NOTES"

COMMENT COLUMN "WARNINGS"
**********

W = ZERO OR ADVERSE SLOPE PRESENT
(PEAK FLOW MAY EXCEED PIPE CAPACITY)
X = PEAK FLOW EXCEEDS PIPE CAPACITY
(LOW VELOCITIES MAY BE PRESENT)
Y = FULL PIPE VELOCITY BELOW 1.5 FPS
(AVERAGE VELOCITY MAY ALSO BE LOW)
Z = AVERAGE VELOCITY BELOW 1.2 FPS

| MANHOLES FROM MH ID | TO MH ID | INVERT ELEV FROM FT | TO FT | DIST FT | PIPE DIA IN | TYP | SLOPE FT/FT | POPULATION RES | N-RES | RATE OF FLOW(MGD) AVERAGE QA | PEAK QP | CAPACITY QF | PIPE RATIO QP/QF | VELOCITY AVG FPS | PEAK FPS | CAP FPS | UPSTREAM MANHOLE RIM ELEV | COMMENTS NOTE | WARNING |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| H4A | H4B | 920.65 | 919.50 | 210. | 6. | PVC | 0.005 | 0 | 0 | 0.0000 | 0.0000 | 0.3173 | 0.00 | 0.00 | 0.00 | 2.50 | 926.30 | C | |
| H4B | H4C | 919.50 | 918.85 | 113. | 6. | PVC | 0.006 | 0 | 0 | 0.0000 | 0.0000 | 0.3250 | 0.00 | 0.00 | 0.00 | 2.56 | 925.08 | C | |
| H4C | H4 | 918.85 | 918.27 | 147. | 6. | PVC | 0.004 | 0 | 0 | 0.0000 | 0.0000 | 0.2687 | 0.00 | 0.00 | 0.00 | 2.12 | 922.73 | C | |
| H3 | H4 | 924.07 | 918.17 | 269. | 6. | VCP | 0.022 | 60 | 0 | 0.0060 | 0.0228 | 0.5373 | 0.04 | 1.41 | 2.14 | 4.23 | 926.22 | | |
| *AT MH H4 | | | | | | | | 60 | 0 | | | | | | | | | | |
| H4 | H5 | 918.17 | 907.17 | 343. | 8. | VCP | 0.032 | 90 | 0 | 0.0090 | 0.0342 | 1.3987 | 0.02 | 1.73 | 2.67 | 6.20 | 923.67 | B | |
| H5B | H5A | 912.50 | 907.60 | 168. | 8. | PVC | 0.029 | 0 | 50 | 0.0015 | 0.0057 | 1.5776 | 0.00 | 1.04 | 1.70 | 6.99 | 916.80 | | Z |
| H5A | H5 | 907.40 | 907.05 | 164. | 6. | PVC | 0.002 | 0 | 50 | 0.0015 | 0.0057 | 0.1980 | 0.03 | 0.46 | 0.70 | 1.56 | 910.20 | | Z |
| *AT MH H5 | | | | | | | | 60 | 50 | | | | | | | | | | |
| H5 | H6 | 907.02 | 901.06 | 242. | 8. | VCP | 0.025 | 120 | 50 | 0.0135 | 0.0513 | 1.2249 | 0.04 | 1.80 | 2.68 | 5.43 | 911.12 | | |
| H6 | H7 | 900.96 | 898.40 | 92. | 8. | VCP | 0.028 | 120 | 50 | 0.0135 | 0.0513 | 1.3006 | 0.04 | 1.88 | 2.80 | 5.77 | 905.56 | | |
| H8 | H9 | 917.20 | 906.29 | 333. | 8. | VCP | 0.033 | 60 | 0 | 0.0060 | 0.0228 | 1.4138 | 0.02 | 1.53 | 2.39 | 6.27 | 932.12 | | |
| H9 | H7 | 906.29 | 898.40 | 363. | 8. | VCP | 0.022 | 90 | 0 | 0.0090 | 0.0342 | 1.1519 | 0.03 | 1.52 | 2.33 | 5.11 | 912.14 | | |
| *AT MH H7 | | | | | | | | 210 | 50 | | | | | | | | | | |
| H7 | H16 | 898.40 | 893.40 | 168. | 8. | VCP | 0.030 | 210 | 50 | 0.0225 | 0.0855 | 1.3458 | 0.06 | 2.26 | 3.34 | 5.97 | 903.00 | | |
| H11 | H10 | 904.90 | 903.83 | 282. | 8. | VCP | 0.004 | 60 | 0 | 0.0060 | 0.0228 | 0.4809 | 0.05 | 0.74 | 1.09 | 2.13 | 914.90 | | Z |
| H10 | H14 | 903.83 | 895.66 | 293. | 8. | VCP | 0.028 | 90 | 0 | 0.0090 | 0.0342 | 1.3034 | 0.03 | 1.65 | 2.54 | 5.78 | 914.18 | | |
| H12 | H13 | 897.68 | 896.44 | 330. | 8. | VCP | 0.004 | 60 | 0 | 0.0060 | 0.0228 | 0.4787 | 0.05 | 0.73 | 1.09 | 2.12 | 903.68 | B | Z |
| H13 | H14 | 896.44 | 895.66 | 242. | 8. | VCP | 0.003 | 90 | 0 | 0.0090 | 0.0342 | 0.4431 | 0.08 | 0.79 | 1.18 | 1.96 | 903.84 | | Z |
| *AT MH H14 | | | | | | | | 180 | 0 | | | | | | | | | | |
| H14 | H15 | 895.66 | 894.20 | 318. | 8. | VCP | 0.005 | 210 | 0 | 0.0210 | 0.0798 | 0.5292 | 0.15 | 1.14 | 1.70 | 2.35 | 905.72 | | Z |
| H15 | H16 | 894.20 | 893.16 | 213. | 8. | VCP | 0.005 | 210 | 0 | 0.0210 | 0.0798 | 0.5462 | 0.15 | 1.17 | 1.74 | 2.42 | 901.30 | | Z |
| *AT MH 16 | | | | | | | | 420 | 50 | | | | | | | | | | |
| H16 | H17 | 893.16 | 883.34 | 403. | 8. | VCP | 0.024 | 420 | 50 | 0.0435 | 0.1653 | 1.2184 | 0.14 | 2.54 | 3.80 | 5.40 | 901.26 | | |

| MANHOLES FROM MH ID | MANHOLES TO MH ID | INVERT ELEV FROM FT | INVERT ELEV TO FT | DIST FT | PIPE DIA IN | PIPE TYP | PIPE SLOPE FT/FT | POPULATION RES | POPULATION N-RES | RATE OF FLOW(MGD) AVERAGE QA | RATE OF FLOW(MGD) PEAK QP | RATE OF FLOW(MGD) CAPACITY QF | PIPE RATIO QP/QF | VELOCITY AVG FPS | VELOCITY PEAK FPS | VELOCITY CAP FPS | UPSTREAM MANHOLE RIM ELEV | COMMENTS NOTE WARNING |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| H17 | H18 | 883.34 | 876.01 | 416. | 8. | VCP | 0.018 | 420 | 50 | 0.0435 | 0.1653 | 1.0366 | 0.16 | 2.27 | 3.38 | 4.59 | 888.61 | |
| H18 | J16 | 876.01 | 870.79 | 343. | 8. | VCP | 0.015 | 420 | 50 | 0.0435 | 0.1653 | 0.9641 | 0.17 | 2.16 | 3.21 | 4.27 | 880.83 | |
| J16 | J15A | 870.79 | 870.39 | 80. | 8. | CP | 0.005 | 420 | 50 | 0.0435 | 0.1653 | 0.4788 | 0.35 | 1.32 | 1.93 | 2.12 | 878.35 | |
| H81 | H80 | 890.41 | 888.78 | 207. | 8. | VCP | 0.008 | 40 | 0 | 0.0040 | 0.0152 | 0.6925 | 0.02 | 0.83 | 1.28 | 3.07 | 895.66 | Z |
| H80 | H79 | 888.78 | 887.57 | 291. | 8. | VCP | 0.004 | 66 | 0 | 0.0066 | 0.0251 | 0.5040 | 0.05 | 0.78 | 1.16 | 2.23 | 894.24 | Z |
| H79 | H76 | 887.57 | 886.12 | 234. | 8. | CP | 0.006 | 88 | 0 | 0.0088 | 0.0334 | 0.5325 | 0.06 | 0.89 | 1.32 | 2.36 | 893.40 | Z |
| H78 | H77 | 889.39 | 888.32 | 276. | 8. | CP | 0.004 | 22 | 0 | 0.0022 | 0.0084 | 0.4215 | 0.02 | 0.49 | 0.76 | 1.87 | 894.88 | Z |
| H77 | H76 | 888.32 | 886.12 | 270. | 8. | CP | 0.008 | 44 | 0 | 0.0044 | 0.0167 | 0.6105 | 0.03 | 0.78 | 1.20 | 2.71 | 893.42 | Z |
| *AT MH H76 | | | | | | | | 132 | 0 | | | | | | | | | |
| H76 | H73 | 886.12 | 877.42 | 276. | 8. | VCP | 0.032 | 132 | 0 | 0.0132 | 0.0502 | 1.3867 | 0.04 | 1.94 | 2.91 | 6.15 | 892.20 | |
| H74 | H73A | 882.11 | 878.44 | 353. | 8. | CP | 0.010 | 35 | 0 | 0.0035 | 0.0133 | 0.6906 | 0.02 | 0.79 | 1.23 | 3.06 | 886.36 | Z |
| H73A | H73 | 878.44 | 877.42 | 59. | 8. | CP | 0.017 | 35 | 0 | 0.0035 | 0.0133 | 0.8922 | 0.01 | 0.94 | 1.47 | 3.95 | 885.59 | Z |
| H75 | H73 | 881.80 | 877.42 | 375. | 8. | CP | 0.012 | 39 | 0 | 0.0039 | 0.0148 | 0.7320 | 0.02 | 0.85 | 1.32 | 3.24 | 886.26 | Z |
| *AT MH H73 | | | | | | | | 206 | 0 | | | | | | | | | |
| H73 | H70 | 887.42 | 870.60 | 293. | 8. | CP | 0.057 | 206 | 0 | 0.0206 | 0.0783 | 1.6211 | 0.05 | 2.49 | 3.70 | 7.19 | 884.57 | |
| H72 | H70 | 872.56 | 870.60 | 380. | 8. | CP | 0.005 | 39 | 0 | 0.0039 | 0.0148 | 0.4859 | 0.03 | 0.65 | 0.99 | 2.15 | 879.51 | Z |
| H71 | H70 | 873.54 | 870.60 | 294. | 8. | CP | 0.010 | 31 | 0 | 0.0031 | 0.0118 | 0.6766 | 0.02 | 0.75 | 1.17 | 3.00 | 880.04 | Z |
| *AT MH H70 | | | | | | | | 276 | 0 | | | | | | | | | |
| H70 | J15A | 870.60 | 870.42 | 100. | 8. | CP | 0.002 | 276 | 0 | 0.0276 | 0.1049 | 0.2875 | 0.36 | 0.81 | 1.17 | 1.27 | 879.54 | Y |
| *AT MH J15A | | | | | | | | 696 | 50 | | | | | | | | | |
| J15A | J15 | 870.31 | 869.08 | 316. | 21. | CP | 0.004 | 696 | 50 | 0.0711 | 0.2702 | 5.5390 | 0.05 | 1.24 | 1.84 | 3.56 | 879.33 | |
| J15 | J14 | 869.08 | 867.19 | 408. | 21. | CP | 0.005 | 705 | 50 | 0.0720 | 0.2736 | 6.0405 | 0.05 | 1.32 | 1.97 | 3.89 | 874.74 | |
| J14 | J13 | 867.19 | 866.95 | 399. | 21. | CP | 0.001 | 736 | 50 | 0.0751 | 0.2854 | 2.1773 | 0.13 | 0.65 | 0.97 | 1.40 | 874.74 | Y |
| H68 | H67 | 891.00 | 883.22 | 259. | 8. | CP | 0.030 | 31 | 0 | 0.0031 | 0.0118 | 1.1720 | 0.01 | 1.08 | 1.72 | 5.19 | 896.36 | Z |
| H69 | H67 | 884.46 | 883.22 | 259. | 8. | CP | 0.005 | 22 | 0 | 0.0022 | 0.0084 | 0.4679 | 0.02 | 0.52 | 0.81 | 2.07 | 889.74 | Z |
| * AT MH H67 | | | | | | | | 53 | 0 | | | | | | | | | |
| H67 | H64 | 883.22 | 879.94 | 287. | 8. | CP | 0.011 | 53 | 0 | 0.0053 | 0.0201 | 0.7236 | 0.03 | 0.93 | 1.43 | 3.21 | 892.10 | Z |
| H65 | H64 | 879.90 | 876.54 | 359. | 8. | CP | 0.009 | 39 | 0 | 0.0039 | 0.0148 | 0.6545 | 0.02 | 0.79 | 1.22 | 2.90 | 884.80 | Z |
| H66 | H64 | 879.49 | 876.54 | 419. | 8. | CP | 0.007 | 39 | 0 | 0.0039 | 0.0148 | 0.5678 | 0.03 | 0.72 | 1.10 | 2.52 | 882.65 | Z |
| *AT MH H64 | | | | | | | | 131 | 0 | | | | | | | | | |
| H64 | H61 | 876.54 | 870.70 | 282. | 8. | CP | 0.021 | 131 | 0 | 0.0131 | 0.0498 | 0.9745 | 0.05 | 1.53 | 2.26 | 4.32 | 883.84 | |
| H62 | H61 | 871.96 | 870.70 | 371. | 8. | CP | 0.003 | 39 | 0 | 0.0039 | 0.0148 | 0.3943 | 0.04 | 0.56 | 0.84 | 1.75 | 875.23 | Z |
| H63 | H61 | 874.63 | 870.70 | 407. | 8. | CP | 0.010 | 39 | 0 | 0.0039 | 0.0148 | 0.6653 | 0.02 | 0.80 | 1.24 | 2.95 | 878.00 | Z |
| * AT MH H61 | | | | | | | | 209 | 0 | | | | | | | | | |
| H61 | J13 | 870.70 | 868.40 | 206. | 8. | CP | 0.011 | 209 | 0 | 0.0209 | 0.0794 | 0.7149 | 0.11 | 1.43 | 2.11 | 3.17 | 876.10 | |
| * AT MH J13 | | | | | | | | 945 | 50 | | | | | | | | | |
| J13 | J12 | 866.01 | 864.43 | 395. | 21. | CP | 0.004 | 1005 | 50 | 0.1020 | 0.3710 | 5.6115 | 0.07 | 1.39 | 2.04 | 3.61 | 872.55 | |
| H57 | H56 | 872.50 | 870.22 | 231. | 8. | CP | 0.010 | 47 | 0 | 0.0047 | 0.0179 | 0.6722 | 0.03 | 0.85 | 1.31 | 2.98 | 876.38 | Z |

| MANHOLES FROM MH ID | MANHOLES TO MH ID | INVERT ELEV FROM FT | INVERT ELEV TO FT | DIST FT | PIPE DIA IN | PIPE TYP | PIPE SLOPE FT/FT | POPULATION RES | POPULATION N-RES | RATE OF FLOW(MGD) AVERAGE QA | RATE OF FLOW(MGD) PEAK QP | RATE OF FLOW(MGD) CAPACITY QF | PIPE RATIO QP/QF | VELOCITY AVG FPS | VELOCITY PEAK FPS | VELOCITY CAP FPS | UPSTREAM MANHOLE RIM ELEV | COMMENTS NOTE | COMMENTS WARNING |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| H56 | H55 | 869.65 | 866.54 | 296. | 8. | CP | 0.010 | 47 | 0 | 0.0047 | 0.0179 | 0.6935 | 0.03 | 0.87 | 1.34 | 3.07 | 876.32 | | Z |
| H55 | J12 | 866.54 | 864.43 | 163. | 8. | CP | 0.013 | 47 | 0 | 0.0047 | 0.0179 | 0.7697 | 0.02 | 0.94 | 1.45 | 3.41 | 873.78 | | Z |
| *AT MH J12 | | | | | | | | 1099 | 50 | | | | | | | | | | |
| J12 | J12A | 864.43 | 863.37 | 228. | 21. | CP | 0.005 | 1052 | 50 | 0.1067 | 0.3880 | 6.0542 | 0.06 | 1.50 | 2.18 | 3.89 | 871.33 | | |
| J12A | J11 | 863.37 | 862.74 | 172. | 21. | CP | 0.004 | 1141 | 50 | 0.1156 | 0.4200 | 5.3753 | 0.08 | 1.40 | 2.06 | 3.46 | 870.07 | | |
| J11 | J10A | 862.74 | 862.13 | 50. | 21. | CP | 0.012 | 1178 | 50 | 0.1193 | 0.4333 | 9.8017 | 0.04 | 2.16 | 3.17 | 6.31 | 869.24 | | |
| H59 | H58 | 866.26 | 863.71 | 394. | 8. | CP | 0.006 | 44 | 0 | 0.0044 | 0.0167 | 0.5442 | 0.03 | 0.72 | 1.11 | 2.41 | 871.58 | | Z |
| H58 | J10A | 863.71 | 862.13 | 52. | 8. | CP | 0.030 | 70 | 0 | 0.0070 | 0.0266 | 1.1764 | 0.02 | 1.42 | 2.19 | 5.21 | 870.12 | | |
| *AT MH J10A | | | | | | | | 1248 | 50 | | | | | | | | | | |
| J10A | J10 | 862.13 | 861.34 | 276. | 21. | CP | 0.003 | 1248 | 50 | 0.1263 | 0.4585 | 4.7481 | 0.10 | 1.32 | 1.93 | 3.05 | 872.17 | B | |
| H50 | H49 | 904.68 | 903.10 | 135. | 8. | CP | 0.012 | 17 | 0 | 0.0017 | 0.0065 | 0.7313 | 0.01 | 0.65 | 1.03 | 3.24 | 910.03 | | Z |
| H49 | H48 | 900.15 | 898.10 | 195. | 8. | CP | 0.011 | 34 | 0 | 0.0034 | 0.0129 | 0.6936 | 0.02 | 0.78 | 1.22 | 3.07 | 909.90 | | Z |
| H48 | H47 | 895.96 | 893.87 | 173. | 8. | CP | 0.012 | 43 | 0 | 0.0043 | 0.0163 | 0.7441 | 0.02 | 0.89 | 1.38 | 3.30 | 906.26 | | Z |
| H47 | H46 | 892.24 | 888.27 | 181. | 8. | CP | 0.022 | 43 | 0 | 0.0043 | 0.0163 | 1.0022 | 0.02 | 1.09 | 1.70 | 4.44 | 900.37 | | Z |
| H46A | H46 | 891.76 | 889.47 | 229. | 8. | CP | 0.010 | 17 | 0 | 0.0017 | 0.0065 | 0.6770 | 0.01 | 0.62 | 0.98 | 3.00 | 892.63 | D | Z |
| H54 | H53 | 898.28 | 897.32 | 340. | 8. | CP | 0.003 | 31 | 0 | 0.0031 | 0.0118 | 0.3596 | 0.03 | 0.49 | 0.75 | 1.59 | 901.88 | | Z |
| H53 | H52 | 897.32 | 894.69 | 167. | 8. | CP | 0.016 | 44 | 0 | 0.0044 | 0.0167 | 0.8501 | 0.02 | 0.98 | 1.52 | 3.77 | 904.62 | | Z |
| H52 | H51 | 894.69 | 893.69 | 114. | 8. | CP | 0.009 | 53 | 0 | 0.0053 | 0.0201 | 0.6338 | 0.03 | 0.85 | 1.31 | 2.81 | 901.44 | | Z |
| H51 | H46 | 890.61 | 889.47 | 95. | 8. | CP | 0.012 | 53 | 0 | 0.0053 | 0.0201 | 0.7406 | 0.03 | 0.95 | 1.46 | 3.28 | 898.74 | | Z |
| * AT MH H46 | | | | | | | | 104 | 0 | | | | | | | | | | |
| H46 | H45 | 886.02 | 884.00 | 66. | 8. | CP | 0.030 | 104 | 0 | 0.0104 | 0.0395 | 1.1817 | 0.03 | 1.62 | 2.47 | 5.24 | 894.97 | | |
| H45 | H42 | 884.00 | 881.93 | 191. | 8. | CP | 0.011 | 108 | 0 | 0.0108 | 0.0410 | 0.7040 | 0.06 | 1.15 | 1.70 | 3.12 | 892.94 | | Z |
| H44 | H43 | 887.53 | 884.73 | 171. | 8. | CP | 0.016 | 22 | 0 | 0.0022 | 0.0084 | 0.8652 | 0.01 | 0.79 | 1.25 | 3.83 | 894.23 | | Z |
| H43 | H42 | 884.73 | 880.23 | 185. | 8. | CP | 0.024 | 31 | 0 | 0.0031 | 0.0118 | 1.0564 | 0.01 | 1.01 | 1.60 | 4.68 | 891.48 | | Z |
| *AT MH H42 | | | | | | | | 139 | 0 | | | | | | | | | | |
| H42 | H40 | 878.22 | 874.66 | 278. | 8. | CP | 0.013 | 139 | 0 | 0.0139 | 0.0528 | 0.7666 | 0.07 | 1.32 | 1.98 | 3.40 | 887.23 | | |
| H41 | H40 | 879.27 | 874.36 | 400. | 8. | CP | 0.012 | 31 | 0 | 0.0031 | 0.0118 | 0.7495 | 0.02 | 0.80 | 1.26 | 3.32 | 883.51 | | Z |
| H40A | H40 | 875.80 | 874.36 | 216. | 8. | CP | 0.007 | 22 | 0 | 0.0022 | 0.0084 | 0.5528 | 0.02 | 0.58 | 0.92 | 2.45 | 878.68 | | Z |
| *AT MH H40 | | | | | | | | 192 | 0 | | | | | | | | | | |
| H40 | H39 | 873.40 | 867.93 | 273. | 8. | CP | 0.020 | 200 | 0 | 0.0200 | 0.0760 | 0.9586 | 0.08 | 1.73 | 2.57 | 4.25 | 880.66 | | |
| H39 | H38A | 867.93 | 865.62 | 219. | 8. | CP | 0.011 | 222 | 0 | 0.0222 | 0.0844 | 0.6953 | 0.12 | 1.43 | 2.10 | 3.08 | 875.54 | | |
| H38A | H38 | 865.56 | 864.87 | 62. | 8. | CP | 0.011 | 222 | 0 | 0.0222 | 0.0844 | 0.7153 | 0.12 | 1.46 | 2.15 | 3.17 | 872.09 | | |
| H19 | H20 | 919.34 | 915.78 | 279. | 8. | VCP | 0.013 | 60 | 0 | 0.0060 | 0.0228 | 0.8827 | 0.03 | 1.11 | 1.71 | 3.91 | 925.34 | | Z |
| H20 | H21 | 915.78 | 910.82 | 282. | 8. | VCP | 0.018 | 90 | 0 | 0.0090 | 0.0342 | 1.0364 | 0.03 | 1.41 | 2.16 | 4.59 | 920.61 | | |
| H21 | H22 | 910.82 | 909.52 | 188. | 8. | VCP | 0.007 | 120 | 0 | 0.0120 | 0.0456 | 0.6500 | 0.07 | 1.13 | 1.68 | 2.88 | 916.48 | | Z |
| H22 | H27 | 905.42 | 903.52 | 126. | 8. | VCP | 0.015 | 120 | 0 | 0.0120 | 0.0456 | 0.9602 | 0.05 | 1.47 | 2.18 | 4.26 | 914.82 | | |
| H23 | H24 | 921.38 | 915.02 | 232. | 8. | VCP | 0.027 | 30 | 0 | 0.0030 | 0.0114 | 1.2934 | 0.01 | 1.15 | 1.82 | 5.73 | 926.62 | | Z |
| H24 | H25 | 915.02 | 908.03 | 292. | 8. | VCP | 0.024 | 60 | 0 | 0.0060 | 0.0228 | 1.2085 | 0.02 | 1.37 | 2.14 | 5.36 | 920.99 | | |
| H25 | H26 | 908.03 | 904.13 | 286. | 8. | VCP | 0.014 | 90 | 0 | 0.0090 | 0.0342 | 0.9112 | 0.04 | 1.29 | 1.93 | 4.04 | 912.45 | | |
| H26 | H27 | 904.13 | 903.52 | 193. | 8. | VCP | 0.003 | 120 | 0 | 0.0120 | 0.0456 | 0.4390 | 0.10 | 0.86 | 1.27 | 1.95 | 908.18 | | Z |
| *AT MH H27 | | | | | | | | 240 | 0 | | | | | | | | | | |
| H27 | H28 | 903.52 | 899.54 | 138. | 8. | VCP | 0.029 | 240 | 0 | 0.0240 | 0.0912 | 1.3274 | 0.07 | 2.29 | 3.42 | 5.88 | 908.17 | | |
| H28 | H31 | 899.54 | 891.39 | 305. | 8. | VCP | 0.027 | 240 | 0 | 0.0240 | 0.0912 | 1.2766 | 0.07 | 2.23 | 3.32 | 5.66 | 909.04 | | |
| H29 | H30 | 902.22 | 892.34 | 369. | 8. | VCP | 0.027 | 60 | 0 | 0.0060 | 0.0228 | 1.2785 | 0.02 | 1.43 | 2.22 | 5.67 | 908.22 | | |
| H30 | H31 | 892.34 | 891.39 | 237. | 8. | VCP | 0.004 | 90 | 0 | 0.0090 | 0.0342 | 0.4948 | 0.07 | 0.85 | 1.28 | 2.19 | 900.34 | | Z |
| *AT MH H31 | | | | | | | | 330 | 0 | | | | | | | | | | |

| MANHOLES FROM MH ID | MANHOLES TO MH ID | INVERT ELEV FROM FT | INVERT ELEV TO FT | DIST FT | PIPE DIA IN | PIPE TYP | PIPE SLOPE FT/FT | POPULATION RES | POPULATION N-RES | RATE OF FLOW(MGD) AVERAGE QA | RATE OF FLOW(MGD) PEAK QP | RATE OF FLOW(MGD) CAPACITY QF | PIPE RATIO QP/QF | VELOCITY AVG FPS | VELOCITY PEAK FPS | VELOCITY CAP FPS | UPSTREAM MANHOLE RIM ELEV | COMMENTS NOTE | WARNING |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| H31 | H33 | 891.39 | 888.44 | 220. | 8. | VCP | 0.013 | 360 | 0 | 0.0360 | 0.1368 | 0.9034 | 0.15 | 1.95 | 2.90 | 4.00 | 901.64 | | |
| H32 | H33 | 892.42 | 886.34 | 361. | 8. | VCP | 0.017 | 60 | 0 | 0.0060 | 0.0228 | 1.0138 | 0.02 | 1.22 | 1.89 | 4.49 | 900.17 | | |
| *AT MH H33 | | | | | | | | 420 | 0 | | | | | | | | | | |
| H33 | H34 | 886.29 | 883.36 | 400. | 10. | VCP | 0.007 | 420 | 0 | 0.0420 | 0.1596 | 1.2125 | 0.13 | 1.61 | 2.40 | 3.44 | 894.09 | | |
| H34C | H34A | 887.28 | 885.46 | 149. | 8. | CP | 0.012 | 75 | 0 | 0.0075 | 0.0285 | 0.7474 | 0.04 | 1.07 | 1.59 | 3.31 | 891.09 | | Z |
| H34A | H34B | 885.46 | 884.05 | 88. | 8. | CP | 0.016 | 150 | 0 | 0.0150 | 0.0570 | 0.8565 | 0.07 | 1.46 | 2.19 | 3.80 | 890.03 | | |
| H34B | H34 | 884.05 | 883.36 | 65. | 8. | CP | 0.011 | 225 | 0 | 0.0225 | 0.0855 | 0.6986 | 0.12 | 1.44 | 2.12 | 3.10 | 889.66 | | |
| *AT MH H34 | | | | | | | | 645 | 0 | | | | | | | | | | |
| H34 | H35 | 882.89 | 879.33 | 276. | 10. | VCP | 0.013 | 645 | 0 | 0.0645 | 0.2451 | 1.6068 | 0.15 | 2.22 | 3.31 | 4.56 | 887.61 | | |
| H35 | H36A | 879.69 | 874.69 | 364. | 10. | VCP | 0.014 | 645 | 0 | 0.0645 | 0.2451 | 1.6600 | 0.15 | 2.27 | 3.39 | 4.71 | 885.09 | | |
| H36B | H36A | 878.36 | 874.69 | 287. | 8. | CP | 0.013 | 45 | 0 | 0.0045 | 0.0171 | 0.7652 | 0.02 | 0.92 | 1.42 | 3.39 | 884.56 | 85-1 | Z |
| H36G | H36F | 896.72 | 885.26 | 401. | 8. | CP | 0.029 | 50 | 0 | 0.0050 | 0.0190 | 1.1441 | 0.02 | 1.25 | 1.95 | 5.07 | 905.39 | 4-1 | |
| H36F | H36E | 885.26 | 883.55 | 155. | 8. | CP | 0.011 | 75 | 0 | 0.0075 | 0.0285 | 0.7101 | 0.04 | 1.03 | 1.54 | 3.15 | 892.46 | 5-3 | Z |
| H36E | H36D | 883.55 | 880.19 | 400. | 8. | CP | 0.008 | 100 | 0 | 0.0100 | 0.0380 | 0.6200 | 0.06 | 1.03 | 1.52 | 2.75 | 891.16 | 5-2 | Z |
| H36D | H36C | 880.19 | 878.43 | 208. | 8. | CP | 0.008 | 125 | 0 | 0.0125 | 0.0475 | 0.6223 | 0.08 | 1.11 | 1.65 | 2.76 | 888.22 | 5-1 | Z |
| H36C | H36A | 878.43 | 874.69 | 269. | 8. | CP | 0.014 | 150 | 0 | 0.0150 | 0.0570 | 0.7987 | 0.07 | 1.39 | 2.08 | 3.54 | 885.99 | S5-2 | |
| *AT MH H36A | | | | | | | | 840 | 0 | | | | | | | | | | |
| H36A | H37 | 874.69 | 867.82 | 547. | 10. | VCP | 0.013 | 840 | 0 | 0.0840 | 0.3192 | 1.5866 | 0.20 | 2.38 | 3.52 | 4.50 | 882.21 | S5-1A | |
| H37 | H38 | 867.82 | 864.87 | 467. | 10. | VCP | 0.006 | 840 | 0 | 0.0840 | 0.3192 | 1.1251 | 0.28 | 1.87 | 2.75 | 3.19 | 875.19 | | |
| *AT MH H38 | | | | | | | | 1062 | 0 | | | | | | | | | | |
| H38 | J10 | 864.87 | 861.34 | 369. | 10. | VCP | 0.010 | 1062 | 0 | 0.1062 | 0.3861 | 1.3851 | 0.28 | 2.32 | 3.37 | 3.93 | 871.17 | | |
| *AT MH J10 | | | | | | | | 2310 | 50 | | | | | | | | | | |
| J10 | J9 | 861.31 | 860.58 | 398. | 21. | CP | 0.002 | 2310 | 50 | 0.2325 | 0.8368 | 3.7995 | 0.22 | 1.35 | 1.96 | 2.44 | 867.61 | | |
| J9 | J8 | 860.58 | 857.98 | 394. | 21. | CP | 0.007 | 2310 | 50 | 0.2325 | 0.8368 | 7.2071 | 0.12 | 2.12 | 3.10 | 4.64 | 863.98 | | |
| J8 | J7 | 857.98 | 857.00 | 388. | 21. | CP | 0.003 | 2310 | 50 | 0.2325 | 0.8368 | 4.4619 | 0.19 | 1.51 | 2.20 | 2.87 | 865.36 | | |
| J7 | R29 | 856.50 | 855.61 | 23. | 21. | CP | 0.038 | 2310 | 50 | 0.2325 | 0.837 | 17.2937 | 0.05 | 3.93 | 5.74 | 11.12 | 866.70 | D | |

* FLOW FROM AREA 12 ENTERS AREA 13 AT MANHOLE R-29.

| | | | | |
|---|---|---|---|---|
| * AT MH R-29 | | 2310 | 50 | (AREA 12) |
| * | 28097 | 4205 | 2941 | (AREA 13) |
| * | 45428 | | | |
| * | 73525 | 6515 | 2991 | (TOTAL) |

*
*
*

TOTAL NUMBER OF REACHES BELOW 1.2 FPS = 54.
TOTAL NUMBER OF ADVERSE REACHES = 0.
TOTAL NUMBER OF REACHES EXCEEDING PIPE CAPACITY = 0.
TOTAL NUMBER OF REACHES WHICH HAVE FULL PIPE VELOCITIES BELOW 1.5 FPS= 2.
H70 J15A
J14 J13

TOTAL NUMBER OF REACHES = 109.

## SUBAREA 13

Subarea 13 comprises the eastern portion of the Chaffee Village family housing development along with the military barracks and support facilities between Hood Road and 27th Street. Flow from this region enters Subarea 14 at manhole R-24.

Average flow velocities below the specified minimum 1.2 FPS occur in 79 of the 180 reaches. Nearly 90% of these are concrete pipe. Seven also show full pipe velocities less than the minimum required 1.5 FPS.

Field personnel noted standing sewage and/or surcharging in manholes B7-1B, B7-6, B7-6A, and B7-6B. Periodic inspection of these areas is recommended to insure proper flow. The analysis indicates that all have average flow velocities below the specified minimum, but replacement of the lines is not considered feasible.

No reconstruction of sewer lines within Subarea 13 is required unless television inspection indicates significant pipe deterioration. However, the following problems need attention:

| | | |
|---|---|---|
| MH B7-6 | --- Broken rim replaced | $ 150.00 |
| MH B-11A | --- Deteriorated concrete collar replaced | 150.00 |
| MH R-28A25 | --- Below grade; should be raised approximately 2'. | 200.00 |
| | | $ 500.00 |

AREA 13,AS DEFINED BY THE SANITARY SEWER ANALYSIS, COMPLETED BY BOHANNAN-HUSTON, INC., SEPTEMBER 1984.

COMMENT COLUMN "NOTES"
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EXCEPT AS NOTED:
> ELEVATIONS WERE OBTAINED THROUGH FIELD SURVEYS
> DISTANCES WERE GENERATED FROM COMPUTER PLOTS

A = INVERT BASED ON REPORT BY FREESE & NICHOLS (4/78)
B = DISTANCE BETWEEN MANHOLES IS SCALED
C = INVERT BASED ON "AS-BUILT" DRAWINGS
D = INVERT BASED ON TOPOGRAPHY & ADJACENT MANHOLE DATA
NA = NOT AVAILABLE
NF = NOT FOUND

FORMER MANHOLE IDENTIFICATION NUMBERS ALSO APPEAR IN THE COMMENT COLUMN UNDER "NOTES"

COMMENT COLUMN "WARNINGS"
**********

W = ZERO OR ADVERSE SLOPE PRESENT
(PEAK FLOW MAY EXCEED PIPE CAPACITY)
X = PEAK FLOW EXCEEDS PIPE CAPACITY
(LOW VELOCITIES MAY BE PRESENT)
Y = FULL PIPE VELOCITY BELOW 1.5 FPS
(AVERAGE VELOCITY MAY ALSO BE LOW)
Z = AVERAGE VELOCITY BELOW 1.2 FPS

| MANHOLES FROM MH ID | MANHOLES TO MH ID | INVERT ELEV FROM FT | INVERT ELEV TO FT | DIST FT | PIPE DIA IN | PIPE TYP | PIPE SLOPE FT/FT | POPULATION RES | POPULATION N-RES | RATE OF FLOW(MGD) AVERAGE QA | RATE OF FLOW(MGD) PEAK QP | RATE OF FLOW(MGD) CAPACITY QF | PIPE RATIO QP/QF | VELOCITY AVG FPS | VELOCITY PEAK FPS | VELOCITY CAP FPS | UPSTREAM MANHOLE RIM ELEV | COMMENTS NOTE | COMMENTS WARNING |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| B27D | B25B | 948.22 | 939.89 | 391. | 6. | VCP | 0.021 | 0 | 150 | 0.0045 | 0.0171 | 0.5291 | 0.03 | 1.27 | 1.95 | 4.17 | 951.62 | | |
| B25C | B25B | 941.14 | 939.74 | 197. | 6. | CP | 0.007 | 172 | 0 | 0.0172 | 0.0654 | 0.2648 | 0.25 | 1.17 | 1.72 | 2.09 | 944.17 | | Z |
| *AT MH B25B | | | | | | | | 172 | 150 | | | | | | | | | | |
| B25B | B25A | 939.27 | 937.75 | 166. | 8. | CP | 0.009 | 172 | 150 | 0.0217 | 0.0825 | 0.6472 | 0.13 | 1.35 | 1.98 | 2.87 | 944.49 | | |
| B27C | B25A | 943.93 | 938.70 | 359. | 6. | VCP | 0.015 | 164 | 0 | 0.0164 | 0.0623 | 0.4379 | 0.14 | 1.69 | 2.46 | 3.45 | 947.61 | | |
| *AT MH B25A | | | | | | | | 336 | 150 | | | | | | | | | | |
| B25A | B25D | 937.75 | 936.97 | 167. | 8. | CP | 0.005 | 336 | 150 | 0.0381 | 0.1448 | 0.4623 | 0.31 | 1.24 | 1.81 | 2.05 | 943.40 | | |
| B27B | B25D | 942.80 | 937.23 | 361. | 6. | VCP | 0.015 | 145 | 0 | 0.0145 | 0.0551 | 0.4506 | 0.12 | 1.65 | 2.43 | 3.55 | 946.80 | | |
| *AT MH B25D | | | | | | | | 481 | 150 | | | | | | | | | | |
| B25D | B25 | 936.94 | 936.75 | 50. | 8. | CP | 0.004 | 481 | 150 | 0.0526 | 0.1999 | 0.4172 | 0.48 | 1.27 | 1.83 | 1.85 | 942.46 | B | |
| B25 | B24C | 936.75 | 936.13 | 222. | 8. | CP | 0.003 | 481 | 150 | 0.0526 | 0.1999 | 0.3574 | 0.56 | 1.13 | 1.62 | 1.58 | NF | D | Z |
| B24C | B24B | 936.13 | 935.87 | 62. | 8. | VCP | 0.004 | 481 | 150 | 0.0526 | 0.1999 | 0.5057 | 0.40 | 1.45 | 2.11 | 2.24 | 941.76 | B | |
| B24B | B24A | 935.87 | 934.07 | 196. | 8. | VCP | 0.009 | 481 | 200 | 0.0541 | 0.2056 | 0.7476 | 0.27 | 1.93 | 2.81 | 3.31 | 941.67 | | |
| B27A | B27 | 940.11 | 938.39 | 228. | 8. | CP | 0.008 | 0 | 100 | 0.0030 | 0.0114 | 0.5885 | 0.02 | 0.67 | 1.05 | 2.61 | 945.11 | B | Z |
| B27 | B24 | 938.34 | 934.91 | 334. | 8. | CP | 0.010 | 0 | 115 | 0.0035 | 0.0131 | 0.6859 | 0.02 | 0.78 | 1.22 | 3.04 | 943.99 | B | Z |
| B24 | B24A | 934.91 | 934.01 | 38. | 8. | CP | 0.023 | 0 | 115 | 0.0035 | 0.0131 | 1.0362 | 0.01 | 1.03 | 1.63 | 4.59 | 942.65 | | Z |
| *AT MH 24A | | | | | | | | 481 | 315 | | | | | | | | | | |
| B24A | B21 | 933.97 | 927.16 | 335. | 8. | CP | 0.020 | 481 | 330 | 0.0580 | 0.2204 | 0.9649 | 0.23 | 2.35 | 3.46 | 4.28 | 940.40 | | |
| B22E | B22D | 933.97 | 931.42 | 254. | 6. | VCP | 0.010 | 203 | 0 | 0.0203 | 0.0771 | 0.3634 | 0.21 | 1.54 | 2.27 | 2.86 | 937.37 | | |
| B22D | B22C | 931.42 | 930.49 | 166. | 8. | VCP | 0.006 | 203 | 0 | 0.0203 | 0.0771 | 0.5852 | 0.13 | 1.24 | 1.81 | 2.59 | 937.50 | | |
| B22C | B22A | 930.49 | 930.27 | 56. | 8. | VCP | 0.004 | 203 | 0 | 0.0203 | 0.0771 | 0.4908 | 0.16 | 1.07 | 1.59 | 2.18 | 935.87 | | Z |
| B22B | B22A | 933.07 | 930.05 | 198. | 6. | VCP | 0.015 | 163 | 0 | 0.0163 | 0.0619 | 0.4474 | 0.14 | 1.71 | 2.49 | 3.53 | 936.62 | | |
| *AT MH B22A | | | | | | | | 366 | 0 | | | | | | | | | | |
| B22A | B22 | 930.05 | 929.50 | 60. | 8. | CP | 0.009 | 366 | 0 | 0.0366 | 0.1391 | 0.6480 | 0.21 | 1.55 | 2.29 | 2.87 | 936.79 | B/D | |
| B22 | B21A | 929.50 | 926.52 | 214. | 8. | CP | 0.014 | 366 | 0 | 0.0366 | 0.1391 | 0.7996 | 0.17 | 1.80 | 2.67 | 3.54 | NF | A | |
| B21B | B21A | 932.30 | 928.52 | 203. | 6. | VCP | 0.019 | 0 | 100 | 0.0030 | 0.0114 | 0.4944 | 0.02 | 1.07 | 1.65 | 3.90 | 935.70 | | Z |
| *AT MH B21A | | | | | | | | 366 | 100 | | | | | | | | | | |

| MANHOLES FROM MH ID | MANHOLES TO MH ID | INVERT ELEV FROM FT | INVERT ELEV TO FT | DIST FT | PIPE DIA IN | PIPE TYP | PIPE SLOPE FT/FT | POPULATION RES | POPULATION N-RES | RATE OF FLOW(MGD) AVERAGE QA | RATE OF FLOW(MGD) PEAK QP | RATE OF FLOW(MGD) CAPACITY QF | PIPE RATIO QP/QF | VELOCITY AVG FPS | VELOCITY PEAK FPS | VELOCITY CAP FPS | UPSTREAM MANHOLE RIM ELEV | COMMENTS NOTE | COMMENTS WARNING |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| B21A | B21 | 928.52 | 927.31 | 241. | 8. | CP | 0.005 | 366 | 150 | 0.0411 | 0.1562 | 0.4797 | 0.33 | 1.30 | 1.90 | 2.13 | 934.62 | | |
| *AT MH B21 | | | | | | | | 847 | 480 | | | | | | | | | | |
| B21 | B20 | 927.15 | 925.12 | 170. | 8. | CP | 0.012 | 847 | 495 | 0.0996 | 0.3783 | 0.7400 | 0.51 | 2.29 | 3.29 | 3.28 | 932.99 | | |
| B20 | B19 | 925.12 | 918.24 | 449. | 8. | CP | 0.015 | 847 | 495 | 0.0996 | 0.3783 | 0.8382 | 0.45 | 2.50 | 3.61 | 3.72 | 931.47 | | |
| B19 | B17 | 918.49 | 916.02 | 352. | 8. | CP | 0.007 | 847 | 495 | 0.0996 | 0.3783 | 0.5668 | 0.67 | 1.89 | 2.69 | 2.51 | 924.05 | | |
| B18 | B17 | 928.06 | 916.20 | 632. | 8. | CP | 0.019 | 0 | 52 | 0.0016 | 0.0059 | 0.9273 | 0.01 | 0.74 | 1.19 | 4.11 | 934.28 | | Z |
| B17F | B17D | 922.10 | 921.37 | 235. | 8. | CP | 0.003 | 0 | 15 | 0.0005 | 0.0017 | 0.3773 | 0.00 | 0.27 | 0.44 | 1.67 | 927.98 | H-1A | Z |
| B17E | B17D | 926.00 | 921.37 | 262. | 8. | CP | 0.018 | 32 | 0 | 0.0032 | 0.0122 | 0.8995 | 0.01 | 0.92 | 1.44 | 3.99 | 929.57 | H-2 | Z |
| B17D | B17C | 921.37 | 919.00 | 140. | 8. | CP | 0.017 | 63 | 15 | 0.0068 | 0.0257 | 0.8802 | 0.03 | 1.15 | 1.77 | 3.90 | 926.45 | H-1C | Z |
| B17C | B17A | 919.00 | 916.52 | 161. | 8. | CP | 0.015 | 63 | 15 | 0.0068 | 0.0257 | 0.8408 | 0.03 | 1.12 | 1.71 | 3.73 | 924.21 | H-1 | Z |
| B17B | B17A | 917.36 | 916.52 | 342. | 8. | CP | 0.002 | 63 | 0 | 0.0063 | 0.0239 | 0.3355 | 0.07 | 0.58 | 0.87 | 1.49 | 922.61 | | Y |
| B17A | B17 | 916.52 | 916.40 | 91. | 8. | CP | 0.001 | 126 | 15 | 0.0131 | 0.0496 | 0.2458 | 0.20 | 0.58 | 0.85 | 1.09 | 922.60 | D | Y |
| *AT MH B17 | | | | | | | | 973 | 562 | | | | | | | | | | |
| B17 | B16 | 915.99 | 914.57 | 348. | 10. | CP | 0.004 | 973 | 623 | 0.1160 | 0.4214 | 0.7836 | 0.54 | 1.59 | 2.26 | 2.22 | 919.33 | | |
| B16 | B15 | 914.57 | 912.88 | 400. | 10. | CP | 0.004 | 994 | 658 | 0.1191 | 0.4327 | 0.7977 | 0.54 | 1.63 | 2.31 | 2.26 | 921.64 | B | |
| B15D | B15C | 916.73 | 915.84 | 177. | 4. | VCP | 0.005 | 0 | 35 | 0.0011 | 0.0040 | 0.0872 | 0.05 | 0.53 | 0.80 | 1.55 | 918.00 | D | Z |
| B15C | B15B | 915.84 | 914.88 | 177. | 6. | CP | 0.005 | 0 | 35 | 0.0011 | 0.0040 | 0.2314 | 0.02 | 0.45 | 0.71 | 1.82 | 917.49 | | Z |
| B15B | B15A | 914.88 | 914.65 | 227. | 8. | CP | 0.001 | 0 | 35 | 0.0011 | 0.0040 | 0.2154 | 0.02 | 0.24 | 0.38 | 0.95 | 920.63 | | Y |
| B15A | B15 | 914.65 | 912.88 | 227. | 8. | CP | 0.008 | 0 | 35 | 0.0011 | 0.0040 | 0.5974 | 0.01 | 0.48 | 0.78 | 2.65 | 920.08 | | Z |
| *AT MH B15 | | | | | | | | 994 | 693 | | | | | | | | | | |
| B15 | B14 | 912.88 | 911.14 | 413. | 10. | CP | 0.004 | 994 | 723 | 0.1211 | 0.4398 | 0.7961 | 0.55 | 1.63 | 2.31 | 2.26 | 923.94 | | |
| B14 | B12 | 911.14 | 898.17 | 386. | 10. | CP | 0.034 | 994 | 815 | 0.1239 | 0.4497 | 2.2481 | 0.20 | 3.42 | 4.98 | 6.38 | 914.61 | | |
| B13 | B12 | 905.65 | 898.17 | 351. | 8. | CP | 0.021 | 0 | 5 | 0.0002 | 0.0006 | 0.9875 | 0.00 | 0.36 | 0.61 | 4.38 | 911.90 | | Z |
| * AT MH B12 | | | | | | | | 994 | 820 | | | | | | | | | | |
| B12 | B11D | 898.17 | 883.73 | 550. | 10. | VCP | 0.026 | 994 | 820 | 0.1240 | 0.4502 | 2.2934 | 0.20 | 3.47 | 5.06 | 6.51 | 906.27 | | |
| B11D | B11 | 882.99 | 882.63 | 31. | 10. | VCP | 0.012 | 994 | 820 | 0.1240 | 0.4502 | 1.5308 | 0.29 | 2.61 | 3.77 | 4.34 | 890.48 | | |
| * | | | | | | | | | | | | | | | | | | | |
| * | | | | | | | | | | | | | | | | | | | |
| B72 | B71 | 927.23 | 926.05 | 339. | 8. | CP | 0.003 | 0 | 20 | 0.0006 | 0.0023 | 0.3993 | 0.01 | 0.31 | 0.49 | 1.77 | 932.93 | | Z |
| B71 | B70A | 925.97 | 925.40 | 126. | 8. | CP | 0.005 | 0 | 20 | 0.0006 | 0.0023 | 0.4548 | 0.01 | 0.33 | 0.54 | 2.02 | 933.57 | | Z |
| B70A | B70 | 925.40 | 924.51 | 213. | 8. | CP | 0.004 | 0 | 33 | 0.0010 | 0.0038 | 0.4375 | 0.01 | 0.38 | 0.61 | 1.94 | 932.30 | B | Z |
| B70 | B69 | 924.51 | 923.27 | 340. | 8. | CP | 0.004 | 0 | 133 | 0.0040 | 0.0152 | 0.4090 | 0.04 | 0.58 | 0.86 | 1.81 | 931.93 | | Z |
| B69 | B65 | 923.27 | 917.71 | 368. | 8. | CP | 0.015 | 0 | 283 | 0.0085 | 0.0323 | 0.8323 | 0.04 | 1.19 | 1.78 | 3.69 | 932.47 | | Z |
| B68 | B67 | 927.48 | 923.64 | 340. | 8. | CP | 0.011 | 0 | 15 | 0.0005 | 0.0017 | 0.7189 | 0.00 | 0.41 | 0.68 | 3.19 | 933.08 | | Z |
| B67 | B66A | 923.64 | 920.35 | 222. | 8. | CP | 0.015 | 163 | 15 | 0.0168 | 0.0637 | 0.8246 | 0.08 | 1.47 | 2.20 | 3.66 | 926.69 | | |
| B66B | B66A | 921.05 | 920.44 | 169. | 6. | VCP | 0.004 | 155 | 0 | 0.0155 | 0.0589 | 0.2175 | 0.27 | 0.99 | 1.45 | 1.71 | 925.35 | | Z |
| *AT MH B66A | | | | | | | | 318 | 15 | | | | | | | | | | |
| B66A | B66 | 920.39 | 919.35 | 118. | 8. | CP | 0.009 | 318 | 15 | 0.0323 | 0.1226 | 0.6357 | 0.19 | 1.47 | 2.18 | 2.82 | 924.59 | | Z |
| B66 | B65 | 919.35 | 917.73 | 337. | 8. | CP | 0.005 | 318 | 15 | 0.0323 | 0.1226 | 0.4690 | 0.26 | 1.19 | 1.74 | 2.08 | 924.70 | | |
| *AT MH B65 | | | | | | | | 318 | 298 | | | | | | | | | | |
| B65 | B61 | 917.71 | 912.44 | 387. | 8. | CP | 0.014 | 318 | 298 | 0.0407 | 0.1548 | 0.7899 | 0.20 | 1.84 | 2.72 | 3.50 | 926.38 | | |
| B64 | B63 | 923.45 | 917.74 | 337. | 8. | CP | 0.017 | 0 | 10 | 0.0003 | 0.0011 | 0.8805 | 0.00 | 0.41 | 0.70 | 3.90 | 929.18 | | Z |
| B63 | B62 | 917.74 | 913.64 | 342. | 8. | CP | 0.012 | 0 | 10 | 0.0003 | 0.0011 | 0.7410 | 0.00 | 0.37 | 0.62 | 3.28 | 920.56 | | Z |

| MANHOLES FROM MH ID | MANHOLES TO MH ID | INVERT ELEV FROM FT | INVERT ELEV TO FT | DIST FT | PIPE DIA IN | PIPE TYP | PIPE SLOPE FT/FT | POPULATION RES | POPULATION N-RES | RATE OF FLOW(MGD) AVERAGE QA | RATE OF FLOW(MGD) PEAK QP | RATE OF FLOW(MGD) CAPACITY QF | PIPE RATIO QP/QF | VELOCITY AVG FPS | VELOCITY PEAK FPS | VELOCITY CAP FPS | UPSTREAM MANHOLE RIM ELEV | COMMENTS NOTE | COMMENTS WARNING |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| B62 | B61 | 913.64 | 912.44 | 333. | 8. | CP | 0.004 | 0 | 10 | 0.0003 | 0.0011 | 0.4064 | 0.00 | 0.25 | 0.41 | 1.80 | 919.83 | | Z |
| B84 | B81 | 945.02 | 940.70 | 303. | 8. | CP | 0.014 | 0 | 100 | 0.0030 | 0.0114 | 0.8082 | 0.01 | 0.84 | 1.31 | 3.58 | 951.32 | B | Z |
| B81 | B81A | 940.50 | 934.95 | 285. | 8. | CP | 0.019 | 0 | 200 | 0.0060 | 0.0228 | 0.9440 | 0.02 | 1.16 | 1.80 | 4.14 | 945.80 | | Z |
| B81A | B77 | 934.95 | 929.68 | 283. | 8. | VCP | 0.019 | 0 | 200 | 0.0060 | 0.0228 | 1.0657 | 0.02 | 1.26 | 1.96 | 4.72 | 942.35 | | |
| B77A | B77 | 930.96 | 929.76 | 169. | 8. | CP | 0.007 | 0 | 100 | 0.0030 | 0.0114 | 0.5710 | 0.02 | 0.66 | 1.03 | 2.53 | 938.61 | | Z |
| *AT MH B77 | | | | | | | | 0 | 300 | | | | | | | | | | |
| B77 | B76 | 929.68 | 921.77 | 442. | 8. | VCP | 0.018 | 0 | 300 | 0.0090 | 0.0342 | 1.0447 | 0.03 | 1.42 | 2.17 | 4.63 | 933.79 | B | |
| B76 | B73A | 921.77 | 920.52 | 193. | 8. | CP | 0.006 | 0 | 400 | 0.0120 | 0.0456 | 0.5451 | 0.08 | 1.00 | 1.48 | 2.42 | 928.19 | | Z |
| B73A | B73 | 920.52 | 919.10 | 257. | 8. | CP | 0.006 | 0 | 400 | 0.0120 | 0.0456 | 0.5029 | 0.09 | 0.95 | 1.40 | 2.23 | 925.19 | | Z |
| B73B | B73 | 920.17 | 919.55 | 168. | 8. | CP | 0.004 | 0 | 100 | 0.0030 | 0.0114 | 0.4108 | 0.03 | 0.53 | 0.81 | 1.82 | 926.27 | | Z |
| *AT MH B73 | | | | | | | | 0 | 500 | | | | | | | | | | |
| B73 | B61 | 919.00 | 912.34 | 286. | 8. | CP | 0.023 | 0 | 500 | 0.0150 | 0.0570 | 1.0329 | 0.06 | 1.66 | 2.46 | 4.58 | 922.90 | | |
| *AT MH B61 | | | | | | | | 318 | 808 | | | | | | | | | | |
| B61 | B59 | 912.24 | 910.48 | 227. | 8. | CP | 0.008 | 318 | 808 | 0.0560 | 0.2130 | 0.5953 | 0.36 | 1.66 | 2.42 | 2.64 | 921.04 | | |
| B59 | B58A | 910.48 | 908.57 | 263. | 8. | CP | 0.007 | 318 | 808 | 0.0560 | 0.2130 | 0.5769 | 0.37 | 1.62 | 2.36 | 2.56 | 919.78 | | |
| B58A | B58 | 907.57 | 905.22 | 190. | 8. | CP | 0.012 | 318 | 958 | 0.0605 | 0.2301 | 0.7525 | 0.31 | 2.00 | 2.93 | 3.34 | 917.17 | | |
| B58 | B57A | 905.22 | 902.39 | 193. | 8. | CP | 0.015 | 318 | 958 | 0.0605 | 0.2301 | 0.8196 | 0.28 | 2.12 | 3.10 | 3.63 | 913.23 | | |
| B57B | B57A | 904.95 | 902.79 | 271. | 6. | CP | 0.008 | 138 | 0 | 0.0138 | 0.0524 | 0.2806 | 0.19 | 1.15 | 1.70 | 2.21 | 908.85 | | Z |
| *AT MH B57A | | | | | | | | 456 | 958 | | | | | | | | | | |
| B57A | B57 | 902.29 | 901.00 | 116. | 8. | CP | 0.011 | 456 | 958 | 0.0743 | 0.2825 | 0.7139 | 0.40 | 2.05 | 2.98 | 3.16 | 911.29 | | |
| B57 | B55 | 900.65 | 899.61 | 166. | 10. | CP | 0.006 | 574 | 958 | 0.0861 | 0.3273 | 0.9722 | 0.34 | 1.70 | 2.49 | 2.78 | 911.10 | | |
| B54B | B54 | 906.45 | 905.81 | 100. | 8. | CP | 0.006 | 167 | 0 | 0.0167 | 0.0635 | 0.5406 | 0.12 | 1.10 | 1.62 | 2.40 | 917.77 | | Z |
| B54C | B54A | 909.98 | 905.83 | 294. | 8. | CP | 0.014 | 159 | 0 | 0.0159 | 0.0604 | 0.8046 | 0.08 | 1.43 | 2.13 | 3.57 | 916.11 | | |
| B54A | B54 | 905.83 | 905.81 | 40. | 8. | CP | 0.001 | 326 | 0 | 0.0326 | 0.1239 | 0.1520 | 0.81 | 0.54 | 0.75 | 0.67 | 916.43 | | Y |
| B54 | B55 | 905.81 | 899.61 | 425. | 8. | CP | 0.015 | 326 | 0 | 0.0326 | 0.1239 | 0.8178 | 0.15 | 1.76 | 2.63 | 3.63 | 917.27 | | |
| * AT MH B55 | | | | | | | | 968 | 958 | | | | | | | | | | |
| B55 | B56 | 899.61 | 897.41 | 301. | 10. | CP | 0.007 | 968 | 958 | 0.1255 | 0.4558 | 1.0496 | 0.43 | 2.01 | 2.87 | 2.98 | 911.31 | | |
| B56 | B56A | 897.41 | 895.41 | 327. | 10. | CP | 0.006 | 1162 | 958 | 0.1449 | 0.5254 | 0.9599 | 0.55 | 1.96 | 2.78 | 2.72 | 905.66 | | |
| B45H | B45G | 920.59 | 917.23 | 405. | 8. | CP | 0.008 | 0 | 50 | 0.0015 | 0.0057 | 0.6168 | 0.01 | 0.56 | 0.88 | 2.73 | 925.81 | | Z |
| B45G | B45F | 917.23 | 914.63 | 357. | 8. | CP | 0.007 | 0 | 50 | 0.0015 | 0.0057 | 0.5777 | 0.01 | 0.53 | 0.84 | 2.56 | 922.00 | | Z |
| B45F | B45E | 914.63 | 912.17 | 344. | 8. | CP | 0.007 | 0 | 50 | 0.0015 | 0.0057 | 0.5724 | 0.01 | 0.53 | 0.84 | 2.54 | 919.47 | B | Z |
| B45E | B45D | 912.17 | 911.38 | 134. | 8. | CP | 0.006 | 0 | 50 | 0.0015 | 0.0057 | 0.5198 | 0.01 | 0.49 | 0.78 | 2.30 | 917.95 | | Z |
| B45D | B45C | 911.38 | 909.76 | 313. | 8. | CP | 0.005 | 0 | 50 | 0.0015 | 0.0057 | 0.4869 | 0.01 | 0.47 | 0.75 | 2.16 | 916.88 | | Z |
| B45C | B45B | 909.76 | 908.16 | 311. | 8. | CP | 0.005 | 0 | 50 | 0.0015 | 0.0057 | 0.4851 | 0.01 | 0.47 | 0.75 | 2.15 | 917.56 | | Z |
| B45B | B45A | 908.16 | 906.78 | 326. | 8. | CP | 0.004 | 0 | 50 | 0.0015 | 0.0057 | 0.4403 | 0.01 | 0.44 | 0.70 | 1.95 | 917.01 | | Z |
| B45A | B45 | 906.78 | 905.35 | 272. | 8. | CP | 0.005 | 0 | 50 | 0.0015 | 0.0057 | 0.4905 | 0.01 | 0.48 | 0.75 | 2.17 | 913.78 | | Z |
| B45I | B45 | 908.70 | 905.84 | 264. | 8. | CP | 0.011 | 0 | 100 | 0.0030 | 0.0114 | 0.7042 | 0.02 | 0.76 | 1.19 | 3.12 | 913.28 | | Z |
| B50A | B50 | 913.24 | 910.74 | 155. | 8. | VCP | 0.016 | 0 | 20 | 0.0006 | 0.0023 | 0.9908 | 0.00 | 0.56 | 0.93 | 4.39 | 918.02 | | Z |
| B50 | B45 | 910.74 | 905.44 | 574. | 8. | CP | 0.009 | 0 | 100 | 0.0030 | 0.0114 | 0.6505 | 0.02 | 0.72 | 1.13 | 2.88 | 916.03 | | Z |
| B47 | B46 | 911.15 | 907.07 | 263. | 8. | CP | 0.016 | 0 | 100 | 0.0030 | 0.0114 | 0.8436 | 0.01 | 0.86 | 1.35 | 3.74 | 916.81 | | Z |
| B46 | B45 | 907.07 | 905.44 | 316. | 8. | CP | 0.005 | 0 | 100 | 0.0030 | 0.0114 | 0.4863 | 0.02 | 0.59 | 0.92 | 2.16 | 912.59 | | Z |
| *AT MH B45 | | | | | | | | 0 | 250 | | | | | | | | | | |
| B45 | B44A | 905.04 | 903.43 | 308. | 8. | CP | 0.005 | 0 | 250 | 0.0075 | 0.0285 | 0.4897 | 0.06 | 0.80 | 1.18 | 2.17 | 910.38 | | Z |
| B44A | B44 | 903.43 | 901.11 | 123. | 10. | CP | 0.019 | 0 | 400 | 0.0120 | 0.0456 | 1.6883 | 0.03 | 1.38 | 2.07 | 4.79 | 910.64 | | |
| B44 | B43A | 901.11 | 899.40 | 112. | 10. | CP | 0.015 | 0 | 400 | 0.0120 | 0.0456 | 1.5167 | 0.03 | 1.28 | 1.92 | 4.30 | 910.77 | | |

| MANHOLES FROM MH ID | TO MH ID | INVERT ELEV FROM FT | TO FT | DIST FT | DIA IN | PIPE TYP | SLOPE FT/FT | POPULATION RES | N-RES | RATE OF FLOW(MGD) AVERAGE QA | PEAK QP | CAPACITY QF | PIPE RATIO QP/QF | VELOCITY AVG FPS | PEAK FPS | CAP FPS | UPSTREAM MANHOLE RIM ELEV | COMMENTS NOTE | WARNING |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| B43A | B43 | 899.40 | 896.18 | 213. | 10. | CP | 0.015 | 0 | 450 | 0.0135 | 0.0513 | 1.5101 | 0.03 | 1.33 | 1.99 | 4.28 | 908.79 | | |
| B43 | B56A | 896.18 | 895.41 | 166. | 10. | CP | 0.005 | 232 | 450 | 0.0367 | 0.1395 | 0.8350 | 0.17 | 1.19 | 1.76 | 2.37 | 905.79 | | Z |
| *AT MH B56A | | | | | | | | 1394 | 1408 | | | | | | | | | | |
| B56A | B42 | 895.41 | 892.84 | 279. | 12. | CP | 0.009 | 1394 | 1408 | 0.1816 | 0.6564 | 1.9164 | 0.34 | 2.38 | 3.42 | 3.78 | 903.73 | | |
| B42A | B42 | 897.20 | 892.84 | 360. | 6. | CP | 0.012 | 0 | 100 | 0.0030 | 0.0114 | 0.3457 | 0.03 | 0.84 | 1.28 | 2.72 | NF | A | Z |
| *AT MH B42 | | | | | | | | 1394 | 1508 | | | | | | | | | | |
| B42 | B30C | 892.84 | 891.88 | 180. | 12. | CP | 0.005 | 1394 | 1548 | 0.1858 | 0.6714 | 1.4587 | 0.46 | 1.97 | 2.81 | 2.87 | 900.24 | | |
| B30C | B30B | 891.88 | 891.65 | 93. | 12. | CP | 0.002 | 1394 | 1548 | 0.1858 | 0.6714 | 0.9903 | 0.68 | 1.50 | 2.09 | 1.95 | 899.01 | | |
| B30B | B30A | 891.65 | 889.40 | 86. | 12. | CP | 0.026 | 1394 | 1548 | 0.1858 | 0.6714 | 3.2227 | 0.21 | 3.45 | 5.01 | 6.35 | 899.28 | | |
| B53B | B53A | 902.61 | 902.06 | 79. | 8. | CP | 0.007 | 0 | 100 | 0.0030 | 0.0114 | 0.5645 | 0.02 | 0.66 | 1.02 | 2.50 | 915.63 | | Z |
| B53A | B53 | 902.06 | 901.29 | 183. | 8. | CP | 0.004 | 0 | 100 | 0.0030 | 0.0114 | 0.4389 | 0.03 | 0.55 | 0.85 | 1.95 | 914.31 | | Z |
| B53 | B52 | 901.29 | 900.14 | 306. | 8. | SL | 0.004 | 0 | 133 | 0.0040 | 0.0152 | 0.5654 | 0.03 | 0.72 | 1.11 | 2.51 | 916.43 | | Z |
| B52 | B30A | 896.03 | 889.52 | 370. | 8. | SL | 0.018 | 0 | 233 | 0.0070 | 0.0266 | 1.2246 | 0.02 | 1.46 | 2.26 | 5.43 | 907.67 | | |
| B40A | B40 | 909.62 | 907.76 | 215. | 8. | CP | 0.009 | 189 | 0 | 0.0189 | 0.0718 | 0.6293 | 0.11 | 1.27 | 1.87 | 2.79 | 914.53 | B40 | Z |
| B40 | B39 | 907.76 | 905.86 | 452. | 8. | CP | 0.004 | 189 | 0 | 0.0189 | 0.0718 | 0.4387 | 0.16 | 0.97 | 1.44 | 1.94 | 913.46 | | |
| B39 | B38 | 905.80 | 901.16 | 299. | 8. | CP | 0.016 | 189 | 100 | 0.0219 | 0.0832 | 0.8435 | 0.10 | 1.63 | 2.41 | 3.74 | 914.20 | | |
| B41 | B38B | 906.22 | 902.94 | 202. | 8. | CP | 0.016 | 0 | 0 | 0.0000 | 0.0000 | 0.8631 | 0.00 | 0.00 | 0.00 | 3.83 | 911.82 | | |
| B38B | B38A | 902.94 | 902.08 | 91. | 8. | CP | 0.009 | 0 | 0 | 0.0000 | 0.0000 | 0.6591 | 0.00 | 0.00 | 0.00 | 2.92 | 912.44 | | Z |
| B38A | B38 | 902.00 | 901.16 | 91. | 8. | CP | 0.009 | 0 | 50 | 0.0015 | 0.0057 | 0.6511 | 0.01 | 0.58 | 0.92 | 2.89 | 911.63 | | |
| *AT MH B38 | | | | | | | | 189 | 150 | | | | | | | | | | |
| B38 | B37 | 901.16 | 897.83 | 243. | 8. | CP | 0.014 | 189 | 170 | 0.0240 | 0.0912 | 0.7925 | 0.12 | 1.61 | 2.36 | 3.51 | 911.38 | | Z |
| B37A | B37 | 910.58 | 897.77 | 337. | 6. | VCP | 0.038 | 0 | 20 | 0.0006 | 0.0023 | 0.7074 | 0.00 | 0.80 | 1.31 | 5.57 | 913.73 | | |
| *AT MH B37 | | | | | | | | 189 | 190 | | | | | | | | | | |
| B37 | B36B | 897.75 | 895.62 | 313. | 10. | CP | 0.007 | 189 | 150 | 0.0234 | 0.0889 | 1.0123 | 0.09 | 1.21 | 1.77 | 2.87 | 907.57 | | |
| B36B | B36A | 895.62 | 895.23 | 29. | 10. | CP | 0.013 | 189 | 150 | 0.0234 | 0.0889 | 1.4236 | 0.06 | 1.52 | 2.25 | 4.04 | 906.63 | | |
| B90 | B89 | 912.29 | 908.85 | 339. | 8. | CP | 0.010 | 412 | 0 | 0.0412 | 0.1566 | 0.6814 | 0.23 | 1.66 | 2.45 | 3.02 | 916.83 | | |
| B89 | B36A | 908.95 | 895.23 | 265. | 8. | CP | 0.052 | 633 | 0 | 0.0633 | 0.2405 | 1.5408 | 0.16 | 3.35 | 4.99 | 6.83 | 913.14 | | |
| *AT MH B36A | | | | | | | | 822 | 150 | | | | | | | | | | |
| B36A | B33 | 895.23 | 892.66 | 353. | 10. | CP | 0.007 | 822 | 150 | 0.0867 | 0.3295 | 1.0472 | 0.31 | 1.80 | 2.63 | 2.97 | 907.24 | | |
| B35 | B34 | 909.42 | 904.69 | 469. | 8. | CP | 0.010 | 0 | 100 | 0.0030 | 0.0114 | 0.6797 | 0.02 | 0.74 | 1.16 | 3.01 | 915.04 | | Z |
| B34 | B33 | 904.69 | 892.66 | 477. | 8. | CP | 0.025 | 0 | 120 | 0.0036 | 0.0137 | 1.0744 | 0.01 | 1.07 | 1.69 | 4.76 | 915.04 | | Z |
| *AT MH B33 | | | | | | | | 822 | 270 | | | | | | | | | | |
| B33 | B30E | 892.66 | 891.66 | 101. | 10. | CP | 0.010 | 822 | 270 | 0.0903 | 0.3431 | 1.2189 | 0.28 | 2.02 | 2.97 | 3.46 | 904.34 | | |
| B30F | B30E | 897.19 | 891.66 | 228. | 8. | VCP | 0.024 | 0 | 20 | 0.0006 | 0.0023 | 1.2170 | 0.00 | 0.65 | 1.08 | 5.39 | 905.74 | | Z |
| *AT MH B30E | | | | | | | | 822 | 290 | | | | | | | | | | |
| B30E | B30D | 891.66 | 891.35 | 124. | 10. | CP | 0.003 | 822 | 290 | 0.0909 | 0.3454 | 0.6143 | 0.56 | 1.25 | 1.79 | 1.74 | 902.16 | | |
| B30D | B30A | 890.87 | 889.22 | 271. | 10. | CP | 0.006 | 822 | 295 | 0.0911 | 0.3460 | 0.9584 | 0.36 | 1.71 | 2.50 | 2.72 | 900.02 | | |
| *AT MH B30A | | | | | | | | 2216 | 2076 | | | | | | | | | | |
| B30A | B30 | 889.14 | 888.31 | 238. | 12. | CP | 0.003 | 2216 | 2076 | 0.2839 | 1.0175 | 1.1784 | 0.86 | 1.91 | 2.61 | 2.32 | 899.46 | | |
| B30 | B11A | 887.30 | 886.39 | 148. | 12. | CP | 0.006 | 2216 | 2076 | 0.2839 | 1.0175 | 1.5629 | 0.65 | 2.34 | 3.28 | 3.08 | 895.71 | | |
| B11A | B11B | 886.30 | 884.78 | 156. | 12. | CP | 0.010 | 2216 | 2121 | 0.2852 | 1.0222 | 1.9695 | 0.52 | 2.76 | 3.91 | 3.88 | 894.62 | | |
| B11B | B11C | 884.78 | 882.92 | 143. | 12. | CP | 0.013 | 2216 | 2121 | 0.2852 | 1.0222 | 2.2787 | 0.45 | 3.06 | 4.36 | 4.49 | 892.46 | | |
| B11C | B11 | 882.92 | 882.54 | 106. | 12. | CP | 0.004 | 2216 | 2121 | 0.2852 | 1.0222 | 1.1971 | 0.85 | 1.94 | 2.65 | 2.36 | 890.47 | | |
| *AT B11 | | | | | | | | 3210 | 2[illegible] | | | | | | | | | | |

| MANHOLES FROM MH ID | MANHOLES TO MH ID | INVERT ELEV FROM FT | INVERT ELEV TO FT | DIST FT | DIA IN | PIPE TYP | PIPE SLOPE FT/FT | POPULATION RES | POPULATION N-RES | RATE OF FLOW(MGD) AVERAGE QA | RATE OF FLOW(MGD) PEAK QP | RATE OF FLOW(MGD) CAPACITY QF | PIPE RATIO QP/QF | VELOCITY AVG FPS | VELOCITY PEAK FPS | VELOCITY CAP FPS | UPSTREAM MANHOLE RIM ELEV | COMMENTS NOTE | COMMENTS WARNING |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| B11 | B10 | 882.54 | 879.41 | 503. | 15. | VCP | 0.006 | 3210 | 2941 | 0.4092 | 1.4519 | 3.2929 | 0.44 | 2.83 | 4.01 | 4.15 | 889.21 | | |
| B10A | B10B | 881.93 | 880.33 | 369. | 8. | VCP | 0.004 | 0 | 0 | 0.0000 | 0.0000 | 0.5144 | 0.00 | 0.00 | 0.00 | 2.28 | 889.95 | | |
| B10B | B10 | 880.33 | 879.41 | 347. | 8. | VCP | 0.003 | 0 | 0 | 0.0000 | 0.0000 | 0.4020 | 0.00 | 0.00 | 0.00 | 1.78 | 883.73 | | |
| *AT MH B10 | | | | | | | | 3210 | 2941 | | | | | | | | | | |
| B10 | B7-12 | 879.41 | 878.13 | 346. | 15. | VCP | 0.004 | 3210 | 2941 | 0.4092 | 1.4519 | 2.5405 | 0.57 | 2.35 | 3.31 | 3.20 | 883.61 | | |
| B7-12 | B7-11 | 878.13 | 877.48 | 98. | 15. | VCP | 0.007 | 3210 | 2941 | 0.4092 | 1.4519 | 3.3992 | 0.43 | 2.89 | 4.11 | 4.29 | 884.97 | | |
| B7-11 | B7-10 | 877.48 | 876.93 | 193. | 15. | VCP | 0.003 | 3210 | 2941 | 0.4092 | 1.4519 | 2.2313 | 0.65 | 2.14 | 2.99 | 2.81 | 884.03 | | |
| B7-10 | B7-9 | 876.87 | 875.80 | 189. | 15. | VCP | 0.006 | 3240 | 2941 | 0.4122 | 1.4622 | 3.1426 | 0.47 | 2.74 | 3.88 | 3.96 | 883.55 | T4-10 | |
| B7-9 | B7-8 | 875.80 | 874.91 | 271. | 15. | CP | 0.003 | 3270 | 2941 | 0.4152 | 1.4725 | 2.0751 | 0.71 | 2.04 | 2.83 | 2.62 | 884.58 | T4-9 | |
| B7-8 | B7-7 | 874.91 | 873.12 | 403. | 15. | CP | 0.004 | 3300 | 2941 | 0.4182 | 1.4828 | 2.4107 | 0.62 | 2.28 | 3.19 | 3.04 | 882.39 | T4-8 | |
| B7-7 | B7-6 | 873.07 | 867.91 | 400. | 15. | CP | 0.013 | 3356 | 2941 | 0.4238 | 1.5019 | 4.1111 | 0.37 | 3.34 | 4.77 | 5.18 | 879.27 | T4-7 | |
| B7-6D | B7-6C | 870.82 | 869.67 | 142. | 6. | CP | 0.008 | 40 | 0 | 0.0040 | 0.0152 | 0.2829 | 0.05 | 0.80 | 1.21 | 2.23 | 876.22 | E7-4 | Z |
| B7-6C | B7-6B | 869.67 | 868.17 | 397. | 8. | CP | 0.004 | 60 | 0 | 0.0060 | 0.0228 | 0.4160 | 0.05 | 0.67 | 0.99 | 1.84 | 875.69 | E7-3 | Z |
| B7-6B | B7-6A | 868.17 | 867.20 | 261. | 8. | CP | 0.004 | 80 | 0 | 0.0080 | 0.0304 | 0.4127 | 0.07 | 0.73 | 1.08 | 1.83 | 875.39 | E7-2 | Z |
| B7-6A | B7-6 | 867.20 | 867.04 | 169. | 8. | CP | 0.001 | 100 | 0 | 0.0100 | 0.0380 | 0.2083 | 0.18 | 0.48 | 0.70 | 0.92 | 875.68 | E7-1 | Y |
| *AT MH B7-6 | | | | | | | | 3456 | 2941 | | | | | | | | | | |
| B7-6 | B7-5 | 867.91 | 862.16 | 298. | 18. | CP | 0.019 | 3463 | 2941 | 0.4345 | 1.5385 | 8.1686 | 0.19 | 3.79 | 5.50 | 7.15 | 876.44 | T6-6 | |
| B7-5A | B7-5 | 865.23 | 862.18 | 516. | 10. | CP | 0.006 | 0 | 0 | 0.0000 | 0.0000 | 0.9434 | 0.00 | 0.00 | 0.00 | 2.68 | 872.13 | | |
| *AT MH B7-5 | | | | | | | | 3463 | 2941 | | | | | | | | | | |
| B7-5 | B7-4 | 862.18 | 861.25 | 374. | 18. | CP | 0.002 | 3497 | 2941 | 0.4379 | 1.5501 | 2.9356 | 0.53 | 1.85 | 2.60 | 2.57 | 870.39 | B7-5 | |
| B7-4 | B7-3 | 861.25 | 860.21 | 296. | 18. | VCP | 0.004 | 3532 | 2941 | 0.4414 | 1.5621 | 4.0240 | 0.39 | 2.31 | 3.30 | 3.52 | 867.95 | B7-4 | |
| B7-3 | B7-2 | 860.21 | 858.85 | 404. | 18. | VCP | 0.003 | 3567 | 2941 | 0.4449 | 1.5740 | 3.9379 | 0.40 | 2.28 | 3.25 | 3.45 | 867.68 | B7-3 | |
| B7-2 | B7-1 | 858.85 | 857.60 | 256. | 18. | VCP | 0.005 | 3601 | 2941 | 0.4483 | 1.5856 | 4.7400 | 0.33 | 2.61 | 3.73 | 4.15 | 869.72 | B7-2 | |
| B5-6 | B5-5 | 893.49 | 892.11 | 377. | 8. | CP | 0.004 | 54 | 0 | 0.0054 | 0.0205 | 0.4097 | 0.05 | 0.64 | 0.95 | 1.82 | 899.99 | 5-6 | Z |
| B5-5 | B5-4 | 892.11 | 890.57 | 400. | 8. | CP | 0.004 | 86 | 0 | 0.0086 | 0.0327 | 0.4200 | 0.08 | 0.75 | 1.12 | 1.86 | 898.74 | 5-5 | Z |
| B5-4 | B6-4 | 890.40 | 885.75 | 345. | 8. | CP | 0.013 | 128 | 0 | 0.0128 | 0.0486 | 0.7861 | 0.06 | 1.31 | 1.93 | 3.48 | 895.66 | 5-4 | |
| B6-4 | B8-6 | 885.75 | 883.20 | 170. | 8. | CP | 0.015 | 140 | 0 | 0.0140 | 0.0532 | 0.8288 | 0.06 | 1.40 | 2.06 | 3.67 | 891.59 | 06-3 | |
| B8-6 | B8-5 | 883.20 | 880.01 | 194. | 8. | CP | 0.016 | 150 | 0 | 0.0150 | 0.0570 | 0.8671 | 0.07 | 1.47 | 2.21 | 3.84 | 889.32 | 06-2 | |
| B8-5 | B8-4 | 880.01 | 877.60 | 146. | 8. | CP | 0.017 | 159 | 0 | 0.0159 | 0.0604 | 0.8710 | 0.07 | 1.50 | 2.25 | 3.86 | 885.94 | 06-1 | |
| B4-10 | B4-9 | 903.50 | 900.34 | 223. | 8. | CP | 0.014 | 20 | 0 | 0.0020 | 0.0076 | 0.8062 | 0.01 | 0.73 | 1.16 | 3.57 | 910.00 | 4-10 | Z |
| B4-9 | B6-8 | 900.34 | 895.40 | 310. | 8. | CP | 0.016 | 60 | 0 | 0.0060 | 0.0228 | 0.8548 | 0.03 | 1.09 | 1.67 | 3.79 | 908.31 | 4-9 | Z |
| B6-8 | B6-7 | 895.40 | 889.25 | 297. | 8. | CP | 0.021 | 86 | 0 | 0.0086 | 0.0327 | 0.9743 | 0.03 | 1.33 | 2.04 | 4.32 | 901.27 | 6-8 | |
| B6-7 | B6-6 | 889.13 | 884.45 | 239. | 8. | CP | 0.020 | 106 | 0 | 0.0106 | 0.0403 | 0.9472 | 0.04 | 1.40 | 2.08 | 4.20 | 895.66 | 6-7 | |
| B6-6 | B6-5 | 884.45 | 877.87 | 364. | 8. | CP | 0.018 | 146 | 0 | 0.0146 | 0.0555 | 0.9096 | 0.06 | 1.51 | 2.23 | 4.03 | 890.93 | 6-6 | |
| B6-5 | B8-4 | 877.87 | 877.63 | 367. | 8. | CP | 0.001 | 172 | 0 | 0.0172 | 0.0654 | 0.1732 | 0.38 | 0.49 | 0.71 | 0.77 | 885.34 | 6-5 | Y |
| *AT MH B8-4 | | | | | | | | 331 | 0 | | | | | | | | | | |
| B8-4 | B8-3 | 877.57 | 876.18 | 183. | 8. | CP | 0.008 | 338 | 0 | 0.0338 | 0.1284 | 0.5899 | 0.22 | 1.42 | 2.09 | 2.61 | 883.53 | 7-4 | |
| B8-3 | B8-2 | 876.18 | 873.79 | 231. | 8. | CP | 0.010 | 358 | 0 | 0.0358 | 0.1360 | 0.6884 | 0.20 | 1.61 | 2.38 | 3.05 | 882.10 | 7-3 | |
| B6-3 | B6-2 | 878.44 | 876.47 | 299. | 8. | CP | 0.007 | 40 | 0 | 0.0040 | 0.0152 | 0.5490 | 0.03 | 0.71 | 1.09 | 2.43 | 885.22 | 6-3 | Z |
| B6-2 | B6-1 | 876.47 | 875.29 | 243. | 8. | CP | 0.005 | 75 | 0 | 0.0075 | 0.0285 | 0.4713 | 0.06 | 0.78 | 1.15 | 2.09 | 882.65 | 6-2 | Z |
| B6-1 | B8-2 | 875.29 | 873.74 | 321. | 8. | CP | 0.005 | 106 | 0 | 0.0106 | 0.0403 | 0.4706 | 0.09 | 0.87 | 1.29 | 2.09 | 883.34 | 6-1 | Z |
| *AT MH B8-2 | | | | | | | | 464 | 0 | | | | | | | | | | |
| B8-2 | B8 | 872.67 | 869.40 | 290. | 8. | CP | 0.011 | 477 | 0 | 0.0477 | 0.1813 | 0.7193 | 0.25 | 1.81 | 2.65 | 3.19 | 880.99 | 7-2 | |
| B8-1 | B8 | 870.43 | 869.57 | 376. | 8. | CP | 0.002 | 40 | 0 | 0.0040 | 0.0152 | 0.3238 | 0.05 | 0.49 | 0.73 | 1.44 | 874.63 | 8-1 | Y |
| *AT MH B8 | | | | | | | | 517 | 0 | | | | | | | | | | |
| B8 | B7-1B | 869.38 | 862.60 | 284. | 8. | CP | 0.024 | 530 | 0 | 0.0530 | 0.2014 | 1.0463 | 0.19 | 2.42 | 3.59 | 4.64 | 875.95 | 7-1 | |

| MANHOLES FROM MH ID | MANHOLES TO MH ID | INVERT ELEV FROM FT | INVERT ELEV TO FT | DIST FT | PIPE DIA IN | PIPE TYP | PIPE SLOPE FT/FT | POPULATION HES | POPULATION N-HES | RATE OF FLOW(MGD) AVERAGE QA | RATE OF FLOW(MGD) PEAK QP | RATE OF FLOW(MGD) CAPACITY QF | PIPE RATIO QP/QF | VELOCITY AVG FPS | VELOCITY PEAK FPS | VELOCITY CAP FPS | UPSTREAM MANHOLE RIM ELEV | COMMENTS NOTE WARNING | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| B7-01C | B7-1B | 863.37 | 862.60 | 282. | 8. | CP | 0.003 | 26 | 0 | 0.0026 | 0.0099 | 0.3538 | 0.03 | 0.46 | 0.70 | 1.57 | 872.25 | B-3 | Z |
| *AT MH B7-1B | | | | | | | | 556 | 0 | | | | | | | | | | |
| B7-1B | B7-1A | 862.60 | 861.65 | 356. | 8. | CP | 0.003 | 589 | 0 | 0.0589 | 0.2238 | 0.3496 | 0.64 | 1.15 | 1.64 | 1.55 | 872.50 | T7-2 | Z |
| B7-1A | B7-1 | 861.65 | 857.60 | 158. | 8. | CP | 0.026 | 604 | 0 | 0.0604 | 0.2295 | 1.0849 | 0.21 | 2.59 | 3.82 | 4.81 | 871.75 | 7-1A | |
| *AT MH B7-1 | | | | | | | | 4205 | 2941 | | | | | | | | | | |
| B7-1 | R29 | 857.60 | 856.91 | 270. | 18. | VCP | 0.003 | 4205 | 2941 | 0.5087 | 1.7904 | 3.4305 | 0.52 | 2.15 | 3.03 | 3.00 | 870.52 | B7-1 | |
| * FLOW FROM AREA 12 ENTERS AREA 13 AT MANHOLE R-29 | | | | | | | | | | | | | | | | | | | |
| * AT MH R-29 | | | | 28097 | | | | 2310 | 50 | (AREA 12) | | | | | | | | | |
| * | | | | 45428 | | | | 4205 | 2941 | (AREA 13) | | | | | | | | | |
| * | | | | 73525 | | | | 6515 | 2991 | (TOTAL) | | | | | | | | | |
| R29 | R28A | 855.61 | 851.31 | 399. | 18. | VCP | 0.011 | 6515 | 2991 | 0.7412 | 2.5600 | 7.0484 | 0.36 | 4.00 | 5.67 | 6.17 | 866.81 | | |
| * FLOWS FROM AREAS 12 AND 13 JOIN THE FLOWS FROM AREAS 1-11 AT MANHOLE R-28A | | | | | | | | | | | | | | | | | | | |
| * AT MH R-28A | | | | 278672 | | | | 20874 | 23491 | (AREAS 1-11) | | | | | | | | | |
| * | | | | 45827 | | | | 6515 | 2991 | (AREAS 12 & 13) | | | | | | | | | |
| * | | | | 352596 | | | | 27389 | 26482 | (TOTAL) | | | | | | | | | |
| R28A | R28 | 851.39 | 849.55 | 155. | 30. | VCP | 0.012 | 27389 | 26482 | 3.5334 | 9.733 | 28.8828 | 0.34 | 6.17 | 8.21 | 9.10 | 860.13 | B | |
| R28 | R27 | 849.55 | 845.66 | 383. | 30. | VCP | 0.010 | 27389 | 26482 | 3.5334 | 9.733 | 26.7159 | 0.36 | 5.84 | 7.75 | 8.42 | 857.67 | B | |
| R27 | R26 | 845.66 | 840.55 | 471. | 30. | VCP | 0.011 | 27389 | 26482 | 3.5334 | 9.733 | 27.6117 | 0.35 | 5.98 | 7.94 | 8.70 | 855.48 | B | |
| R26 | R25 | 840.55 | 836.94 | 340. | 30. | VCP | 0.010 | 27389 | 26482 | 3.5334 | 9.733 | 26.9996 | 0.36 | 5.89 | 7.81 | 8.51 | 848.36 | B | |
| R25 | R24 | 836.94 | 836.23 | 174. | 30. | VCP | 0.004 | 27389 | 26482 | 3.5334 | 9.733 | 16.9338 | 0.57 | 4.22 | 5.52 | 5.34 | 847.08 | B | |
| * FLOWS FROM AREAS 1-13 ENTER AREA 14 AT MANHOLE R-24 | | | | | | | | | | | | | | | | | | | |
| * AT MH R-24 | | | | 371458 | | | | 27389 | 26482 | (AREAS 1-13) | | | | | | | | | |
| * | | | | 5293 | | | | 350 | 0 | (AREA 14) | | | | | | | | | |
| * | | | | 376751 | | | | 27739 | 26482 | (TOTAL) | | | | | | | | | |

TOTAL NUMBER OF REACHES BELOW 1.2 FPS = 79.
TOTAL NUMBER OF ADVERSE REACHES = 0.
TOTAL NUMBER OF REACHES EXCEEDING PIPE CAPACITY = 0.
TOTAL NUMBER OF REACHES WHICH HAVE FULL PIPE VELOCITIES BELOW 1.5 FPS= 7.

| | |
|---|---|
| B17B | B17A |
| B17A | B17 |
| B15B | B15A |
| B54A | B54 |
| B7-6A | B7-6 |
| B6-5 | B8-4 |
| B8-1 | B8 |

TOTAL NUMBER OF REACHES = 180.

## SUBAREA 14

Subarea 14 consists of the western portion of the Patton Park family housing area, flow from which enters Subarea 16 at manhole R-22.

Average flow velocities below the specified minimum 1.2 FPS occur in 13 of the 22 reaches, all but one consisting of concrete pipe (CP).

Peak flow will exceed pipe capacity in the reach between manholes R-23 and R-22 under present conditions. The ratio of peak flow to pipe capacity in this segment is 1.11 to 1, but this condition will be alleviated by a current MCA project involving the outfall lines surrounding the metering station.

No reconstruction of manholes or sewer lines is required in Subarea 14. Television inspection will show whether significant pipe damage exists.

PATTON PARK
**********

AREA 14,AS DEFINED BY THE SANITARY SEWER ANALYSIS, COMPLETED BY BOHANNAN-HUSTON, INC., SEPTEMBER 1984.

COMMENT COLUMN "NOTES"
**********

EXCEPT AS NOTED:
> ELEVATIONS WERE OBTAINED THROUGH FIELD SURVEYS
> DISTANCES WERE GENERATED FROM COMPUTER PLOTS

A = INVERT BASED ON REPORT BY FREESE & NICHOLS (4/78)
B = DISTANCE BETWEEN MANHOLES IS SCALED
C = INVERT BASED ON "AS-BUILT" DRAWINGS
D = INVERT BASED ON TOPOGRAPHY & ADJACENT MANHOLE DATA
NA = NOT AVAILABLE
NF = NOT FOUND

COMMENT COLUMN "WARNINGS"
**********

W = ZERO OR ADVERSE SLOPE PRESENT
(PEAK FLOW MAY EXCEED PIPE CAPACITY)
X = PEAK FLOW EXCEEDS PIPE CAPACITY
(LOW VELOCITIES MAY BE PRESENT)
Y = FULL PIPE VELOCITY BELOW 1.5 FPS
(AVERAGE VELOCITY MAY ALSO BE LOW)
Z = AVERAGE VELOCITY BELOW 1.2 FPS

FORMER MANHOLE IDENTIFICATION NUMBERS ALSO APPEAR IN THE COMMENT COLUMN UNDER "NOTES"

| MANHOLES FROM MH ID | MANHOLES TO MH ID | INVERT ELEV FROM FT | INVERT ELEV TO FT | DIST FT | PIPE DIA IN | PIPE TYP | PIPE SLOPE FT/FT | POPULATION RES | POPULATION N-RES | RATE OF FLOW(MGD) AVERAGE QA | RATE OF FLOW(MGD) PEAK QP | RATE OF FLOW(MGD) CAPACITY QF | PIPE RATIO QP/QF | VELOCITY AVG FPS | VELOCITY PEAK FPS | VELOCITY CAP FPS | UPSTREAM MANHOLE RIM ELEV | COMMENTS NOTE | COMMENTS WARNING |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S13B | S12B | 897.21 | 887.05 | 228. | 8. | CP | 0.044 | 27 | 0 | 0.0027 | 0.0103 | 1.4274 | 0.01 | 1.18 | 1.89 | 6.33 | 902.49 | 13B | Z |
| S12B | S11E | 887.05 | 881.77 | 246. | 8. | CP | 0.021 | 42 | 0 | 0.0042 | 0.0160 | 0.9919 | 0.02 | 1.07 | 1.67 | 4.40 | 892.65 | 12B | Z |
| S15D | S14F | 887.86 | 881.23 | 169. | 8. | CP | 0.039 | 19 | 0 | 0.0019 | 0.0072 | 1.3417 | 0.01 | 1.01 | 1.63 | 5.95 | 898.50 | 15D | Z |
| S14F | S11E | 881.23 | 880.32 | 124. | 8. | CP | 0.007 | 27 | 0 | 0.0027 | 0.0103 | 0.5803 | 0.02 | 0.65 | 1.01 | 2.57 | 890.34 | 14F | Z |
| *AT MH S11E | | | | | | | | 69 | 0 | | | | | | | | | | |
| S11E | S10E | 880.32 | 876.28 | 383. | 8. | CP | 0.011 | 96 | 0 | 0.0096 | 0.0365 | 0.6947 | 0.05 | 1.10 | 1.63 | 3.08 | 886.02 | 11E | Z |
| S16B | S10E | 890.13 | 876.28 | 389. | 8. | CP | 0.036 | 38 | 0 | 0.0038 | 0.0144 | 1.2773 | 0.01 | 1.23 | 1.94 | 5.66 | 896.51 | 16B | |
| *AT MH S10E | | | | | | | | 134 | 0 | | | | | | | | | | |
| S10E | S9C | 876.28 | 874.84 | 352. | 8. | CP | 0.004 | 158 | 0 | 0.0158 | 0.0600 | 0.4331 | 0.14 | 0.91 | 1.36 | 1.92 | 882.91 | 10E | Z |
| S9C | S8B | 874.84 | 873.88 | 220. | 8. | CP | 0.004 | 169 | 0 | 0.0169 | 0.0642 | 0.4468 | 0.14 | 0.95 | 1.42 | 1.98 | 883.39 | 9C | Z |
| S17B | S8B | 887.21 | 874.21 | 129. | 8. | CP | 0.101 | 19 | 0 | 0.0019 | 0.0072 | 2.1462 | 0.00 | 1.39 | 2.27 | 9.51 | 892.81 | 17B | |
| *AT MH S8B | | | | | | | | 188 | 0 | | | | | | | | | | |
| S8B | S1B | 873.78 | 862.48 | 328. | 8. | CP | 0.034 | 200 | 0 | 0.0200 | 0.0760 | 1.2560 | 0.06 | 2.08 | 3.07 | 5.57 | 883.03 | 8B | |
| S7E | S6G | 875.15 | 870.60 | 238. | 8. | CP | 0.019 | 27 | 0 | 0.0027 | 0.0103 | 0.9361 | 0.01 | 0.89 | 1.41 | 4.15 | 881.35 | 7E | Z |
| S6G | S5F | 870.60 | 868.83 | 261. | 8. | CP | 0.007 | 46 | 0 | 0.0046 | 0.0175 | 0.5578 | 0.03 | 0.75 | 1.15 | 2.47 | 874.81 | 6G | Z |
| S5F | S4E | 868.75 | 866.83 | 381. | 8. | CP | 0.005 | 81 | 0 | 0.0081 | 0.0308 | 0.4807 | 0.06 | 0.81 | 1.19 | 2.13 | 873.50 | 5F | Z |
| S4E | S3E | 866.78 | 864.20 | 369. | 8. | CP | 0.007 | 115 | 0 | 0.0115 | 0.0437 | 0.5659 | 0.08 | 1.01 | 1.51 | 2.51 | 871.43 | 4E | Z |
| S3E | S2B | 864.20 | 862.48 | 239. | 8. | CP | 0.007 | 138 | 0 | 0.0138 | 0.0524 | 0.5738 | 0.09 | 1.08 | 1.60 | 2.54 | 871.57 | 3E | Z |
| S2B | S1B | 862.48 | 860.22 | 185. | 8. | CP | 0.012 | 150 | 0 | 0.0150 | 0.0570 | 0.7472 | 0.08 | 1.33 | 1.98 | 3.31 | 859.49 | 2B | |
| *AT MH S1B | | | | | | | | 350 | 0 | | | | | | | | | | |
| S1B | S1C | 860.22 | 859.38 | 184. | 8. | CP | 0.005 | 350 | 0 | 0.0350 | 0.1330 | 0.4575 | 0.29 | 1.20 | 1.75 | 2.03 | 871.79 | 1B | Z |
| S1C | S2C | 859.38 | 854.51 | 312. | 8. | CP | 0.016 | 350 | 0 | 0.0350 | 0.1330 | 0.8452 | 0.16 | 1.84 | 2.75 | 3.75 | 866.52 | 1C | |
| S2C | S3D | 854.51 | 843.64 | 277. | 8. | CP | 0.039 | 350 | 0 | 0.0350 | 0.1330 | 1.3417 | 0.10 | 2.59 | 3.83 | 6.95 | 859.49 | 2C | |
| S3D | R24 | 843.64 | 836.23 | 279. | 8. | VCP | 0.027 | 350 | 0 | 0.0350 | 0.1330 | 1.2721 | 0.10 | 2.50 | 3.69 | 5.64 | 850.63 | 3D | |

* FLOWS FROM AREAS 1-13 ENTER AREA 14 AT MANHOLE R-24
* AT MH R-24

| MANHOLES FROM MH ID | MANHOLES TO MH ID | INVERT ELEV FROM FT | INVERT ELEV TO FT | DIST FT | PIPE DIA IN | PIPE TYP | PIPE SLOPE FT/FT | POPULATION RES | POPULATION N-RES | RATE OF FLOW(MGD) AVERAGE QA | RATE OF FLOW(MGD) PEAK QP | RATE OF FLOW(MGD) CAPACITY QF | PIPE RATIO QP/QF | VELOCITY AVG FPS | VELOCITY PEAK FPS | VELOCITY CAP FPS | UPSTREAM MANHOLE RIM ELEV | COMMENTS NOTE | WARNING |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| * | | | | 371458 | | | | 27389 | 26482 | (AREAS 1-13) | | | | | | | | | |
| * | | | | 5293 | | | | 350 | 0 | (AREA 14) | | | | | | | | | |
| * | | | | 376751 | | | | 27739 | 26482 | (TOTAL) | | | | | | | | | |
| R24 | R23 | 836.23 | 834.59 | 515. | 30. | VC | 0.003 | 27739 | 26482 | 3.5684 | 9.802 | 14.9591 | 0.66 | 3.87 | 5.03 | 4.72 | 845.55 | B | |
| R23 | R22 | 834.59 | 834.42 | 153. | 30. | VC | 0.001 | 27739 | 26482 | 3.5684 | 9.8019 | 8.8375 | 1.11 | 2.64 | 3.09 | 2.79 | 844.91 | B | X |
| * FLOWS FROM AREAS 1-14 JOIN WITH THE FLOW FROM AREA 16 AT MANHOLE R-22 | | | | | | | | | | | | | | | | | | | |
| * AT MH R-22 | | | | 377419 | | | | 27739 | 26482 | (AREAS 1-14) | | | | | | | | | |
| * | | | | 8888 | | | | 984 | 0 | (AREA 16) | | | | | | | | | |
| * | | | | 386307 | | | | 28723 | 26482 | (TOTAL) | | | | | | | | | |

TOTAL NUMBER OF REACHES BELOW 1.2 FPS = 13.
TOTAL NUMBER OF ADVERSE REACHES = 0.
TOTAL NUMBER OF REACHES EXCEEDING PIPE CAPACITY = 1.
R23 R22
TOTAL NUMBER OF REACHES WHICH HAVE FULL PIPE VELOCITIES BELOW 1.5 FPS= 0.
TOTAL NUMBER OF REACHES = 22.

## SUBAREA 15

Subarea 15 is the eastern portion of Patton Park and most of the Wainwright Heights family housing area. Sewage flows into Subarea 16 at manhole R-21A.

The minimum average flow velocity of 1.2 FPS is not attained in 33 of the 49 reaches, of which nearly 90% are concrete pipe construction. The interceptor passing through Patton Park experiences low velocities, but has adequate capacity to carry average and peak flows. Five of the 33 reaches also have full pipe velocities below the specified minimum 1.5 FPS.

The analysis indicates an adverse grade in the reach between manholes K-9A and K-9. Field personnel also noted surcharging in manholes K-9A and K-9B, with no flow reaching manhole K-9. These conditions were reported to DFE personnel and no recommendations are provided in this analysis since the area was recently redesigned and constructed under a private contract.

No reconstruction of sewer lines within Subarea 15 is required. The following repairs are necessary:

| | | |
|---|---|---|
| MH K-1 --- | New concrete collar constructed | $ 150.00 |
| MH K-2 --- | New concrete collar constructed | 150.00 |
| | | $ 300.00 |

WAINWRIGHT HIEGHTS AND PATTON PARK
**********

AREA 15,AS DEFINED BY THE SANITARY SEWER ANALYSIS, COMPLETED BY BOHANNAN-HUSTON, INC., SEPTEMBER 1984.

COMMENT COLUMN "NOTES"
**********

EXCEPT AS NOTED:
> ELEVATIONS WERE OBTAINED THROUGH FIELD SURVEYS
> DISTANCES WERE GENERATED FROM COMPUTER PLOTS

A = INVERT BASED ON REPORT BY FREESE & NICHOLS (4/78)
B = DISTANCE BETWEEN MANHOLES IS SCALED
C = INVERT BASED ON "AS-BUILT" DRAWINGS
D = INVERT BASED ON TOPOGRAPHY & ADJACENT MANHOLE DATA
NA = NOT AVAILABLE
NF = NOT FOUND

COMMENT COLUMN "WARNINGS"
**********

W = ZERO OR ADVERSE SLOPE PRESENT
(PEAK FLOW MAY EXCEED PIPE CAPACITY)
X = PEAK FLOW EXCEEDS PIPE CAPACITY
(LOW VELOCITIES MAY BE PRESENT)
Y = FULL PIPE VELOCITY BELOW 1.5 FPS
(AVERAGE VELOCITY MAY ALSO BE LOW)
Z = AVERAGE VELOCITY BELOW 1.2 FPS

FORMER MANHOLE IDENTIFICATION NUMBERS ALSO APPEAR IN THE COMMENT COLUMN UNDER "NOTES"

| MANHOLES FROM MH ID | MANHOLES TO MH ID | INVERT ELEV FROM FT | INVERT ELEV TO FT | DIST FT | DIA IN | PIPE TYP | PIPE SLOPE FT/FT | POPULATION RES | POPULATION N-RES | RATE OF FLOW(MGD) AVERAGE QA | RATE OF FLOW(MGD) PEAK QP | RATE OF FLOW(MGD) CAPACITY QF | PIPE RATIO QP/QF | VELOCITY AVG FPS | VELOCITY PEAK FPS | VELOCITY CAP FPS | UPSTREAM MANHOLE RIM ELEV | COMMENTS NOTE | COMMENTS WARNING |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| M13 | M12 | 909.29 | 908.17 | 325. | 8. | CP | 0.003 | 32 | 0 | 0.0032 | 0.0122 | 0.3973 | 0.03 | 0.53 | 0.81 | 1.76 | 917.82 | | Z |
| M12 | M11 | 908.17 | 907.24 | 233. | 8. | CP | 0.004 | 60 | 0 | 0.0060 | 0.0228 | 0.4280 | 0.05 | 0.68 | 1.01 | 1.90 | 914.52 | | Z |
| M11 | M10 | 907.24 | 907.12 | 147. | 8. | CP | 0.001 | 60 | 0 | 0.0060 | 0.0228 | 0.1932 | 0.12 | 0.39 | 0.58 | 0.86 | 915.13 | | Y |
| M15 | M14 | 907.13 | 903.18 | 327. | 8. | CP | 0.012 | 32 | 0 | 0.0032 | 0.0122 | 0.7438 | 0.02 | 0.81 | 1.26 | 3.30 | 912.66 | | Z |
| M14 | M10 | 903.18 | 902.98 | 243. | 8. | CP | 0.001 | 60 | 0 | 0.0060 | 0.0228 | 0.1940 | 0.12 | 0.40 | 0.58 | 0.86 | 910.66 | | Y |
| *AT MH M10 | | | | | | | | 120 | 0 | | | | | | | | | | |
| M10 | M9 | 902.98 | 898.61 | 278. | 8. | CP | 0.016 | 120 | 0 | 0.0120 | 0.0456 | 0.8479 | 0.05 | 1.35 | 2.00 | 3.76 | 913.62 | | |
| M17 | M16 | 903.29 | 899.94 | 343. | 8. | CP | 0.010 | 32 | 0 | 0.0032 | 0.0122 | 0.6689 | 0.02 | 0.75 | 1.17 | 2.97 | 908.94 | | Z |
| M16 | M9 | 899.94 | 898.61 | 288. | 8. | CP | 0.005 | 64 | 0 | 0.0064 | 0.0243 | 0.4598 | 0.05 | 0.73 | 1.08 | 2.04 | 906.24 | | Z |
| M19 | M18 | 908.31 | 905.58 | 301. | 8. | CP | 0.009 | 28 | 0 | 0.0028 | 0.0106 | 0.6450 | 0.02 | 0.70 | 1.10 | 2.86 | 912.96 | | Z |
| M18 | M9 | 905.58 | 898.61 | 340. | 8. | CP | 0.021 | 60 | 0 | 0.0060 | 0.0228 | 0.9696 | 0.02 | 1.18 | 1.83 | 4.30 | 910.13 | | Z |
| *AT MH M9 | | | | | | | | 244 | 0 | | | | | | | | | | |
| M9 | M8 | 898.61 | 893.92 | 269. | 8. | CP | 0.017 | 244 | 0 | 0.0244 | 0.0927 | 0.8938 | 0.10 | 1.75 | 2.59 | 3.96 | 907.21 | | |
| M21 | M20 | 899.48 | 895.80 | 291. | 8. | CP | 0.013 | 32 | 0 | 0.0032 | 0.0122 | 0.7608 | 0.02 | 0.82 | 1.28 | 3.37 | 905.20 | | Z |
| M20 | M8 | 895.80 | 893.92 | 292. | 8. | CP | 0.006 | 64 | 0 | 0.0064 | 0.0243 | 0.5427 | 0.04 | 0.82 | 1.21 | 2.41 | 902.19 | | Z |
| M23 | M22 | 900.33 | 897.33 | 301. | 8. | CP | 0.010 | 32 | 0 | 0.0032 | 0.0122 | 0.6756 | 0.02 | 0.76 | 1.18 | 2.99 | 906.08 | | Z |
| M22 | M8 | 897.33 | 893.92 | 263. | 8. | CP | 0.013 | 55 | 0 | 0.0055 | 0.0209 | 0.7707 | 0.03 | 0.98 | 1.52 | 3.42 | 902.79 | | Z |
| *AT MH M8 | | | | | | | | 363 | 0 | | | | | | | | | | |
| M8 | M7 | 893.92 | 892.22 | 235. | 8. | CP | 0.007 | 363 | 0 | 0.0363 | 0.1379 | 0.5753 | 0.24 | 1.42 | 2.09 | 2.55 | 900.59 | | |
| M7 | M6 | 892.22 | 888.87 | 191. | 8. | CP | 0.018 | 386 | 0 | 0.0386 | 0.1467 | 0.8957 | 0.16 | 1.98 | 2.94 | 3.97 | 897.50 | | |
| M24 | M6 | 892.29 | 888.87 | 299. | 8. | CP | 0.011 | 32 | 0 | 0.0032 | 0.0122 | 0.7239 | 0.02 | 0.79 | 1.24 | 3.21 | 895.86 | | Z |
| *AT MH M6 | | | | | | | | 418 | 0 | | | | | | | | | | |
| M6 | M5 | 888.87 | 888.56 | 74. | 8. | CP | 0.004 | 418 | 0 | 0.0418 | 0.1588 | 0.4369 | 0.36 | 1.22 | 1.78 | 1.94 | 895.12 | | |

| MANHOLES FROM MH ID | MANHOLES TO MH ID | INVERT ELEV FROM FT | INVERT ELEV TO FT | DIST FT | PIPE DIA IN | PIPE TYP | PIPE SLOPE FT/FT | POPULATION RES | POPULATION N-RES | RATE OF FLOW(MGD) AVERAGE QA | RATE OF FLOW(MGD) PEAK QP | RATE OF FLOW(MGD) CAPACITY QF | PIPE RATIO QP/QF | VELOCITY AVG FPS | VELOCITY PEAK FPS | VELOCITY CAP FPS | UPSTREAM MANHOLE RIM ELEV | COMMENTS NOTE | WARNING |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| M5 | M4 | 888.56 | 888.24 | 169. | 8. | CP | 0.002 | 418 | 0 | 0.0418 | 0.1588 | 0.2948 | 0.54 | 0.93 | 1.33 | 1.31 | 894.36 | | Y |
| M4 | M3 | 888.24 | 887.55 | 197. | 8. | CP | 0.004 | 418 | 0 | 0.0418 | 0.1588 | 0.4006 | 0.40 | 1.15 | 1.67 | 1.78 | 893.18 | | Z |
| K19B | K20B | 899.98 | 896.01 | 273. | 8. | CP | 0.015 | 28 | 0 | 0.0028 | 0.0106 | 0.8155 | 0.01 | 0.82 | 1.29 | 3.61 | 904.39 | | Z |
| K20B | M3 | 896.01 | 889.26 | 288. | 8. | CP | 0.023 | 35 | 0 | 0.0035 | 0.0133 | 1.0358 | 0.01 | 1.04 | 1.63 | 4.59 | 901.21 | | Z |
| *AT MH M3 | | | | | | | | 453 | 0 | | | | | | | | | | |
| M3 | M2 | 887.55 | 886.70 | 292. | 8. | CP | 0.003 | 457 | 0 | 0.0457 | 0.1737 | 0.3651 | 0.48 | 1.10 | 1.59 | 1.62 | 894.11 | | Z |
| K18B | M26 | 898.57 | 895.66 | 144. | 8. | CP | 0.020 | 12 | 0 | 0.0012 | 0.0046 | 0.9634 | 0.00 | 0.70 | 1.13 | 4.27 | 903.69 | | Z |
| M26 | M2 | 895.66 | 886.23 | 298. | 8. | CP | 0.032 | 31 | 0 | 0.0031 | 0.0118 | 1.2044 | 0.01 | 1.10 | 1.75 | 5.34 | 903.32 | | Z |
| M25 | M2 | 887.83 | 886.70 | 191. | 8. | CP | 0.006 | 16 | 0 | 0.0016 | 0.0061 | 0.5205 | 0.01 | 0.51 | 0.80 | 2.31 | 892.05 | | Z |
| *AT MH M2 | | | | | | | | 504 | 0 | | | | | | | | | | |
| M2 | M1 | 886.70 | 886.17 | 183. | 8. | CP | 0.003 | 504 | 0 | 0.0504 | 0.1915 | 0.3647 | 0.53 | 1.14 | 1.63 | 1.62 | 897.08 | | Z |
| M1 | K10 | 886.17 | 885.64 | 194. | 8. | CP | 0.003 | 508 | 0 | 0.0508 | 0.1930 | 0.3539 | 0.55 | 1.11 | 1.60 | 1.57 | 899.53 | | Z |
| K12 | K11 | 887.35 | 886.09 | 230. | 8. | CP | 0.005 | 8 | 0 | 0.0008 | 0.0030 | 0.5006 | 0.01 | 0.39 | 0.63 | 2.22 | 901.55 | | Z |
| K11 | K10 | 886.09 | 885.67 | 144. | 8. | CP | 0.003 | 16 | 0 | 0.0016 | 0.0061 | 0.3659 | 0.02 | 0.40 | 0.62 | 1.62 | 900.17 | | Z |
| *AT MH K10 | | | | | | | | 524 | 0 | | | | | | | | | | |
| K10 | K7 | 885.57 | 885.44 | 75. | 8. | CP | 0.002 | 524 | 0 | 0.0524 | 0.1991 | 0.2825 | 0.70 | 0.96 | 1.35 | 1.25 | 898.30 | | Y |
| K9B | K9A | 888.85 | 886.68 | 127. | 6. | PVC | 0.017 | 4 | 0 | 0.0004 | 0.0015 | 0.5602 | 0.00 | 0.60 | 0.99 | 4.41 | NA | A/B | Z |
| K9A | K9 | 886.66 | 887.85 | 143. | 8. | PVC | -.008 | 12 | 0 | 0.0012 | 0.0046 | | | | | | 891.02 | B | W |
| K9 | K8 | 887.26 | 886.21 | 233. | 8. | PVC | 0.005 | 20 | 0 | 0.0020 | 0.0076 | 0.6200 | 0.01 | 0.61 | 0.96 | 2.75 | 891.60 | | Z |
| K8 | K7 | 886.21 | 885.44 | 248. | 8. | PVC | 0.003 | 31 | 0 | 0.0031 | 0.0118 | 0.5139 | 0.02 | 0.62 | 0.96 | 2.28 | 894.42 | | Z |
| *AT MH K7 | | | | | | | | 555 | 0 | | | | | | | | | | |
| K7 | K7A | 885.44 | 885.26 | 126. | 8. | CP | 0.001 | 555 | 0 | 0.0555 | 0.2109 | 0.2558 | 0.82 | 0.91 | 1.27 | 1.13 | 897.12 | B | Y |
| K7A | K6 | 885.26 | 884.55 | 140. | 8. | CP | 0.005 | 571 | 0 | 0.0571 | 0.2170 | 0.4828 | 0.45 | 1.44 | 2.08 | 2.14 | 896.62 | | |
| K6 | K6A | 884.55 | 884.17 | 81. | 8. | CP | -0.005 | 575 | 0 | 0.0575 | 0.2185 | 0.4634 | 0.47 | 1.40 | 2.02 | 2.05 | 893.95 | | |
| K6A | K5 | 884.17 | 883.37 | 199. | 8. | CP | 0.004 | 579 | 0 | 0.0579 | 0.2200 | 0.4293 | 0.51 | 1.33 | 1.91 | 1.90 | 893.57 | | |
| K16 | K5 | 888.68 | 886.36 | 369. | 8. | CP | 0.006 | 12 | 0 | 0.0012 | 0.0046 | 0.5364 | 0.01 | 0.47 | 0.75 | 2.38 | 895.08 | | Z |
| *AT MH K5 | | | | | | | | 591 | 0 | | | | | | | | | | |
| K5 | K4A | 883.31 | 876.31 | 250. | 10. | CP | 0.028 | 591 | 0 | 0.0591 | 0.2246 | 2.0523 | 0.11 | 2.62 | 3.82 | 5.82 | 892.61 | | |
| K4A | K4 | 876.31 | 873.96 | 227. | 10. | CP | 0.014 | 591 | 0 | 0.0591 | 0.2246 | 1.4699 | 0.15 | 2.03 | 3.03 | 4.17 | 884.61 | | |
| K4 | K3 | 868.71 | 858.14 | 367. | 10. | CP | 0.029 | 591 | 0 | 0.0591 | 0.2246 | 2.0832 | 0.11 | 2.65 | 3.86 | 5.91 | 877.11 | | |
| K3 | K2 | 857.95 | 848.81 | 284. | 10. | CP | 0.032 | 591 | 0 | 0.0591 | 0.2246 | 2.2023 | 0.10 | 2.75 | 4.02 | 6.25 | 868.61 | | |
| K2 | K1 | 848.59 | 840.98 | 340. | 10. | CP | 0.022 | 591 | 0 | 0.0591 | 0.2246 | 1.8155 | 0.12 | 2.36 | 3.53 | 5.15 | 857.97 | | |
| K1 | K1-1A | 840.98 | 840.09 | 258. | 12. | VCP | 0.003 | 591 | 0 | 0.0591 | 0.2246 | 1.3517 | 0.17 | 1.33 | 1.98 | 2.86 | 848.78 | | |
| K2A | K1-1A | 853.98 | 840.09 | 506. | 6. | CP | 0.027 | 0 | 0 | 0.0000 | 0.0000 | 0.5206 | 0.00 | 0.00 | 0.00 | 4.10 | 858.03 | | |

* NOTE THAT THE LINE BETWEEN MANHOLES K2A & K1-1A CHANGES FROM A 6" TO 12".
* MANHOLES IN BETWEEN THESE TWO POINTS WERE NOT FOUND.

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *AT MH K1-1A | | | | | | | | 576 | 10 | | | | | | | | | | |
| K1-1A | R21A | 840.09 | 836.22 | 456. | 12. | CP | 0.008 | 591 | 0 | 0.0591 | 0.2246 | 1.8384 | 0.12 | 1.65 | 2.45 | 3.62 | 845.03 | B | |

* FLOW FROM AREA 15 ENTERS AREA 16 AT MANHOLE R-21A

| | | | |
|---|---|---|---|
| * AT MH R-21A | 386437 | 28723 | 26482 (AREAS 1-14 & 16) |
| * | 12080 | 591 | 0 (AREA 15) |
| * | ------ | ----- | ----- |
| * | 398517 | 29314 | 26482 (TOTAL) |
| * | | | |

| MANHOLES FROM MH ID | TO MH ID | INVERT ELEV FROM FT | TO FT | DIST FT | PIPE DIA IN | TYP | SLOPE FT/FT | POPULATION RES | N-RES | RATE OF FLOW(MGD) AVERAGE QA | PEAK QP | CAPACITY QF | PIPE RATIO QP/QF | VELOCITY AVG FPS | PEAK FPS | CAP FPS | UPSTREAM MANHOLE RIM ELEV | COMMENTS NOTE WARNING |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

*
*
*

TOTAL NUMBER OF REACHES BELOW 1.2 FPS = 33.
TOTAL NUMBER OF ADVERSE REACHES = 1.
K9A K9
TOTAL NUMBER OF REACHES EXCEEDING PIPE CAPACITY = 0.
TOTAL NUMBER OF REACHES WHICH HAVE FULL PIPE VELOCITIES BELOW 1.5 FPS= 5.
M11 M10
M14 M10
M5 M4
K10 K7
K7 K7A
TOTAL NUMBER OF REACHES = 49.

## SUBAREA 16

Subarea 16, south of Business Highway 190, is the Venable Village family housing area, flow from which enters Subarea 17 at manhole R-19.

Average flow velocities below the specified minimum 1.2 FPS occur in 2 of the 30 reaches, both of which are in the trunk line conveying the flow from this area to Subarea 17. The two have more than adequate capacity to transmit average and peak flows and are not problem situations because they are constructed of VC pipe.

Three reaches (between manholes R-21A and R-19) exceed pipe capacity at peak flow conditions. A current MCA project is expected to reroute most of the the flow entering this section from the main cantonment area and therefore no recommendations are presented.

No reconstruction of manholes or sewer lines is required in Subarea 16.

VENABLE VILLAGE
**********

AREA 16,AS DEFINED BY THE SANITARY SEWER ANALYSIS, COMPLETED BY BOHANNAN-HUSTON, INC., SEPTEMBER 1984.

COMMENT COLUMN "NOTES"
**********

EXCEPT AS NOTED:
> ELEVATIONS WERE OBTAINED THROUGH FIELD SURVEYS
> DISTANCES WERE GENERATED FROM COMPUTER PLOTS

A = INVERT BASED ON REPORT BY FREESE & NICHOLS (4/78)
B = DISTANCE BETWEEN MANHOLES IS SCALED
C = INVERT BASED ON "AS-BUILT" DRAWINGS
D = INVERT BASED ON TOPOGRAPHY & ADJACENT MANHOLE DATA
NA = NOT AVAILABLE
NF = NOT FOUND

COMMENT COLUMN "WARNINGS"
**********

W = ZERO OR ADVERSE SLOPE PRESENT (PEAK FLOW MAY EXCEED PIPE CAPACITY)
X = PEAK FLOW EXCEEDS PIPE CAPACITY (LOW VELOCITIES MAY BE PRESENT)
Y = FULL PIPE VELOCITY BELOW 1.5 FPS (AVERAGE VELOCITY MAY ALSO BE LOW)
Z = AVERAGE VELOCITY BELOW 1.2 FPS

FORMER MANHOLE IDENTIFICATION NUMBERS ALSO APPEAR IN THE COMMENT COLUMN UNDER "NOTES"

| MANHOLES FROM MH ID | MANHOLES TO MH ID | INVERT ELEV FROM FT | INVERT ELEV TO FT | DIST FT | PIPE DIA IN | PIPE TYP | PIPE SLOPE FT/FT | POPULATION RES | POPULATION N-RES | RATE OF FLOW(MGD) AVERAGE QA | RATE OF FLOW(MGD) PEAK QP | RATE OF FLOW(MGD) CAPACITY QF | PIPE RATIO QP/QF | VELOCITY AVG FPS | VELOCITY PEAK FPS | VELOCITY CAP FPS | UPSTREAM MANHOLE RIM ELEV | COMMENTS NOTE | COMMENTS WARNING |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| R76 | R75 | 870.53 | 864.20 | 400. | 6. | VCP | 0.016 | 69 | 0 | 0.0089 | 0.0338 | 0.4562 | 0.07 | 1.43 | 2.13 | 3.59 | 874.93 | B | |
| R75 | R74 | 864.20 | 856.23 | 425. | 6. | VCP | 0.019 | 148 | 0 | 0.0148 | 0.0562 | 0.4967 | 0.11 | 1.78 | 2.62 | 3.91 | 869.38 | | |
| R74 | R71 | 855.63 | 852.20 | 303. | 6. | VCP | 0.011 | 148 | 0 | 0.0148 | 0.0562 | 0.3860 | 0.15 | 1.50 | 2.18 | 3.04 | 860.03 | | |
| R73 | R72 | 866.47 | 859.80 | 260. | 6. | VCP | 0.026 | 59 | 0 | 0.0059 | 0.0224 | 0.5808 | 0.04 | 1.48 | 2.25 | 4.58 | 871.71 | B | |
| R72 | R71 | 859.80 | 852.20 | 534. | 6. | VCP | 0.014 | 138 | 0 | 0.0138 | 0.0524 | 0.4325 | 0.12 | 1.58 | 2.32 | 3.41 | NF | D | |
| *AT MH R71 | | | | | | | | 286 | 0 | | | | | | | | | | |
| R71 | R70 | 852.20 | 848.31 | 65. | 6. | VCP | 0.060 | 286 | 0 | 0.0286 | 0.1087 | 0.8871 | 0.12 | 3.26 | 4.78 | 6.99 | 857.97 | B | |
| R70 | R64 | 848.31 | 846.12 | 311. | 15. | VCP | 0.007 | 286 | 0 | 0.0286 | 0.1087 | 3.5011 | 0.03 | 1.33 | 1.99 | 4.41 | 854.06 | | |
| R69 | R68 | 877.60 | 873.46 | 314. | 6. | VCP | 0.013 | 69 | 0 | 0.0069 | 0.0262 | 0.4165 | 0.06 | 1.24 | 1.86 | 3.28 | 882.42 | | |
| R68 | R67 | 873.46 | 868.37 | 442. | 6. | VCP | 0.012 | 128 | 0 | 0.0128 | 0.0486 | 0.3891 | 0.13 | 1.44 | 2.11 | 3.07 | 878.24 | | |
| R67 | R66 | 868.37 | 860.28 | 397. | 6. | VCP | 0.020 | 197 | 0 | 0.0197 | 0.0749 | 0.5176 | 0.14 | 2.00 | 2.92 | 4.08 | 873.12 | B | |
| R66 | R65 | 860.28 | 856.87 | 173. | 6. | VCP | 0.020 | 216 | 0 | 0.0216 | 0.0821 | 0.5098 | 0.16 | 2.04 | 2.96 | 4.02 | 864.73 | | |
| R65 | R64 | 856.87 | 846.69 | 461. | 6. | VCP | 0.022 | 295 | 0 | 0.0295 | 0.1121 | 0.5386 | 0.21 | 2.27 | 3.35 | 4.24 | 862.25 | | |
| *AT MH R64 | | | | | | | | 581 | 0 | | | | | | | | | | |
| R64 | R61 | 846.12 | 844.36 | 273. | 15. | VCP | 0.006 | 581 | 0 | 0.0581 | 0.2208 | 3.3551 | 0.07 | 1.62 | 2.39 | 4.23 | 852.66 | | |
| R63 | R62 | 860.93 | 855.03 | 313. | 6. | VCP | 0.019 | 69 | 0 | 0.0069 | 0.0262 | 0.4982 | 0.05 | 1.40 | 2.11 | 3.93 | 865.02 | | |
| R62 | R61A | 854.94 | 848.73 | 355. | 6. | VCP | 0.017 | 108 | 0 | 0.0108 | 0.0410 | 0.4796 | 0.09 | 1.57 | 2.34 | 3.78 | 859.69 | | |
| R61A | R61 | 848.73 | 845.26 | 132. | 6. | VCP | 0.026 | 128 | 0 | 0.0128 | 0.0486 | 0.5873 | 0.08 | 1.91 | 2.84 | 4.63 | 854.29 | | |
| *AT MH R61 | | | | | | | | 709 | 0 | | | | | | | | | | |
| R61 | R59 | 844.36 | 843.60 | 289. | 15. | VCP | 0.003 | 709 | 0 | 0.0709 | 0.2694 | 2.1408 | 0.13 | 1.24 | 1.85 | 2.70 | 850.11 | | |
| R59 | R53 | 843.60 | 843.11 | 393. | 15. | VCP | 0.001 | 739 | 0 | 0.0739 | 0.2808 | 1.4748 | 0.19 | 0.97 | 1.43 | 1.86 | 850.62 | | Z |
| R54 | R53 | 851.16 | 843.80 | 352. | 6. | VCP | 0.021 | 69 | 0 | 0.0069 | 0.0262 | 0.5241 | 0.05 | 1.45 | 2.19 | 4.13 | 856.34 | | |
| *AT MH R53 | | | | | | | | 808 | 0 | | | | | | | | | | |
| R53 | R52 | 843.11 | 842.01 | 453. | 15. | VCP | 0.002 | 808 | 0 | 0.0808 | 0.3070 | 2.0564 | 0.15 | 1.26 | 1.86 | 2.59 | 849.93 | | |
| R55 | R56 | 856.19 | 850.25 | 444. | 6. | VCP | 0.013 | 78 | 0 | 0.0078 | 0.0296 | 0.4194 | 0.07 | 1.30 | 1.94 | 3.31 | 860.48 | | |
| R56 | R57 | 850.25 | 844.29 | 407. | 6. | VCP | 0.015 | 138 | 0 | 0.0138 | 0.0524 | 0.4389 | 0.12 | 1.60 | 2.35 | 3.46 | 855.95 | | |
| R57 | R52 | 844.77 | 842.11 | 146. | 6. | VCP | 0.018 | 176 | 0 | 0.0176 | 0.0669 | 0.4889 | 0.14 | 1.86 | 2.72 | 3.85 | 850.58 | | |

| MANHOLES FROM MH ID | MANHOLES TO MH ID | INVERT ELEV FROM FT | INVERT ELEV TO FT | DIST FT | DIA IN | PIPE TYP | PIPE SLOPE FT/FT | POPULATION RES | POPULATION N-RES | RATE OF FLOW(MGD) AVERAGE QA | RATE OF FLOW(MGD) PEAK QP | RATE OF FLOW(MGD) CAPACITY QF | PIPE RATIO QP/QF | VELOCITY AVG FPS | VELOCITY PEAK FPS | VELOCITY CAP FPS | UPSTREAM MANHOLE RIM ELEV | COMMENTS NOTE WARNING |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | 984 | 0 | | | | | | | | | |
| *AT MH R52 | | | | | | | | | | | | | | | | | | |
| R52 | R51 | 842.01 | 836.88 | 875. | 15. | VCP | 0.006 | 984 | 0 | 0.0984 | 0.3739 | 3.1963 | 0.12 | 1.82 | 2.70 | 4.03 | 848.63 | |
| R51 | R50 | 836.88 | 836.35 | 271. | 16. | CI | 0.002 | 984 | 0 | 0.0984 | 0.3739 | 2.0364 | 0.18 | 1.16 | 1.72 | 2.26 | 827.38 | B Z |
| R50 | R22 | 826.35 | 824.42 | 100. | 16. | CI | 0.019 | 984 | 0 | 0.0984 | 0.3739 | 6.3970 | 0.06 | 2.62 | 3.87 | 7.09 | 841.17 | B |
| * FLOW FROM AREAS 1-14 JOIN AREA 16 AT MANHOLE R-22 | | | | | | | | | | | | | | | | | | |
| * AT MH R-22 | | | | 377419 | | | | 27739 | 26482 | (AREAS 1-14) | | | | | | | | |
| * | | | | 8888 | | | | 984 | 0 | (AREA 16) | | | | | | | | |
| * | | | | ====== | | | | ===== | ===== | | | | | | | | | |
| * | | | | 386307 | | | | 28723 | 26482 | (TOTAL) | | | | | | | | |
| R22 | R21A | 834.42 | 834.15 | 130. | 30. | CP | 0.002 | 28609 | 22075 | 3.5232 | 9.713 | 10.4694 | 0.93 | 2.98 | 3.75 | 3.30 | 842.77 | B |
| * FLOW FROM AREA 15 ENTERS AREA 16 AT MANHOLE R-21A | | | | | | | | | | | | | | | | | | |
| * AT MH R-21A | | | | 386437 | | | | 28723 | 26482 | (AREAS 1-14 & 16) | | | | | | | | |
| * | | | | 12080 | | | | 591 | 0 | (AREA 15) | | | | | | | | |
| * | | | | ====== | | | | ===== | ===== | | | | | | | | | |
| * | | | | 398517 | | | | 29314 | 26482 | (TOTAL) | | | | | | | | |
| R21A | R21 | 834.15 | 833.80 | 220. | 30. | CP | 0.002 | 29185 | 22085 | 3.5811 | 9.8266 | 9.1641 | 1.07 | 2.71 | 3.10 | 2.89 | 840.78 | B X |
| R21 | R20 | 833.80 | 833.45 | 530. | 30. | CP | 0.001 | 29185 | 22085 | 3.5811 | 9.8266 | 5.9037 | 1.66 | 1.95 | 3.10 | 1.86 | 841.38 | B X |
| R20 | R19 | 833.45 | 832.90 | 440. | 30. | CP | 0.001 | 29185 | 22085 | 3.5811 | 9.8266 | 8.1226 | 1.21 | 2.48 | 3.10 | 2.56 | 842.09 | B X |
| * FLOW FROM AREAS 1-16 ENTERS AREA 17 AT MANHOLE R-19 | | | | | | | | | | | | | | | | | | |
| * AT MH R-19 | | | | 399707 | | | | 29314 | 26482 | (AREAS 1-16) | | | | | | | | |
| * | | | | 51386 | | | | 4568 | 3637 | (AREA 17) | | | | | | | | |
| * | | | | ====== | | | | ===== | ===== | | | | | | | | | |
| * | | | | 451093 | | | | 33882 | 30119 | (TOTAL) | | | | | | | | |

TOTAL NUMBER OF REACHES BELOW 1.2 FPS = 2.
TOTAL NUMBER OF ADVERSE REACHES = 0.
TOTAL NUMBER OF REACHES EXCEEDING PIPE CAPACITY = 3.

| | |
|---|---|
| R21A | R21 |
| R21 | R20 |
| R20 | R19 |

TOTAL NUMBER OF REACHES WHICH HAVE FULL PIPE VELOCITIES BELOW 1.5 FPS= 0.
TOTAL NUMBER OF REACHES = 30.

## SUBAREA 17

Subarea 17 is the largest of the 21 subsystems on the post and is situated generally north of the east gate. Flow from the area enters the main outfall line just west of Meter "A".

Average flow velocities below the specified minimum 1.2 FPS occur in 110 of the 189 reaches. Nearly 85% of these are concrete pipe (CP).

The analysis indicates an adverse grade between manholes A45 and A45A, a reach which was rebuilt as part of a larger line reconstruction accomplished since 1978. Previously, flow leaving manhole A45 entered manhole A39 directly. No surcharging conditions were reported by field personnel. In addition, the analysis indicates that peak flow will exceed pipe capacities in the following 10 sections:

| | | |
|---|---|---|
| MH A-106 to Lift Station 8001 | --- | 4 reaches |
| MH A-36 to MH A-29A | --- | 2 reaches |
| MH A-26 to MH A-12A | --- | 3 reaches |
| MH A-11D to MH A-11E | --- | 1 reach |

Although flows should pass under pressure conditions, the above reaches should be inspected periodically to determine whether adverse conditions have developed to impede flow. Inasmuch as no surcharging has been observed, no additional capacity measures are suggested at this time.

The following repair items are needed:

MH A-8A --- Broken rim should be replaced $ 150.00

AREA 17,AS DEFINED BY THE SANITARY SEWER ANALYSIS, COMPLETED BY BOHANNAN-HUSTON, INC., SEPTEMBER 1984.

COMMENT COLUMN "NOTES"
**********

EXCEPT AS NOTED:
> ELEVATIONS WERE OBTAINED THROUGH FIELD SURVEYS
> DISTANCES WERE GENERATED FROM COMPUTER PLOTS

A = INVERT BASED ON REPORT BY FREESE & NICHOLS (4/78)
B = DISTANCE BETWEEN MANHOLES IS SCALED
C = INVERT BASED ON "AS-BUILT" DRAWINGS
D = INVERT BASED ON TOPOGRAPHY & ADJACENT MANHOLE DATA
NA = NOT AVAILABLE
NF = NOT FOUND

COMMENT COLUMN "WARNINGS"
**********

W = ZERO OR ADVERSE SLOPE PRESENT
(PEAK FLOW MAY EXCEED PIPE CAPACITY)
X = PEAK FLOW EXCEEDS PIPE CAPACITY
(LOW VELOCITIES MAY BE PRESENT)
Y = FULL PIPE VELOCITY BELOW 1.5 FPS
(AVERAGE VELOCITY MAY ALSO BE LOW)
Z = AVERAGE VELOCITY BELOW 1.2 FPS

FORMER MANHOLE IDENTIFICATION NUMBERS ALSO APPEAR IN THE COMMENT COLUMN UNDER "NOTES"

| MANHOLES FROM MH ID | MANHOLES TO MH ID | INVERT ELEV FROM FT | INVERT ELEV TO FT | DIST FT | PIPE DIA IN | PIPE TYP | PIPE SLOPE FT/FT | POPULATION RES | POPULATION N-RES | RATE OF FLOW(MGD) AVERAGE QA | RATE OF FLOW(MGD) PEAK QP | RATE OF FLOW(MGD) CAPACITY QF | PIPE RATIO QP/QF | VELOCITY AVG FPS | VELOCITY PEAK FPS | VELOCITY CAP FPS | UPSTREAM MANHOLE RIM ELEV | COMMENTS NOTE | COMMENTS WARNING |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A82D | A82C | 908.63 | 908.24 | 109. | 8. | CP | 0.004 | 0 | 20 | 0.0006 | 0.0023 | 0.4049 | 0.01 | 0.31 | 0.50 | 1.79 | 912.04 | B | Z |
| A82C | A82B | 908.24 | 907.26 | 315. | 8. | CP | 0.003 | 0 | 60 | 0.0018 | 0.0068 | 0.3774 | 0.02 | 0.42 | 0.66 | 1.67 | 911.28 | | Z |
| A82B | A82A | 907.26 | 905.16 | 503. | 8. | CP | 0.004 | 0 | 100 | 0.0030 | 0.0114 | 0.4371 | 0.03 | 0.55 | 0.85 | 1.94 | 910.50 | | Z |
| A82A | A82 | 905.16 | 904.80 | 120. | 8. | CP | 0.003 | 0 | 100 | 0.0030 | 0.0114 | 0.3708 | 0.03 | 0.49 | 0.76 | 1.64 | 912.27 | | Z |
| A82 | A81 | 904.80 | 898.05 | 237. | 8. | CP | 0.028 | 0 | 140 | 0.0042 | 0.0160 | 1.1418 | 0.01 | 1.18 | 1.85 | 5.06 | NF | A | Z |
| A83 | A81 | 898.30 | 898.05 | 80. | 8. | CP | 0.003 | 0 | 30 | 0.0009 | 0.0034 | 0.3795 | 0.01 | 0.34 | 0.54 | 1.68 | NF | B/A | Z |
| * AT MH A81 | | | | | | | | 0 | 170 | | | | | | | | | | |
| A81 | A80 | 898.05 | 896.96 | 400. | 8. | CP | 0.003 | 0 | 270 | 0.0081 | 0.0308 | 0.3534 | 0.09 | 0.66 | 0.97 | 1.57 | 905.30 | | Z |
| A80 | A78 | 896.96 | 895.70 | 416. | 8. | CP | 0.003 | 0 | 330 | 0.0099 | 0.0376 | 0.3727 | 0.10 | 0.72 | 1.07 | 1.65 | 901.86 | | Z |
| A78B | A78A | 901.28 | 897.72 | 261. | 8. | CP | 0.014 | 0 | 20 | 0.0006 | 0.0023 | 0.7912 | 0.00 | 0.49 | 0.80 | 3.51 | 906.88 | | Z |
| A78A | A78 | 897.72 | 895.70 | 335. | 8. | CP | 0.006 | 0 | 20 | 0.0006 | 0.0023 | 0.5255 | 0.00 | 0.37 | 0.60 | 2.33 | 906.22 | | Z |
| A79 | A78 | 904.32 | 895.70 | 403. | 8. | CP | 0.021 | 0 | 20 | 0.0006 | 0.0023 | 0.9901 | 0.00 | 0.56 | 0.93 | 4.39 | 909.28 | | Z |
| * AT MH A78 | | | | | | | | 0 | 370 | | | | | | | | | | |
| A78 | A77 | 895.70 | 895.17 | 202. | 10. | CP | 0.003 | 0 | 370 | 0.0111 | 0.0422 | 0.6279 | 0.07 | 0.69 | 1.01 | 1.78 | 904.90 | | Z |
| A77 | A76A | 895.17 | 894.86 | 137. | 10. | CP | 0.002 | 0 | 370 | 0.0111 | 0.0422 | 0.5842 | 0.07 | 0.65 | 0.96 | 1.66 | 905.05 | | Z |
| A76A | A75 | 894.86 | 894.53 | 368. | 10. | CP | 0.001 | 0 | 370 | 0.0111 | 0.0422 | 0.3676 | 0.11 | 0.47 | 0.69 | 1.04 | 907.42 | | Y |
| A100 | A99 | 916.65 | 913.71 | 280. | 8. | CP | 0.010 | 0 | 30 | 0.0009 | 0.0034 | 0.6935 | 0.00 | 0.51 | 0.82 | 3.07 | 921.87 | | Z |
| A101 | A99 | 916.38 | 913.71 | 577. | 8. | CP | 0.005 | 16 | 30 | 0.0025 | 0.0095 | 0.4604 | 0.02 | 0.54 | 0.84 | 2.04 | 924.50 | | Z |
| A99 | A96 | 913.71 | 912.20 | 388. | 8. | CP | 0.004 | 16 | 60 | 0.0034 | 0.0129 | 0.4225 | 0.03 | 0.56 | 0.86 | 1.87 | 920.27 | | Z |
| A98 | A97A | 914.95 | 913.65 | 290. | 8. | CP | 0.004 | 0 | 20 | 0.0006 | 0.0023 | 0.4532 | 0.01 | 0.33 | 0.54 | 2.01 | 918.55 | B | Z |
| A97A | A97 | 913.65 | 913.23 | 160. | 8. | CP | 0.003 | 0 | 20 | 0.0006 | 0.0023 | 0.3468 | 0.01 | 0.28 | 0.45 | 1.54 | 920.14 | B | Z |
| A97 | A96 | 913.23 | 912.20 | 243. | 8. | CP | 0.004 | 0 | 50 | 0.0015 | 0.0057 | 0.4406 | 0.01 | 0.44 | 0.70 | 1.95 | 921.09 | B | Z |
| * AT MH A96 | | | | | | | | 16 | 110 | | | | | | | | | | |
| A96 | A95 | 912.20 | 910.84 | 339. | 8. | CP | 0.004 | 16 | 150 | 0.0061 | 0.0232 | 0.4286 | 0.05 | 0.68 | 1.01 | 1.90 | 922.20 | | Z |
| A95 | A93 | 910.84 | 909.16 | 435. | 8. | CP | 0.004 | 16 | 170 | 0.0067 | 0.0255 | 0.4207 | 0.06 | 0.70 | 1.03 | 1.86 | 923.40 | | Z |
| A94 | A93 | 912.65 | 910.66 | 250. | 8. | CP | 0.008 | 533 | 0 | 0.0533 | 0.2025 | 0.6039 | 0.34 | 1.65 | 2.41 | 2.68 | 918.55 | B | |
| * AT MH A93 | | | | | | | | 549 | 170 | | | | | | | | | | |
| A93 | A92 | 909.16 | 905.34 | 417. | 8. | CP | 0.009 | 549 | 198 | 0.0608 | 0.2312 | 0.6478 | 0.36 | 1.80 | 2.63 | 2.87 | 920.86 | | |

| MANHOLES FROM MH ID | TO MH ID | INVERT ELEV FROM FT | TO FT | DIST FT | PIPE DIA IN | TYP | SLOPE FT/FT | POPULATION RES | N-RES | RATE OF FLOW(MGD) AVERAGE QA | PEAK QP | CAPACITY QF | PIPE RATIO QP/QF | VELOCITY AVG FPS | PEAK FPS | CAP FPS | UPSTREAM MANHOLE RIM ELEV | COMMENTS NOTE | WARNING |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A92 | A89A | 905.34 | 903.00 | 330. | 8. | CP | 0.007 | 620 | 198 | 0.0679 | 0.2582 | 0.5701 | 0.45 | 1.70 | 2.46 | 2.53 | 912.19 | | |
| A90B | A90 | 914.54 | 907.93 | 398. | 8. | CP | 0.017 | 0 | 10 | 0.0003 | 0.0011 | 0.8727 | 0.00 | 0.41 | 0.69 | 3.87 | 920.50 | | Z |
| A90 | A90A | 907.93 | 907.71 | 14. | 8. | CP | 0.015 | 0 | 10 | 0.0003 | 0.0011 | 0.8365 | 0.00 | 0.40 | 0.67 | 3.71 | 914.69 | | Z |
| A90A | A89C | 907.71 | 906.00 | 140. | 8. | CP | 0.012 | 55 | 10 | 0.0058 | 0.0220 | 0.7480 | 0.03 | 0.98 | 1.51 | 3.32 | 914.15 | B | Z |
| A89C | A89B | 906.00 | 905.20 | 70. | 8. | CP | 0.011 | 55 | 10 | 0.0058 | 0.0220 | 0.7236 | 0.03 | 0.96 | 1.47 | 3.21 | NF | B/A | Z |
| A89B | A89A | 905.20 | 903.00 | 180. | 8. | CP | 0.012 | 55 | 10 | 0.0058 | 0.0220 | 0.7483 | 0.03 | 0.98 | 1.51 | 3.32 | NF | B/A | Z |
| * AT MH A89A | | | | | | | | 675 | 208 | | | | | | | | | | |
| A89A | A89 | 903.00 | 902.06 | 15. | 8. | CP | 0.063 | 675 | 208 | 0.0737 | 0.2802 | 1.7000 | 0.16 | 3.76 | 5.59 | 7.54 | 910.12 | | |
| A89 | A86A | 902.06 | 900.91 | 316. | 10. | CP | 0.004 | 675 | 208 | 0.0737 | 0.2802 | 0.7407 | 0.38 | 1.34 | 1.95 | 2.10 | 910.04 | | |
| A87 | A86A | 909.13 | 900.91 | 471. | 10. | CP | 0.017 | 0 | 5 | 0.0002 | 0.0006 | 1.6208 | 0.00 | 0.32 | 0.55 | 4.60 | 915.41 | | Z |
| * AT MH A86A | | | | | | | | 675 | 213 | | | | | | | | | | |
| A86A | A86 | 900.91 | 899.96 | 26. | 10. | CP | 0.037 | 675 | 213 | 0.0739 | 0.2808 | 2.3593 | 0.12 | 3.03 | 4.50 | 6.69 | 909.29 | | |
| A86 | A85 | 899.96 | 899.20 | 88. | 10. | CP | 0.009 | 759 | 213 | 0.0823 | 0.3127 | 1.1399 | 0.27 | 1.88 | 2.74 | 3.23 | 909.48 | | |
| A85 | A75 | 899.20 | 894.53 | 176. | 12. | CP | 0.027 | 759 | 213 | 0.0823 | 0.3127 | 3.2519 | 0.10 | 2.72 | 4.05 | 6.41 | 910.40 | | |
| * AT MH A-75 | | | | | | | | 759 | 583 | | | | | | | | | | |
| A75 | A69 | 894.53 | 894.40 | 124. | 12. | CP | 0.001 | 759 | 583 | 0.0934 | 0.3549 | 0.6474 | 0.55 | 0.91 | 1.30 | 1.28 | 910.23 | | Y |
| A74 | A69 | 903.13 | 902.40 | 109. | 8. | CP | 0.007 | 188 | 0 | 0.0188 | 0.0714 | 0.5544 | 0.13 | 1.16 | 1.70 | 2.46 | 910.55 | | Z |
| A73 | A72 | 910.87 | 908.00 | 287. | 8. | CP | 0.010 | 0 | 40 | 0.0012 | 0.0046 | 0.6770 | 0.01 | 0.55 | 0.88 | 3.00 | 916.94 | D | Z |
| A72 | A71 | 908.00 | 906.77 | 46. | 8. | CP | 0.027 | 0 | 40 | 0.0012 | 0.0046 | 1.1061 | 0.00 | 0.76 | 1.24 | 4.90 | 914.30 | | Z |
| A71 | A70 | 906.77 | 906.44 | 58. | 8. | CP | 0.006 | 0 | 40 | 0.0012 | 0.0046 | 0.5101 | 0.01 | 0.45 | 0.72 | 2.26 | 914.32 | | Z |
| A70 | A69 | 906.44 | 894.40 | 326. | 8. | CP | 0.037 | 0 | 90 | 0.0027 | 0.0103 | 1.3008 | 0.01 | 1.11 | 1.77 | 5.77 | 914.28 | | Z |
| * AT MH A69 | | | | | | | | 947 | 673 | | | | | | | | | | |
| A69 | A68 | 894.40 | 893.50 | 190. | 12. | CP | 0.005 | 947 | 673 | 0.1149 | 0.4175 | 1.3734 | 0.30 | 1.64 | 2.37 | 2.71 | 910.20 | B | |
| A68 | A60 | 893.50 | 893.21 | 373. | 12. | CP | 0.001 | 947 | 723 | 0.1164 | 0.4229 | 0.5564 | 0.76 | 0.87 | 1.21 | 1.10 | NF | B/A | Y |
| A64 | A62 | 903.02 | 898.84 | 248. | 8. | CP | 0.017 | 0 | 70 | 0.0021 | 0.0080 | 0.8788 | 0.01 | 0.79 | 1.25 | 3.90 | 910.00 | | Z |
| A63 | A62 | 899.90 | 898.84 | 186. | 8. | CP | 0.006 | 0 | 40 | 0.0012 | 0.0046 | 0.5109 | 0.01 | 0.45 | 0.72 | 2.26 | NF | B/A | Z |
| A62 | A61 | 898.84 | 898.41 | 79. | 8. | CP | 0.005 | 0 | 130 | 0.0039 | 0.0148 | 0.4999 | 0.03 | 0.66 | 1.01 | 2.22 | 905.23 | B | Z |
| A61 | A60 | 898.41 | 897.36 | 240. | 8. | CP | 0.004 | 0 | 130 | 0.0039 | 0.0148 | 0.4477 | 0.03 | 0.61 | 0.93 | 1.98 | 903.86 | B | Z |
| * AT MH A60 | | | | | | | | 947 | 853 | | | | | | | | | | |
| A60 | A52 | 893.21 | 892.14 | 400. | 12. | CP | 0.003 | 947 | 853 | 0.1203 | 0.4369 | 1.0321 | 0.42 | 1.36 | 1.95 | 2.03 | 906.26 | B | |
| A54 | A57 | 902.76 | 899.40 | 335. | 8. | CP | 0.010 | 0 | 20 | 0.0006 | 0.0023 | 0.6779 | 0.00 | 0.44 | 0.72 | 3.00 | 907.03 | | Z |
| A57 | A53 | 899.40 | 896.96 | 274. | 8. | CP | 0.010 | 0 | 20 | 0.0006 | 0.0023 | 0.8616 | 0.00 | 0.51 | 0.85 | 3.82 | 904.40 | | Z |
| A53A | A53 | 896.96 | 894.96 | 317. | 8. | CP | 0.006 | 143 | 0 | 0.0143 | 0.0543 | 0.5378 | 0.10 | 1.05 | 1.54 | 2.38 | 903.17 | | Z |
| A55 | A53 | 902.56 | 898.27 | 527. | 8. | CP | 0.008 | 0 | 87 | 0.0026 | 0.0099 | 0.6105 | 0.02 | 0.66 | 1.03 | 2.71 | 908.63 | | Z |
| A53 | A52 | 894.96 | 892.14 | 451. | 8. | CP | 0.006 | 299 | 107 | 0.0331 | 0.1258 | 0.5351 | 0.24 | 1.32 | 1.93 | 2.37 | 905.02 | | |
| * AT MH A52 | | | | | | | | 1246 | 960 | | | | | | | | | | |
| A52 | A51 | 892.14 | 890.60 | 436. | 12. | CP | 0.004 | 1246 | 960 | 0.1534 | 0.5556 | 1.1854 | 0.47 | 1.61 | 2.29 | 2.34 | 901.44 | | |
| A51 | A48 | 890.60 | 889.00 | 433. | 12. | CP | 0.004 | 1246 | 960 | 0.1534 | 0.5556 | 1.2131 | 0.46 | 1.64 | 2.33 | 2.39 | 899.06 | | |
| A50 | A49 | 909.30 | 907.78 | 180. | 6. | CP | 0.008 | 0 | 0 | 0.0000 | 0.0000 | 0.2888 | 0.00 | 0.00 | 0.00 | 2.28 | 914.16 | B | Y |
| A49 | A49A | 898.80 | 898.65 | 75. | 6. | CP | 0.002 | 0 | 0 | 0.0000 | 0.0000 | 0.1405 | 0.00 | 0.00 | 0.00 | 1.11 | 912.41 | B | Y |
| A49A | A48 | 898.65 | 897.86 | 391. | 6. | CP | 0.002 | 0 | 20 | 0.0006 | 0.0023 | 0.1412 | 0.02 | 0.27 | 0.42 | 1.11 | NF | A | |
| * AT MH A48 | | | | | | | | 1246 | 980 | | | | | | | | | | |

| MANHOLES FROM MH ID | MANHOLES TO MH ID | INVERT ELEV FROM FT | INVERT ELEV TO FT | DIST FT | DIA IN | PIPE TYP | PIPE SLOPE FT/FT | POPULATION RES | POPULATION N-RES | RATE OF FLOW(MGD) AVERAGE QA | RATE OF FLOW(MGD) PEAK QP | RATE OF FLOW(MGD) CAPACITY QF | PIPE RATIO QP/QF | VELOCITY AVG FPS | VELOCITY PEAK FPS | VELOCITY CAP FPS | UPSTREAM MANHOLE RIM ELEV | COMMENTS NOTE | COMMENTS WARNING |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A48 | A45 | 889.00 | 887.47 | 394. | 12. | CP | 0.004 | 1246 | 980 | 0.1540 | 0.5578 | 1.2430 | 0.45 | 1.67 | 2.38 | 2.45 | 902.61 | | |
| A47 | A46 | 890.75 | 889.18 | 452. | 8. | CP | 0.003 | 0 | 90 | 0.0027 | 0.0103 | 0.3990 | 0.03 | 0.50 | 0.77 | 1.77 | 897.35 | | Z |
| A46 | A45 | 889.18 | 887.47 | 499. | 8. | CP | 0.003 | 0 | 120 | 0.0044 | 0.0167 | 0.3962 | 0.04 | 0.58 | 0.87 | 1.76 | 893.54 | | Z |
| * AT MH A45 | | | | | | | | 1254 | 1100 | | | | | | | | | | |
| A45 | A45A | 887.47 | 887.50 | 137. | 12. | CP | 0.000 | 1254 | 1100 | 0.1584 | 0.5735 | | | | | | 895.17 | | W |
| A45A | A39 | 887.50 | 886.82 | 129. | 12. | CP | 0.005 | 1254 | 1100 | 0.1584 | 0.5735 | 1.4509 | 0.40 | 1.88 | 2.69 | 2.86 | 898.19 | | |
| A44 | A43 | 889.60 | 889.31 | 148. | 8. | CP | 0.002 | 0 | 0 | 0.0000 | 0.0000 | 0.2994 | 0.00 | 0.00 | 0.00 | 1.33 | NF | A | Y |
| A43A | A43 | 894.83 | 889.31 | 452. | 8. | CP | 0.012 | 0 | 10 | 0.0003 | 0.0011 | 0.7476 | 0.00 | 0.37 | 0.62 | 3.31 | 899.75 | | Z |
| * AT MH A43 | | | | | | | | 0 | 10 | | | | | | | | | | |
| A43 | A42 | 889.31 | 889.10 | 452. | 8. | CP | 0.000 | 0 | 100 | 0.0030 | 0.0114 | 0.1459 | 0.08 | 0.26 | 0.39 | 0.65 | 893.11 | | Y |
| A42 | A41 | 888.42 | 887.64 | 254. | 8. | CP | 0.003 | 0 | 140 | 0.0042 | 0.0160 | 0.3748 | 0.04 | 0.55 | 0.82 | 1.66 | 891.62 | | Z |
| A41 | A40 | 887.64 | 886.94 | 419. | 8. | CP | 0.002 | 0 | 170 | 0.0051 | 0.0194 | 0.2765 | 0.07 | 0.48 | 0.72 | 1.23 | 891.21 | | Y |
| A40 | A39 | 886.94 | 886.82 | 159. | 8. | CP | 0.001 | 0 | 170 | 0.0051 | 0.0194 | 0.1862 | 0.10 | 0.37 | 0.54 | 0.83 | 893.71 | | Y |
| * AT MH A39 | | | | | | | | 1254 | 1270 | | | | | | | | | | |
| A39 | A37 | 886.82 | 886.66 | 144. | 12. | CP | 0.001 | 1254 | 1270 | 0.1635 | 0.5917 | 0.6653 | 0.89 | 1.09 | 1.48 | 1.31 | 896.47 | | Y |
| A38A | A38 | 901.72 | 894.01 | 410. | 8. | CP | 0.019 | 56 | 0 | 0.0056 | 0.0213 | 0.9279 | 0.02 | 1.12 | 1.74 | 4.11 | 906.36 | | Z |
| A38 | A37 | 894.01 | 886.66 | 276. | 8. | CP | 0.027 | 89 | 0 | 0.0089 | 0.0338 | 1.1052 | 0.03 | 1.47 | 2.25 | 4.90 | 901.03 | | |
| * AT MH A37 | | | | | | | | 1343 | 1270 | | | | | | | | | | |
| A37 | A36 | 886.66 | 885.88 | 246. | 12. | CP | 0.003 | 1365 | 1270 | 0.1746 | 0.6313 | 1.1241 | 0.56 | 1.61 | 2.28 | 2.21 | 898.11 | | |
| A115C | A115B | 903.70 | 902.60 | 110. | 8. | CP | 0.010 | 0 | 100 | 0.0030 | 0.0114 | 0.6768 | 0.02 | 0.74 | 1.16 | 3.00 | NF | B/A | Z |
| A115B | A115A | 902.60 | 895.60 | 350. | 8. | CP | 0.020 | 0 | 200 | 0.0060 | 0.0228 | 0.9572 | 0.02 | 1.17 | 1.81 | 4.24 | NF | B/A | Z |
| A115A | A115 | 895.60 | 895.10 | 330. | 8. | CP | 0.002 | 0 | 300 | 0.0090 | 0.0342 | 0.2635 | 0.13 | 0.55 | 0.81 | 1.17 | NF | B/A | Y |
| A115 | A114 | 895.10 | 894.30 | 380. | 8. | CP | 0.002 | 0 | 300 | 0.0090 | 0.0342 | 0.3105 | 0.11 | 0.62 | 0.91 | 1.38 | NF | B/A | Y |
| A114 | A113 | 894.30 | 893.21 | 267. | 8. | CP | 0.004 | 0 | 400 | 0.0120 | 0.0456 | 0.4321 | 0.11 | 0.85 | 1.26 | 1.92 | 903.02 | | Z |
| A113B | A113A | 899.42 | 895.93 | 445. | 8. | CP | 0.008 | 0 | 100 | 0.0030 | 0.0114 | 0.5992 | 0.02 | 0.68 | 1.06 | 2.66 | 901.80 | | Z |
| A113A | A113 | 895.93 | 893.21 | 255. | 8. | CP | 0.011 | 0 | 100 | 0.0030 | 0.0114 | 0.6987 | 0.02 | 0.76 | 1.18 | 3.10 | 900.83 | | Z |
| * AT MH A113 | | | | | | | | 0 | 500 | | | | | | | | | | |
| A113 | A112 | 893.21 | 892.07 | 348. | 8. | CP | 0.003 | 0 | 500 | 0.0150 | 0.0570 | 0.3667 | 0.16 | 0.80 | 1.19 | 1.63 | 901.01 | | Z |
| A112 | A111 | 892.07 | 890.53 | 368. | 8. | CP | 0.004 | 187 | 500 | 0.0337 | 0.1281 | 0.4376 | 0.29 | 1.16 | 1.67 | 1.94 | 899.13 | | Z |
| A111A | A111 | 894.02 | 893.13 | 86. | 8. | CP | 0.010 | 0 | 50 | 0.0015 | 0.0057 | 0.6871 | 0.01 | 0.60 | 0.95 | 3.05 | 897.25 | | Z |
| A111 | A110 | 890.53 | 889.28 | 332. | 8. | CP | 0.004 | 352 | 550 | 0.0517 | 0.1965 | 0.4155 | 0.47 | 1.26 | 1.81 | 1.84 | 896.93 | | |
| A110D | A110B | 895.16 | 891.74 | 206. | 8. | CP | 0.017 | 0 | 20 | 0.0006 | 0.0023 | 0.8725 | 0.00 | 0.52 | 0.85 | 3.87 | 901.32 | | Z |
| A110C | A110B | 892.43 | 891.74 | 69. | 8. | CP | 0.010 | 0 | 40 | 0.0012 | 0.0046 | 0.6752 | 0.01 | 0.55 | 0.88 | 2.99 | 896.27 | | Z |
| A110B | A110A | 891.74 | 889.97 | 219. | 8. | CP | 0.008 | 0 | 80 | 0.0024 | 0.0091 | 0.6079 | 0.02 | 0.64 | 1.00 | 2.69 | 896.17 | | Z |
| A110A | A110 | 889.97 | 889.28 | 165. | 8. | CP | 0.004 | 0 | 80 | 0.0024 | 0.0091 | 0.4383 | 0.02 | 0.51 | 0.80 | 1.94 | 896.20 | | Z |
| * AT MH A110 | | | | | | | | 352 | 630 | | | | | | | | | | |
| A110 | A109 | 889.28 | 887.52 | 215. | 8. | CP | 0.008 | 352 | 630 | 0.0541 | 0.2056 | 0.6120 | 0.34 | 1.67 | 2.44 | 2.71 | 895.42 | | |

| MANHOLES FROM MH ID | MANHOLES TO MH ID | INVERT ELEV FROM FT | INVERT ELEV TO FT | DIST FT | PIPE DIA IN | PIPE TYP | PIPE SLOPE FT/FT | POPULATION RES | POPULATION N-RES | RATE OF FLOW(MGD) AVERAGE QA | RATE OF FLOW(MGD) PEAK QP | RATE OF FLOW(MGD) CAPACITY QF | PIPE RATIO QP/QF | VELOCITY AVG FPS | VELOCITY PEAK FPS | VELOCITY CAP FPS | UPSTREAM MANHOLE RIM ELEV | COMMENTS NOTE | COMMENTS WARNING |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A109B | A109A | 897.51 | 892.20 | 275. | 8. | CP | 0.019 | 0 | 50 | 0.0015 | 0.0057 | 0.9411 | 0.01 | 0.74 | 1.19 | 4.17 | 901.85 | | Z |
| A109C | A109A | 895.25 | 892.20 | 98. | 8. | CP | 0.031 | 0 | 43 | 0.0013 | 0.0049 | 1.1934 | 0.00 | 0.82 | 1.34 | 5.29 | 898.38 | | Z |
| A109A | A109 | 892.20 | 888.32 | 204. | 8. | CP | 0.019 | 0 | 113 | 0.0034 | 0.0129 | 0.9341 | 0.01 | 0.96 | 1.51 | 4.14 | 897.46 | | Z |
| *AT MH A109 | | | | | | | | 352 | 743 | | | | | | | | | | |
| A109 | A108 | 887.52 | 885.09 | 204. | 10. | CP | 0.012 | 352 | 783 | 0.0587 | 0.2230 | 1.3406 | 0.17 | 1.90 | 2.83 | 3.80 | 895.42 | | |
| A124A | A124 | 890.00 | 886.79 | 40. | 8. | VCP | 0.080 | 0 | 100 | 0.0030 | 0.0114 | 2.2126 | 0.01 | 1.64 | 2.66 | 9.81 | NF | A | |
| A124 | A123 | 886.79 | 884.79 | 385. | 8. | VCP | 0.005 | 0 | 100 | 0.0030 | 0.0114 | 0.5629 | 0.02 | 0.65 | 1.02 | 2.49 | 895.44 | B | Z |
| A125E | A125D | 907.08 | 895.88 | 360. | 8. | PVC | 0.031 | 0 | 100 | 0.0030 | 0.0114 | 1.6286 | 0.01 | 1.34 | 2.14 | 7.22 | 914.20 | | |
| A125D1 | A125D | 910.21 | 895.88 | 58. | 8. | PVC | 0.248 | 0 | 10 | 0.0003 | 0.0011 | 4.5931 | 0.00 | 1.25 | 2.20 | 20.36 | 914.27 | | |
| A125D | A125C | 895.88 | 892.12 | 360. | 8. | PVC | 0.010 | 0 | 210 | 0.0063 | 0.0239 | 0.9437 | 0.03 | 1.18 | 1.82 | 4.18 | 904.01 | | Z |
| A125C | A125B | 892.12 | 890.70 | 252. | 8. | PVC | 0.006 | 0 | 210 | 0.0063 | 0.0239 | 0.6932 | 0.03 | 0.96 | 1.46 | 3.07 | 898.09 | | Z |
| A125B | A125 | 890.70 | 886.68 | 403. | 8. | PVC | 0.010 | 0 | 210 | 0.0063 | 0.0239 | 0.9213 | 0.03 | 1.16 | 1.79 | 4.08 | 896.75 | | Z |
| A125A | A125 | 889.96 | 886.68 | 10. | 6. | VCP | 0.343 | 0 | 100 | 0.0030 | 0.0114 | 2.1240 | 0.01 | 2.84 | 4.59 | 16.74 | 895.35 | | |
| A125 | A123 | 886.68 | 884.79 | 435. | 8. | VCP | 0.004 | 0 | 410 | 0.0123 | 0.0467 | 0.5147 | 0.09 | 0.97 | 1.43 | 2.28 | 895.44 | | Z |
| * AT MH A123 | | | | | | | | 0 | 510 | | | | | | | | | | |
| A123 | A122 | 884.79 | 884.55 | 100. | 8. | VCP | 0.002 | 0 | 510 | 0.0153 | 0.0581 | 0.3821 | 0.15 | 0.83 | 1.23 | 1.69 | 889.37 | | Z |
| A122 | L89534 | 884.55 | 884.12 | 21. | 8. | VCP | 0.020 | 0 | 510 | 0.0153 | 0.0581 | 1.1096 | 0.05 | 1.75 | 2.60 | 4.92 | 894.93 | | |
| * LIFT STA. #9534 DISCHARGES TO 6 IN. CONC. PIPE AT UNKNOWN ELEV. | | | | | | | | | | | | | | | | | | | |
| * FLOWS TO MH A121 R:905.26 I:897.35 LOC:337.06 FROM LS 9534 | | | | | | | | | | | | | | | | | | | Y |
| A121 | A120 | 897.35 | 896.78 | 390. | 8. | CP | 0.001 | 459 | 510 | 0.0612 | 0.2326 | 0.2588 | 0.90 | 0.94 | 1.30 | 1.15 | 905.26 | | |
| A127 | A127A | 900.82 | 899.60 | 100. | 8. | CP | 0.012 | 198 | 0 | 0.0198 | 0.0752 | 0.7476 | 0.10 | 1.45 | 2.15 | 3.31 | 906.35 | B | |
| A127A | A126 | 899.60 | 897.56 | 244. | 8. | CP | 0.008 | 198 | 0 | 0.0198 | 0.0752 | 0.6185 | 0.12 | 1.27 | 1.87 | 2.74 | NF | | |
| A129 | A126 | 900.62 | 897.34 | 415. | 8. | CP | 0.008 | 273 | 0 | 0.0273 | 0.1037 | 0.6017 | 0.17 | 1.35 | 2.00 | 2.67 | 907.00 | | |
| A128 | A126 | 899.00 | 897.94 | 330. | 8. | CP | 0.003 | 144 | 0 | 0.0144 | 0.0547 | 0.3836 | 0.14 | 0.81 | 1.21 | 1.70 | 904.77 | B | Z |
| * AT MH A126 | | | | | | | | 615 | 0 | | | | | | | | | | |
| A126 | A120 | 897.32 | 896.78 | 402. | 10. | CP | 0.001 | 615 | 0 | 0.0615 | 0.2337 | 0.4498 | 0.52 | 0.89 | 1.28 | 1.28 | 905.66 | | Y |
| * AT MH A120 | | | | | | | | 1074 | 510 | | | | | | | | | | |
| A120 | A119 | 896.76 | 895.27 | 321. | 10. | CP | 0.005 | 1074 | 510 | 0.1227 | 0.4455 | 0.8363 | 0.53 | 1.70 | 2.40 | 2.37 | 904.40 | | |
| A119 | A118 | 895.27 | 893.00 | 313. | 12. | CP | 0.007 | 1074 | 510 | 0.1227 | 0.4455 | 1.6993 | 0.26 | 1.94 | 2.81 | 3.35 | 902.89 | | |
| A118 | A117 | 893.00 | 890.23 | 221. | 12. | CP | 0.013 | 1074 | 510 | 0.1227 | 0.4455 | 2.2322 | 0.20 | 2.36 | 3.43 | 4.40 | 898.43 | | |
| A117G | A117F | 906.62 | 905.87 | 194. | 8. | CP | 0.004 | 0 | 50 | 0.0015 | 0.0057 | 0.4207 | 0.01 | 0.43 | 0.67 | 1.86 | 910.97 | | Z |
| A117F | A117E | 905.87 | 902.03 | 340. | 8. | CP | 0.011 | 0 | 50 | 0.0015 | 0.0057 | 0.7192 | 0.01 | 0.62 | 0.98 | 3.19 | 909.79 | | Z |
| A117E1 | A117E | 905.33 | 902.03 | 117. | 8. | CP | 0.030 | 0 | 50 | 0.0015 | 0.0057 | 1.1685 | 0.00 | 0.85 | 1.38 | 5.18 | 913.55 | | Z |
| A117E | A117D | 902.03 | 900.65 | 145. | 8. | CP | 0.010 | 0 | 100 | 0.0030 | 0.0114 | 0.6601 | 0.02 | 0.73 | 1.14 | 2.93 | 910.21 | | Z |
| A117D2D | A117D2C | 910.02 | 909.07 | 415. | 8. | CP | 0.002 | 0 | 100 | 0.0030 | 0.0114 | 0.3238 | 0.04 | 0.45 | 0.69 | 1.44 | 914.87 | | Y |
| A117D2C | A117D2B | 909.12 | 906.69 | 340. | 8. | CP | 0.004 | 179 | 200 | 0.0239 | 0.0908 | 0.4389 | 0.21 | 1.04 | 1.53 | 1.95 | 917.17 | B | Z |
| A117D2B | A117D2A | 906.69 | 905.65 | 335. | 8. | CP | 0.003 | 548 | 200 | 0.0608 | 0.2310 | 0.3772 | 0.61 | 1.23 | 1.75 | 1.67 | 915.94 | | |
| A117D2A | A117D2 | 905.65 | 904.03 | 160. | 8. | CP | 0.010 | 700 | 200 | 0.0760 | 0.2888 | 0.6638 | 0.44 | 1.96 | 2.83 | 2.94 | 915.65 | | |
| A117D4 | A117D3 | 912.32 | 910.43 | 389. | 8. | CP | 0.005 | 210 | 250 | 0.0285 | 0.1083 | 0.4718 | 0.23 | 1.15 | 1.69 | 2.09 | 916.52 | | Z |
| A117D3 | A117D2 | 910.43 | 904.06 | 342. | 8. | CP | 0.019 | 374 | 250 | 0.0449 | 0.1706 | 0.9239 | 0.18 | 2.11 | 3.13 | 4.10 | 916.86 | | |
| * AT MH A117D2 | | | | | | | | 1074 | 450 | | | | | | | | | | |
| A117D2 | A117D1 | 903.98 | 903.66 | 168. | 10. | CP | 0.002 | 1294 | 450 | 0.1429 | 0.5181 | 0.5351 | 0.97 | 1.29 | 1.73 | 1.52 | 915.92 | | |

```
   MANHOLES        INVERT ELEV   DIST        PIPE        POPULATION   RATE OF FLOW(MGD)    PIPE      VELOCITY      UPSTREAM   COMMENTS
 FROM      TO      FROM    TO          DIA TYP SLOPE   RES N-RES AVERAGE  PEAK CAPACITY RATIO  AVG PEAK  CAP  MANHOLE   NOTE WARNING
 MH ID    MH ID     FT      FT     FT   IN      FT/FT                 QA     QP     QF    QP/QF  FPS  FPS  FPS  RIM ELEV
*
*
*
*
*
*
*
*
*  FLOW FROM AREAS 1-17 ENTER AREA 18 AT MANHOLE R-18
*  AT MH R-18
*                                 451193                 33882 30119 (AREAS 1-17)
*                                 26461                  2695  13    (AREA 18)
*                                 ------                 ----- -----
*                                 477654                 36577 30132 (TOTAL)
*
*
TOTAL NUMBER OF REACHES BELOW 1.2 FPS =  110.
TOTAL NUMBER OF ADVERSE REACHES =    1.
        A45      A45A
TOTAL NUMBER OF REACHES EXCEEDING PIPE CAPACITY =   11.
        A45      A45A
        A106     A105
        A105     A104
        A104     A103
        A103     LS8001
        A36      A30
        A30      A29A
        A26      A17B
        A17B     A16A
        A16A     A12A
        A11D     A11E
TOTAL NUMBER OF REACHES WHICH HAVE FULL PIPE VELOCITIES BELOW 1.5 FPS=   19.
        A76A     A75
        A75      A69
        A68      A60
        A49      A49A
        A49A     A48
        A45      A45A
        A44      A43
        A43      A42
        A41      A40
        A40      A39
        A39      A37
        A115A    A115
        A115     A114
        A121     A120
        A126     A120
        A117D2D  A117D2C
        A105     A104
        A104     A103
        A103     LS8001
TOTAL NUMBER OF REACHES =  189.
```

## SUBAREA 18

Subarea 18 is the Pershing Park family housing area, south of Business Highway 190. Flow from the development combines with those from Subareas 1 through 17 at manhole R-18 prior to passing through Meter 'A'. All sewage is then conveyed eastward, through the City of Killeen, to the Bell County Water Control & Improvement District No. 1 wastewater treatment facility.

Average flow velocities below the specified minimum 1.2 FPS occur in 36 of the 102 reaches. Each of these involves concrete pipe (CP). There are four reaches, three of which are in interceptor lines, with full pipe velocities below the specified minimum 1.5 FPS.

Peak flow exceeds pipe capacity in 2 consecutive reaches (from MH N6F to MH NO20), one of which passes under Business Highway 190. Surcharging conditions were observed in each of manholes N6F, N5E, and NO20 on several occasions by field personnel. Several options were considered to correct the condition:

1) Increase pipe size without altering slope. Requires replacement of line under South Nolan Creek and a bore under both Highway 190 and the railroad tracks.

2) Install same diameter pipe with greater slope along with a lift station south of Highway 190. A force main could be placed into the existing sewers under the roadway and railroad, saving the cost of an additional bore.

3) Reroute the flow from Pershing Park into either of the two existing City sewer mains that parallel South Nolan Creek. Permission of the City of Killeen and an additional flowmeter for the Post would be required. The capacity of the City mains to handle the additional flow would have to be checked.

4) Reroute flow from the western portion of Pershing Park to Subarea 16(Venable Village). Requires construction of approximately 700 feet of sewer line from manhole N29A (Subarea 18) to manhole R-53 (Subarea 16), including an aerial creek crossing similar to the existing pipe.

Option #4 is the most cost effective and the recommended alternative. The existing line from Venable Village will handle the increased flow with no problems. In fact, the addition will raise the minimum velocity to 1.52 FPS where it is now below the specified minimum. The current OMA outfall line project will remove the majority of the flow from the existing 30-inch line, allowing this additional flow to pass.

| | | |
|---|---|---|
| Trenching | 670 L.F. @ $10.00 | $ 6,700.00 |
| 10" PVC | 670 L.F. @ $10.00 | 6,700.00 |
| Aerial Crossing | 30 L.F. @ $100.00 | 3,000.00 |
| Std. MH | 1 EA @ $1,000.00 | 1,000.00 |
| | Sub-Total | $17,400.00 |
| | Contingency (20%) | 3,480.00 |
| | Engineering ( 6%) | 1,250.00 |
| | Test & Inspect'n ( 8%) | 1,770.00 |
| | Total | $23,900.00 |

No other reconstruction of sewer lines or manholes is required in Subarea 18 unless television inspection shows otherwise.

| MANHOLES FROM MH ID | MANHOLES TO MH ID | INVERT ELEV FROM FT | INVERT ELEV TO FT | DIST FT | PIPE DIA IN | PIPE TYP | PIPE SLOPE FT/FT | POPULATION RES | POPULATION N-RES | RATE OF FLOW(MGD) AVERAGE QA | RATE OF FLOW(MGD) PEAK QP | RATE OF FLOW(MGD) CAPACITY QF | PIPE RATIO QP/QF | VELOCITY AVG FPS | VELOCITY PEAK FPS | VELOCITY CAP FPS | UPSTREAM MANHOLE RIM ELEV | COMMENTS NOTE | COMMENTS WARNING |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| N43A | N42A | 876.03 | 871.19 | 125. | 8. | CP | 0.039 | 206 | 0 | 0.0206 | 0.0783 | 1.3324 | 0.06 | 2.18 | 3.23 | 5.91 | 882.09 | | |
| N42A | N41A | 871.19 | 869.09 | 143. | 8. | CP | 0.015 | 213 | 0 | 0.0213 | 0.0809 | 0.8216 | 0.10 | 1.59 | 2.34 | 3.64 | 877.43 | | |
| N41D | N41C | 881.98 | 875.56 | 202. | 8. | CP | 0.032 | 31 | 0 | 0.0031 | 0.0118 | 1.2057 | 0.01 | 1.10 | 1.75 | 5.34 | 888.20 | | Z |
| N41C | N41B | 875.56 | 871.32 | 270. | 8. | CP | 0.016 | 69 | 0 | 0.0069 | 0.0262 | 0.8485 | 0.03 | 1.13 | 1.73 | 3.76 | 883.44 | | Z |
| N41B | N41A | 871.32 | 869.09 | 232. | 8. | CP | 0.010 | 84 | 0 | 0.0084 | 0.0319 | 0.6639 | 0.05 | 1.02 | 1.51 | 2.94 | 876.49 | | Z |
| *AT MH N41A | | | | | | | | 297 | 0 | | | | | | | | | | |
| N41A | N40A | 869.09 | 863.56 | 241. | 8. | CP | 0.023 | 320 | 0 | 0.0320 | 0.1216 | 1.0246 | 0.12 | 2.10 | 3.08 | 4.54 | 874.37 | | |
| N40A | N39A | 863.56 | 862.26 | 137. | 8. | CP | 0.010 | 335 | 0 | 0.0335 | 0.1273 | 0.6605 | 0.19 | 1.53 | 2.27 | 2.93 | 870.53 | | |
| N39A | N34A | 862.26 | 861.50 | 239. | 8. | CP | 0.003 | 335 | 0 | 0.0335 | 0.1273 | 0.3820 | 0.33 | 1.04 | 1.52 | 1.69 | 870.27 | | Z |
| N38A | N37A | 899.15 | 888.42 | 303. | 8. | CP | 0.035 | 46 | 0 | 0.0046 | 0.0175 | 1.2745 | 0.01 | 1.30 | 2.05 | 5.65 | 904.79 | | |
| N37A | N36A | 888.42 | 878.64 | 402. | 8. | CP | 0.024 | 84 | 0 | 0.0084 | 0.0319 | 1.0561 | 0.03 | 1.40 | 2.15 | 4.68 | 894.37 | | |
| N36A | N35A | 878.54 | 873.61 | 220. | 8. | CP | 0.022 | 115 | 0 | 0.0115 | 0.0437 | 1.0123 | 0.04 | 1.50 | 2.24 | 4.49 | 886.19 | | |
| N35A | N34A | 873.61 | 861.20 | 206. | 8. | CP | 0.060 | 146 | 0 | 0.0146 | 0.0555 | 1.6604 | 0.03 | 2.27 | 3.47 | 7.36 | 879.59 | | |
| *AT MH N34A | | | | | | | | 481 | 0 | | | | | | | | | | |
| N34A | N33A | 861.14 | 858.81 | 356. | 8. | CP | 0.007 | 519 | 0 | 0.0519 | 0.1972 | 0.5476 | 0.36 | 1.53 | 2.23 | 2.43 | 875.12 | | |
| N33A | N32A | 858.81 | 851.30 | 134. | 8. | CP | 0.056 | 534 | 0 | 0.0534 | 0.2029 | 1.6041 | 0.13 | 3.35 | 4.90 | 7.11 | 865.73 | | |
| *AT MH N32A | | | | | | | | 1139 | 0 | | | | | | | | | | |
| N32A | N31A | 851.30 | 850.34 | 334. | 10. | CP | 0.003 | 1170 | 0 | 0.1170 | 0.4250 | 0.6578 | 0.65 | 1.41 | 1.98 | 1.87 | 862.32 | | |
| N31A | N30A | 850.34 | 849.21 | 367. | 10. | CP | 0.003 | 1224 | 0 | 0.1224 | 0.4445 | 0.6811 | 0.65 | 1.46 | 2.06 | 1.93 | 858.37 | | |
| N30A | N29A | 849.21 | 848.51 | 221. | 10. | CP | 0.003 | 1247 | 0 | 0.1247 | 0.4527 | 0.6905 | 0.66 | 1.49 | 2.09 | 1.96 | 856.14 | | |
| N29A | N28A | 848.51 | 848.12 | 140. | 10. | CP | 0.003 | 1262 | 0 | 0.1262 | 0.4581 | 0.6489 | 0.71 | 1.43 | 1.99 | 1.84 | 855.92 | | |
| N28A | N14A | 848.12 | 846.95 | 372. | 10. | CP | 0.003 | 1316 | 0 | 0.1316 | 0.4775 | 0.6883 | 0.69 | 1.51 | 2.11 | 1.95 | 855.23 | | |
| N27A | N26A | 910.12 | 907.90 | 283. | 8. | CP | 0.008 | 38 | 0 | 0.0038 | 0.0144 | 0.5997 | 0.02 | 0.74 | 1.14 | 2.66 | 916.07 | | Z |
| N26A | N25A | 907.90 | 905.18 | 350. | 8. | CP | 0.008 | 76 | 0 | 0.0076 | 0.0289 | 0.5970 | 0.05 | 0.92 | 1.36 | 2.65 | 912.80 | | Z |
| N25A | N24A | 905.18 | 901.63 | 291. | 8. | CP | 0.012 | 107 | 0 | 0.0107 | 0.0407 | 0.7481 | 0.05 | 1.20 | 1.77 | 3.32 | 918.10 | | Z |
| N24A | N23A | 901.57 | 891.76 | 402. | 8. | CP | 0.024 | 153 | 0 | 0.0153 | 0.0581 | 1.0578 | 0.05 | 1.70 | 2.51 | 4.69 | 907.23 | | |
| N23E | N23D | 905.01 | 902.37 | 133. | 8. | CP | 0.020 | 7 | 0 | 0.0007 | 0.0027 | 0.9536 | 0.00 | 0.58 | 0.95 | 4.23 | 910.08 | B | Z |
| N23D | N23C | 902.27 | 901.92 | 261. | 8. | CP | 0.001 | 45 | 0 | 0.0045 | 0.0171 | 0.2477 | 0.07 | 0.43 | 0.64 | 1.10 | 907.22 | | Y |
| N23C | N23B | 901.82 | 899.33 | 246. | 8. | CP | 0.010 | 76 | 0 | 0.0076 | 0.0289 | 0.6809 | 0.04 | 1.01 | 1.50 | 3.02 | 906.98 | B | Z |
| N23B | N23A | 899.27 | 891.75 | 287. | 8. | CP | 0.026 | 76 | 0 | 0.0076 | 0.0289 | 1.0960 | 0.03 | 1.39 | 2.14 | 4.86 | 907.39 | | |
| *AT MH N23A | | | | | | | | 229 | 0 | | | | | | | | | | |
| N23A | N22A | 891.75 | 886.98 | 148. | 8. | CP | 0.032 | 244 | 0 | 0.0244 | 0.0927 | 1.2155 | 0.08 | 2.16 | 3.23 | 5.39 | 898.20 | | |
| N22A | N21A | 886.98 | 879.33 | 258. | 8. | CP | 0.030 | 282 | 0 | 0.0282 | 0.1072 | 1.1648 | 0.09 | 2.20 | 3.26 | 5.16 | 893.00 | | |
| N21A | N20A | 879.29 | 872.22 | 309. | 8. | CP | 0.023 | 313 | 0 | 0.0313 | 0.1189 | 1.0233 | 0.12 | 2.08 | 3.06 | 4.54 | 885.67 | | |
| N20A | N19A | 868.42 | 866.51 | 308. | 8. | CP | 0.006 | 344 | 0 | 0.0344 | 0.1307 | 0.5326 | 0.25 | 1.33 | 1.95 | 2.36 | 875.17 | | |
| N19A | N18A | 866.51 | 865.33 | 149. | 8. | CP | 0.008 | 359 | 0 | 0.0359 | 0.1364 | 0.6021 | 0.23 | 1.46 | 2.16 | 2.67 | 871.56 | | |
| N18A | N17A | 865.33 | 864.14 | 215. | 8. | CP | 0.006 | 390 | 0 | 0.0390 | 0.1482 | 0.5035 | 0.29 | 1.32 | 1.93 | 2.23 | 874.06 | B | |
| N17A | N16A | 864.03 | 863.34 | 154. | 8. | CP | 0.004 | 405 | 0 | 0.0405 | 0.1539 | 0.4529 | 0.34 | 1.24 | 1.81 | 2.01 | 875.08 | | |
| N16A | N15A | 863.34 | 857.57 | 168. | 8. | CP | 0.034 | 412 | 0 | 0.0412 | 0.1566 | 1.2532 | 0.12 | 2.60 | 3.82 | 5.55 | 871.06 | | |
| N15B | N15A | 860.07 | 857.67 | 406. | 8. | CP | 0.006 | 54 | 0 | 0.0054 | 0.0205 | 0.5207 | 0.04 | 0.75 | 1.12 | 2.31 | 866.98 | | Z |
| *AT MH N15A | | | | | | | | 466 | 0 | | | | | | | | | | |
| N15A | N14A | 857.57 | 846.95 | 271. | 8. | CP | 0.039 | 473 | 0 | 0.0473 | 0.1797 | 1.3408 | 0.13 | 2.85 | 4.17 | 5.94 | 866.09 | | |
| *AT MH N14A | | | | | | | | 1789 | 0 | | | | | | | | | | |
| N14A | N13A | 846.95 | 846.43 | 211. | 12. | CP | 0.002 | 1812 | 0 | 0.1812 | 0.6549 | 0.9900 | 0.66 | 1.49 | 2.08 | 1.95 | 857.05 | | |
| N13A | N12A | 846.43 | 846.20 | 171. | 12. | CP | 0.001 | 1827 | 0 | 0.1827 | 0.6602 | 0.7329 | 0.90 | 1.20 | 1.63 | 1.44 | 859.41 | | Y |
| N12A | N6A | 846.20 | 845.69 | 376. | 12. | CP | 0.001 | 1827 | 0 | 0.1827 | 0.6602 | 0.7345 | 0.90 | 1.20 | 1.64 | 1.45 | 860.36 | | Y |
| N6E | N6D1 | 881.76 | 875.49 | 325. | 8. | CP | 0.019 | 46 | 0 | 0.0046 | 0.0175 | 0.9401 | 0.02 | 1.06 | 1.66 | 4.17 | 885.94 | | Z |
| N6D1 | N6D | 875.49 | 874.81 | 62. | 8. | CP | 0.011 | 100 | 0 | 0.0100 | 0.0380 | 0.7087 | 0.05 | 1.13 | 1.67 | 3.14 | 882.00 | | Z |

PERSHING PARK
**********

AREA 18,AS DEFINED BY THE SANITARY SEWER ANALYSIS, COMPLETED BY BOHANNAN-HUSTON, INC., SEPTEMBER 1984.

COMMENT COLUMN "NOTES"
**********

EXCEPT AS NOTED:
> ELEVATIONS WERE OBTAINED THROUGH FIELD SURVEYS
> DISTANCES WERE GENERATED FROM COMPUTER PLOTS

A = INVERT BASED ON REPORT BY FREESE & NICHOLS (4/78)
B = DISTANCE BETWEEN MANHOLES IS SCALED
C = INVERT BASED ON "AS-BUILT" DRAWINGS
D = INVERT BASED ON TOPOGRAPHY & ADJACENT MANHOLE DATA
NA = NOT AVAILABLE
NF = NOT FOUND

COMMENT COLUMN "WARNINGS"
**********

W = ZERO OR ADVERSE SLOPE PRESENT (PEAK FLOW MAY EXCEED PIPE CAPACITY)
X = PEAK FLOW EXCEEDS PIPE CAPACITY (LOW VELOCITIES MAY BE PRESENT)
Y = FULL PIPE VELOCITY BELOW 1.5 FPS (AVERAGE VELOCITY MAY ALSO BE LOW)
Z = AVERAGE VELOCITY BELOW 1.2 FPS

FORMER MANHOLE IDENTIFICATION NUMBERS ALSO APPEAR IN THE COMMENT COLUMN UNDER "NOTES"

| MANHOLES FROM MH ID | MANHOLES TO MH ID | INVERT ELEV FROM FT | INVERT ELEV TO FT | DIST FT | PIPE DIA IN | PIPE TYP | PIPE SLOPE FT/FT | POPULATION RES | POPULATION N-RES | RATE OF FLOW(MGD) AVERAGE QA | RATE OF FLOW(MGD) PEAK QP | RATE OF FLOW(MGD) CAPACITY QF | PIPE RATIO QP/QF | VELOCITY AVG FPS | VELOCITY PEAK FPS | VELOCITY CAP FPS | UPSTREAM MANHOLE RIM ELEV | COMMENTS NOTE | COMMENTS WARNING |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| N55A | N54A | 887.23 | 885.52 | 278. | 8. | CP | 0.006 | 46 | 0 | 0.0046 | 0.0175 | 0.5311 | 0.03 | 0.72 | 1.11 | 2.35 | 891.49 | | Z |
| N54A | N53A | 885.52 | 875.67 | 396. | 8. | CP | 0.025 | 69 | 0 | 0.0069 | 0.0262 | 1.0681 | 0.02 | 1.32 | 2.04 | 4.73 | 894.53 | | |
| N53A | N52A | 875.67 | 867.19 | 341. | 8. | CP | 0.025 | 107 | 0 | 0.0107 | 0.0407 | 1.0678 | 0.04 | 1.52 | 2.27 | 4.73 | 883.50 | | |
| N52A | N51A | 867.06 | 861.59 | 272. | 8. | CP | 0.020 | 138 | 0 | 0.0138 | 0.0524 | 0.9596 | 0.05 | 1.54 | 2.27 | 4.25 | 873.72 | | Z |
| N51A | N50A | 861.59 | 860.40 | 220. | 8. | CP | 0.005 | 161 | 0 | 0.0161 | 0.0612 | 0.4977 | 0.12 | 1.03 | 1.51 | 2.21 | 867.69 | | Z |
| N50A | N49A | 860.36 | 859.85 | 144. | 8. | CP | 0.004 | 176 | 0 | 0.0176 | 0.0669 | 0.4022 | 0.17 | 0.89 | 1.33 | 1.78 | 866.25 | | Z |
| N49D | N49C | 880.68 | 878.50 | 142. | 8. | CP | 0.015 | 31 | 0 | 0.0031 | 0.0118 | 0.8398 | 0.01 | 0.87 | 1.36 | 3.72 | 886.11 | | |
| N49C | N49B | 878.50 | 869.83 | 400. | 8. | CP | 0.022 | 85 | 0 | 0.0085 | 0.0323 | 0.9965 | 0.03 | 1.35 | 2.07 | 4.42 | 883.92 | B | |
| N49B | N49A | 869.73 | 859.89 | 300. | 8. | CP | 0.033 | 108 | 0 | 0.0108 | 0.0410 | 1.2258 | 0.03 | 1.68 | 2.57 | 5.43 | 875.85 | B | |
| *AT MH N49A | | | | | | | | 284 | 0 | | | | | | | | | | |
| N49A | N48A | 859.80 | 856.59 | 388. | 8. | CP | 0.008 | 322 | 0 | 0.0322 | 0.1224 | 0.6159 | 0.20 | 1.44 | 2.13 | 2.73 | 866.89 | | |
| N48A | N47A | 856.59 | 854.79 | 199. | 8. | CP | 0.009 | 345 | 0 | 0.0345 | 0.1311 | 0.6444 | 0.20 | 1.52 | 2.24 | 2.86 | 861.01 | | |
| N62A | N61A | 892.20 | 887.92 | 223. | 8. | CP | 0.019 | 38 | 0 | 0.0038 | 0.0144 | 0.9372 | 0.02 | 1.00 | 1.56 | 4.15 | 896.98 | | Z |
| N61A | N60A | 887.92 | 883.22 | 136. | 8. | CP | 0.035 | 53 | 0 | 0.0053 | 0.0201 | 1.2578 | 0.02 | 1.35 | 2.12 | 5.58 | 893.75 | | |
| N60A | N59A | 883.22 | 880.01 | 202. | 8. | CP | 0.016 | 76 | 0 | 0.0076 | 0.0289 | 0.8536 | 0.03 | 1.17 | 1.79 | 3.78 | 888.02 | | Z |
| N59A | N58A | 880.01 | 875.26 | 399. | 8. | CP | 0.012 | 130 | 0 | 0.0130 | 0.0494 | 0.7381 | 0.07 | 1.26 | 1.89 | 3.27 | 884.92 | | |
| N58A | N57A | 875.26 | 872.67 | 217. | 8. | CP | 0.012 | 153 | 0 | 0.0153 | 0.0581 | 0.7393 | 0.08 | 1.33 | 1.98 | 3.28 | 880.30 | | |
| N57A | N56A | 872.57 | 860.28 | 310. | 8. | CP | 0.040 | 199 | 0 | 0.0199 | 0.0756 | 1.3481 | 0.06 | 2.18 | 3.22 | 5.98 | 877.79 | | |
| N56A | N47A | 860.28 | 854.79 | 285. | 8. | CP | 0.019 | 206 | 0 | 0.0206 | 0.0783 | 0.9397 | 0.08 | 1.72 | 2.56 | 4.17 | 869.84 | | |
| N47B | N47A | 856.38 | 854.79 | 412. | 8. | CP | 0.004 | 54 | 0 | 0.0054 | 0.0205 | 0.4206 | 0.05 | 0.65 | 0.96 | 1.86 | 860.64 | | Z |
| *AT MH N47A | | | | | | | | 605 | 0 | | | | | | | | | | |
| N47A | N46A | 854.79 | 852.81 | 218. | 8. | CP | 0.009 | 605 | 0 | 0.0605 | 0.2299 | 0.6447 | 0.36 | 1.79 | 2.62 | 2.86 | 859.53 | | |
| N46A | N32A | 852.81 | 851.30 | 263. | 8. | CP | 0.006 | 605 | 0 | 0.0605 | 0.2299 | 0.5128 | 0.45 | 1.53 | 2.21 | 2.27 | 856.53 | | |
| N45A | N44A | 884.14 | 882.33 | 220. | 8. | CP | 0.008 | 38 | 0 | 0.0038 | 0.0144 | 0.6145 | 0.02 | 0.75 | 1.16 | 2.72 | 885.26 | | Z |
| N44A | N43A | 882.33 | 876.03 | 296. | 8. | CP | 0.021 | 69 | 0 | 0.0069 | 0.0262 | 0.9869 | 0.03 | 1.25 | 1.93 | 4.37 | 887.00 | | |
| N43D | N43C | 893.09 | 890.60 | 390. | 8. | CP | 0.006 | 54 | 0 | 0.0054 | 0.0205 | 0.5407 | 0.04 | 0.77 | 1.15 | 2.40 | 898.29 | | Z |
| N43C | N43B | 890.60 | 887.52 | 331. | 8. | CP | 0.009 | 92 | 0 | 0.0092 | 0.0350 | 0.6526 | 0.05 | 1.04 | 1.54 | 2.89 | 901.37 | | Z |
| N43B | N43A | 887.47 | 876.03 | 400. | 8. | CP | 0.029 | 130 | 0 | 0.0130 | 0.0494 | 1.1446 | 0.04 | 1.70 | 2.53 | 5.07 | 892.32 | | |
| *AT M | 43A | | | | | | | 199 | 0 | | | | | | | | | | |

| MANHOLES FROM MH ID | TO MH ID | INVERT ELEV FROM FT | TO FT | DIST FT | PIPE DIA IN | TYP | SLOPE FT/FT | POPULATION RES | N-RES | RATE OF FLOW(MGD) AVERAGE QA | PEAK QP | CAPACITY QF | PIPE RATIO QP/QF | VELOCITY AVG FPS | PEAK FPS | CAP FPS | UPSTREAM MANHOLE RIM ELEV | COMMENTS NOTE WARNING |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 477654 | | | | 36577 | 30132 | (TOTAL) | | | | | | | | |
| * | | | | | | | | | | | | | | | | | | |
| * | | | | | | | | | | | | | | | | | | |
| R18 | METER | 832.60 | 831.00 | 60. | 30. | CP | 0.027 | 2695 | 13 | 0.2699 | 0.968 | 37.5169 | 0.03 | 3.42 | 5.05 | 11.83 | 844.05 | |
| * | | | | | | | | | | | | | | | | | | |
| * TOTAL AT METER "A" | | | | 477714 | | | | 36577 | 30132 | | | | | | | | | |
| * | | | | | | | | | | | | | | | | | | |
| * | | | | | | | | | | | | | | | | | | |

TOTAL NUMBER OF REACHES BELOW 1.2 FPS = 36.
TOTAL NUMBER OF ADVERSE REACHES = 0.
TOTAL NUMBER OF REACHES EXCEEDING PIPE CAPACITY = 2.

| | |
|---|---|
| N6F | N5E |
| N5E | N020 |

TOTAL NUMBER OF REACHES WHICH HAVE FULL PIPE VELOCITIES BELOW 1.5 FPS= 4.

| | |
|---|---|
| N23D | N23C |
| N13A | N12A |
| N12A | N6A |
| N5E | N020 |

TOTAL NUMBER OF REACHES = 102.

| MANHOLES FROM MH ID | MANHOLES TO MH ID | INVERT ELEV FROM FT | INVERT ELEV TO FT | DIST FT | PIPE DIA IN | PIPE TYP | PIPE SLOPE FT/FT | POPULATION RES | POPULATION N-RES | RATE OF FLOW(MGD) AVERAGE QA | RATE OF FLOW(MGD) PEAK QP | RATE OF FLOW(MGD) CAPACITY QF | PIPE RATIO QP/QF | VELOCITY AVG FPS | VELOCITY PEAK FPS | VELOCITY CAP FPS | UPSTREAM MANHOLE RIM ELEV | COMMENTS NOTE | WARNING |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| N6D | N6C | 874.81 | 873.40 | 241. | 8. | CP | 0.006 | 138 | 13 | 0.0142 | 0.0539 | 0.5181 | 0.10 | 1.02 | 1.50 | 2.30 | 882.91 | | Z |
| N6C | N6B | 873.35 | 866.00 | 297. | 8. | CP | 0.025 | 184 | 13 | 0.0188 | 0.0714 | 1.0641 | 0.07 | 1.82 | 2.72 | 4.72 | 879.85 | | |
| N6B | N6A | 866.00 | 857.94 | 376. | 8. | CP | 0.021 | 222 | 13 | 0.0226 | 0.0858 | 0.9915 | 0.09 | 1.84 | 2.73 | 4.39 | 871.13 | | |
| *AT N6A | | | | | | | | 2049 | 13 | | | | | | | | | | |
| N6A | N5A | 845.61 | 844.91 | 268. | 12. | CP | 0.003 | 2072 | 13 | 0.2076 | 0.7486 | 1.0193 | 0.73 | 1.58 | 2.19 | 2.01 | 865.15 | | |
| N5D | N5C | 869.49 | 867.45 | 272. | 8. | CP | 0.008 | 38 | 0 | 0.0038 | 0.0144 | 0.5863 | 0.02 | 0.73 | 1.12 | 2.60 | 873.84 | | Z |
| N5C | N5B | 867.45 | 860.70 | 401. | 8. | CP | 0.017 | 92 | 0 | 0.0092 | 0.0350 | 0.8785 | 0.04 | 1.27 | 1.89 | 3.89 | 872.41 | | |
| N5B | N5A | 860.60 | 859.11 | 149. | 8. | CP | 0.010 | 107 | 0 | 0.0107 | 0.0407 | 0.6771 | 0.06 | 1.12 | 1.65 | 3.00 | 867.12 | | Z |
| *AT MH N5A | | | | | | | | 2179 | 13 | | | | | | | | | | |
| N5A | N4A | 844.91 | 844.30 | 273. | 12. | CP | 0.002 | 2194 | 13 | 0.2198 | 0.7919 | 0.9428 | 0.84 | 1.52 | 2.08 | 1.86 | 864.71 | | |
| N4D | N4C | 862.05 | 860.91 | 188. | 8. | CP | 0.006 | 38 | 0 | 0.0038 | 0.0144 | 0.5277 | 0.03 | 0.68 | 1.04 | 2.34 | 865.80 | | Z |
| N4C | N4B | 860.91 | 859.32 | 270. | 8. | CP | 0.006 | 84 | 0 | 0.0084 | 0.0319 | 0.5194 | 0.06 | 0.86 | 1.28 | 2.30 | 866.79 | B | Z |
| N4B | N4A | 859.32 | 857.35 | 186. | 8. | CP | 0.011 | 99 | 0 | 0.0099 | 0.0376 | 0.6969 | 0.05 | 1.11 | 1.65 | 3.09 | 865.65 | | Z |
| *AT MH N4A | | | | | | | | 2293 | 13 | | | | | | | | | | |
| N4A | N3A | 844.30 | 843.70 | 281. | 12. | CP | 0.002 | 2308 | 13 | 0.2312 | 0.8322 | 0.9219 | 0.90 | 1.51 | 2.06 | 1.82 | 863.75 | | |
| N3C | N3B | 856.08 | 854.80 | 320. | 8. | CP | 0.004 | 54 | 0 | 0.0054 | 0.0205 | 0.4278 | 0.05 | 0.66 | 0.98 | 1.90 | 859.93 | | Z |
| N3B | N3A | 854.80 | 853.55 | 252. | 8. | CP | 0.005 | 77 | 0 | 0.0077 | 0.0293 | 0.4766 | 0.06 | 0.79 | 1.17 | 2.11 | 861.64 | | Z |
| *AT MH N3A | | | | | | | | 2385 | 13 | | | | | | | | | | |
| N3A | N2A | 843.70 | 843.23 | 203. | 12. | CP | 0.002 | 2400 | 13 | 0.2404 | 0.8646 | 0.9607 | 0.90 | 1.58 | 2.14 | 1.89 | 861.80 | | |
| N2A | N1A | 843.23 | 842.85 | 159. | 12. | CP | 0.002 | 2407 | 13 | 0.2411 | 0.8671 | 0.9768 | 0.89 | 1.60 | 2.17 | 1.92 | 858.18 | | |
| N11C | N11B | 883.26 | 880.93 | 244. | 8. | CP | 0.010 | 38 | 0 | 0.0038 | 0.0144 | 0.6611 | 0.02 | 0.79 | 1.22 | 2.93 | 887.62 | | Z |
| N11B | N11A | 880.93 | 870.26 | 291. | 8. | CP | 0.037 | 76 | 0 | 0.0076 | 0.0289 | 1.2959 | 0.02 | 1.55 | 2.41 | 5.74 | 888.54 | | |
| N11A | N10A | 870.26 | 863.47 | 284. | 8. | CP | 0.024 | 91 | 0 | 0.0091 | 0.0346 | 1.0467 | 0.03 | 1.43 | 2.18 | 4.64 | 879.17 | | |
| N10D | N10C | 868.38 | 867.54 | 152. | 8. | CP | 0.006 | 31 | 0 | 0.0031 | 0.0118 | 0.3034 | 0.02 | 0.61 | 0.95 | 2.23 | 873.46 | | Z |
| N10C | N10B | 867.47 | 866.09 | 174. | 8. | CP | 0.008 | 54 | 0 | 0.0054 | 0.0205 | 0.6027 | 0.03 | 0.83 | 1.27 | 2.67 | 872.93 | | Z |
| N10B | N10A | 866.00 | 863.47 | 306. | 8. | CP | 0.008 | 85 | 0 | 0.0085 | 0.0323 | 0.6156 | 0.05 | 0.97 | 1.44 | 2.73 | 873.86 | | Z |
| *AT MH N10A | | | | | | | | 176 | 0 | | | | | | | | | | |
| N10A | N9A | 863.47 | 858.62 | 265. | 8. | CP | 0.018 | 191 | 0 | 0.0191 | 0.0726 | 0.9151 | 0.08 | 1.65 | 2.46 | 4.06 | 870.85 | | |
| N9B | N9A | 860.92 | 858.62 | 404. | 8. | CP | 0.006 | 54 | 0 | 0.0054 | 0.0205 | 0.5109 | 0.04 | 0.74 | 1.10 | 2.26 | 865.85 | | Z |
| *AT MH N9A | | | | | | | | 245 | 0 | | | | | | | | | | |
| N9A | N8A | 856.82 | 849.00 | 319. | 8. | CP | 0.025 | 268 | 0 | 0.0268 | 0.1018 | 1.0594 | 0.10 | 2.03 | 3.00 | 4.70 | 863.62 | | |
| N8A | N7D | 848.95 | 847.03 | 267. | 8. | CP | 0.007 | 278 | 0 | 0.0278 | 0.1056 | 0.5742 | 0.18 | 1.31 | 1.95 | 2.55 | 855.15 | | |
| N7D | N1A | 847.03 | 845.40 | 290. | 8. | CP | 0.006 | 288 | 0 | 0.0288 | 0.1094 | 0.5078 | 0.22 | 1.22 | 1.79 | 2.25 | 852.30 | | |
| *AT MH N1A | | | | | | | | 2695 | 13 | | | | | | | | | | |
| N1A | N8C | 842.85 | 841.68 | 123. | 12. | CP | 0.010 | 2695 | 13 | 0.2699 | 0.9684 | 1.9464 | 0.50 | 2.70 | 3.82 | 3.83 | 853.80 | | |
| N8C | N7C | 841.66 | 840.67 | 197. | 12. | CP | 0.005 | 2695 | 13 | 0.2699 | 0.9684 | 1.4289 | 0.68 | 2.16 | 3.02 | 2.81 | 851.19 | B | |
| N7C | N6F | 840.67 | 834.95 | 199. | 12. | CP | 0.029 | 2695 | 13 | 0.2699 | 0.9684 | 3.3832 | 0.29 | 3.99 | 5.75 | 6.67 | 847.29 | B | |
| N6F | N5E | 834.75 | 833.58 | 580. | 12. | CP | 0.002 | 2695 | 13 | 0.2699 | 0.9684 | 0.9603 | 1.01 | 1.63 | 1.91 | 1.89 | 840.13 | B | X |
| N5E | N020 | 833.58 | 833.25 | 320. | 12. | CP | 0.001 | 2695 | 13 | 0.2699 | 0.9684 | 0.6408 | 1.51 | 1.21 | 1.91 | 1.26 | 840.32 | B | X |
| N020 | R18 | 833.25 | 832.60 | 100. | 12. | CP | 0.007 | 2695 | 13 | 0.2699 | 0.9684 | 1.6089 | 0.60 | 2.36 | 3.31 | 3.17 | 841.14 | B | |

* FLOW FROM AREAS 1-17 ENTER AREA 18 AT MANHOLE R-18
* AT MH R-18

| | | | |
|---|---|---|---|
| * | 451193 | 33882 30119 | (AREAS 1-17) |
| * | 26461 | 2695 13 | (AREA 18) |
| * | ------ | ----- ----- | |

## SUBAREA 19

Subarea 19 comprises the southeast portion of the Walker Village family housing area. Flow from this area passes through Meter 'B', at the reservation boundary and Walton Walker Drive, prior to entering the City of Killeen collection system.

Average flow velocities below the specified minimum 1.2 FPS occur in 3 of the 7 reaches, each of which is concrete pipe (CP).

No reconstruction of manholes or sewer lines is required in Subarea 19.

WALKER VILLAGE
**********

AREA 19,AS DEFINED BY THE SANITARY SEWER ANALYSIS, COMPLETED BY BOHANNAN-HUSTON, INC., SEPTEMBER 1984.

COMMENT COLUMN "NOTES"
**********

EXCEPT AS NOTED:
> ELEVATIONS WERE OBTAINED THROUGH FIELD SURVEYS
> DISTANCES WERE GENERATED FROM COMPUTER PLOTS

A = INVERT BASED ON REPORT BY FREESE & NICHOLS (4/78)
B = DISTANCE BETWEEN MANHOLES IS SCALED
C = INVERT BASED ON "AS-BUILT" DRAWINGS
D = INVERT BASED ON TOPOGRAPHY & ADJACENT MANHOLE DATA
NA = NOT AVAILABLE
NF = NOT FOUND

FORMER MANHOLE IDENTIFICATION NUMBERS ALSO APPEAR IN THE COMMENT COLUMN UNDER "NOTES"

COMMENT COLUMN "WARNINGS"
**********

W = ZERO OR ADVERSE SLOPE PRESENT
(PEAK FLOW MAY EXCEED PIPE CAPACITY)
X = PEAK FLOW EXCEEDS PIPE CAPACITY
(LOW VELOCITIES MAY BE PRESENT)
Y = FULL PIPE VELOCITY BELOW 1.5 FPS
(AVERAGE VELOCITY MAY ALSO BE LOW)
Z = AVERAGE VELOCITY BELOW 1.2 FPS

| MANHOLES FROM MH ID | MANHOLES TO MH ID | INVERT ELEV FROM FT | INVERT ELEV TO FT | DIST FT | PIPE DIA IN | PIPE TYP | PIPE SLOPE FT/FT | POPULATION RES | POPULATION N-RES | RATE OF FLOW(MGD) AVERAGE QA | RATE OF FLOW(MGD) PEAK QP | RATE OF FLOW(MGD) CAPACITY QF | PIPE RATIO QP/QF | VELOCITY AVG FPS | VELOCITY PEAK FPS | VELOCITY CAP FPS | UPSTREAM MANHOLE RIM ELEV | COMMENTS NOTE | COMMENTS WARNING |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 63 | 62 | 899.60 | 894.69 | 277. | 6. | CP | 0.018 | 34 | 0 | 0.0034 | 0.0129 | 0.4184 | 0.03 | 0.99 | 1.52 | 3.30 | 904.47 | | Z |
| 62 | 66 | 894.69 | 890.50 | 331. | 6. | CP | 0.013 | 82 | 0 | 0.0082 | 0.0312 | 0.3538 | 0.09 | 1.17 | 1.74 | 2.79 | 898.13 | | Z |
| 66 | 65 | 890.50 | 889.10 | 176. | 6. | CP | 0.008 | 82 | 0 | 0.0082 | 0.0312 | 0.2803 | 0.11 | 1.00 | 1.47 | 2.21 | 896.04 | | Z |
| 64 | 65 | 899.09 | 889.62 | 304. | 6. | CP | 0.031 | 34 | 0 | 0.0034 | 0.0129 | 0.5549 | 0.02 | 1.20 | 1.86 | 4.37 | 904.69 | | |
| *AT MH 65 | | | | | | | | 116 | 0 | | | | | | | | | | |
| 65 | 67 | 889.62 | 884.44 | 215. | 6. | CP | 0.024 | 127 | 0 | 0.0127 | 0.0483 | 0.4873 | 0.10 | 1.67 | 2.47 | 3.84 | 894.67 | | |
| 67 | 68 | 884.44 | 883.41 | 98. | 6. | CP | 0.011 | 127 | 0 | 0.0127 | 0.0483 | 0.3229 | 0.15 | 1.26 | 1.84 | 2.54 | 889.69 | | |
| 69 | 68 | 889.06 | 883.41 | 145. | 6. | CP | 0.039 | 27 | 0 | 0.0027 | 0.0103 | 0.6210 | 0.02 | 1.20 | 1.88 | 4.89 | 893.64 | | |
| *AT MH 68 | | | | | | | | 154 | 0 | | | | | | | | | | |

* FLOW FROM MANHOLE 68 PASSES THROUGH METER "B" PRIOR TO ENTERING THE CITY OF KILLEEN COLLECTION SYSTEM.

* TOTAL AT METER "B" 1546 154 0
*
*
TOTAL NUMBER OF REACHES BELOW 1.2 FPS = 3.
TOTAL NUMBER OF ADVERSE REACHES = 0.
TOTAL NUMBER OF REACHES EXCEEDING PIPE CAPACITY = 0.
TOTAL NUMBER OF REACHES WHICH HAVE FULL PIPE VELOCITIES BELOW 1.5 FPS= 0.
TOTAL NUMBER OF REACHES = 7.

## SUBAREA 20

Subarea 20 is the majority of the Walker Village family housing area and the eastern portion of the Hood Army Airfield. Flow from the Subarea passes through Meter 'C', at the reservation boundary and Oswald Drive, before entering the City of Killeen collection system.

Average flow velocities below the specified minimum 1.2 FPS occur in 34 of the 72 reaches. Nearly 95% of them are concrete pipe (CP). Four also have full pipe velocities below the specified minimum 1.5 FPS.

No reconstruction of lines within Subarea 20 is required unless television inspection reveals significant pipe deterioration. The following minor problems should be corrected, however:

| | | |
|---|---|---|
| MH 71 --- | Broken concrete collar replaced | $ 150.00 |
| MH P3 --- | Broken concrete collar and rim replaced | 300.00 |
| | | $ 450.00 |

| MANHOLES FROM MH ID | TO MH ID | INVERT ELEV FROM FT | TO FT | DIST FT | PIPE DIA IN | TYP | SLOPE FT/FT | POPULATION RES | N-RES | RATE OF FLOW(MGD) AVERAGE QA | PEAK QP | CAPACITY QF | PIPE RATIO QP/QF | VELOCITY AVG FPS | PEAK FPS | CAP FPS | UPSTREAM MANHOLE RIM ELEV | COMMENTS NOTE | WARNING |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 18 | 17 | 884.82 | 884.05 | 105. | 8. | CP | 0.007 | 258 | 304 | 0.0349 | 0.1327 | 0.5796 | 0.23 | 1.41 | 2.08 | 2.57 | 892.17 | | |
| 30 | 17 | 888.90 | 884.05 | 370. | 6. | CP | 0.013 | 56 | 0 | 0.0056 | 0.0213 | 0.3598 | 0.06 | 1.05 | 1.58 | 2.84 | NF | A/D/B | Z |
| *AT MH 17 | | | | | | | | 314 | 304 | | | | | | | | | | |
| 17 | 16 | 884.05 | 883.91 | 130. | 8. | CP | 0.001 | 314 | 304 | 0.0405 | 0.1540 | 0.2223 | 0.69 | 0.75 | 1.06 | 0.99 | 892.33 | | Y |
| 14 | 15 | 892.46 | 884.41 | 355. | 6. | CP | 0.023 | 56 | 0 | 0.0056 | 0.0213 | 0.4735 | 0.04 | 1.27 | 1.92 | 3.73 | 898.98 | | |
| 15 | 16 | 884.41 | 883.91 | 58. | 6. | CP | 0.009 | 88 | 0 | 0.0088 | 0.0334 | 0.2910 | 0.11 | 1.05 | 1.54 | 2.29 | 892.64 | | Z |
| *AT MH 16 | | | | | | | | 402 | 304 | | | | | | | | | | |
| 16 | 71 | 883.98 | 882.76 | 254. | 8. | CP | 0.005 | 402 | 304 | 0.0493 | 0.1874 | 0.4693 | 0.40 | 1.35 | 1.96 | 2.08 | 892.33 | | |
| 71 | 72 | 882.76 | 882.48 | 74. | 8. | CP | 0.004 | 415 | 304 | 0.0506 | 0.1924 | 0.4160 | 0.46 | 1.25 | 1.80 | 1.84 | 892.01 | | |
| 72 | 24 | 882.48 | 881.50 | 153. | 8. | CP | 0.006 | 440 | 304 | 0.0531 | 0.2019 | 0.5423 | 0.37 | 1.53 | 2.22 | 2.40 | 893.98 | | |
| 24 | 13 | 881.15 | 879.80 | 311. | 8. | CP | 0.004 | 472 | 304 | 0.0563 | 0.2140 | 0.4463 | 0.48 | 1.35 | 1.95 | 1.98 | 888.13 | | |
| 13 | 9 | 879.80 | 877.76 | 339. | 8. | CP | 0.006 | 491 | 304 | 0.0582 | 0.2212 | 0.5250 | 0.42 | 1.53 | 2.22 | 2.33 | 887.56 | | |
| 9 | 4 | 877.76 | 876.52 | 274. | 8. | CP | 0.005 | 503 | 304 | 0.0594 | 0.2258 | 0.4553 | 0.50 | 1.39 | 2.01 | 2.02 | 886.86 | | |
| 7 | 6 | 890.43 | 886.63 | 337. | 6. | CP | 0.011 | 38 | 0 | 0.0038 | 0.0144 | 0.3339 | 0.04 | 0.88 | 1.34 | 2.63 | 895.46 | | Z |
| 6 | 5 | 886.63 | 879.91 | 283. | 6. | CP | 0.024 | 38 | 0 | 0.0038 | 0.0144 | 0.4840 | 0.03 | 1.13 | 1.74 | 3.81 | 890.68 | | Z |
| 8 | 5 | 884.74 | 879.91 | 270. | 6. | CP | 0.018 | 44 | 0 | 0.0044 | 0.0167 | 0.4202 | 0.04 | 1.08 | 1.64 | 3.31 | 889.90 | | Z |
| *AT MH 5 | | | | | | | | 82 | 0 | | | | | | | | | | |
| 5 | 4 | 879.91 | 876.52 | 113. | 8. | CP | 0.030 | 82 | 0 | 0.0082 | 0.0312 | 0.5444 | 0.06 | 1.57 | 2.37 | 4.29 | 886.06 | | |
| *AT MH 4 | | | | | | | | 585 | 304 | | | | | | | | | | |
| 4 | 3 | 876.52 | 875.71 | 210. | 8. | CP | 0.004 | 585 | 304 | 0.0676 | 0.2570 | 0.4201 | 0.61 | 1.37 | 1.95 | 1.86 | 883.38 | | |
| 32 | 33 | 889.51 | 885.69 | 421. | 6. | CP | 0.009 | 38 | 0 | 0.0038 | 0.0144 | 0.2994 | 0.05 | 0.82 | 1.24 | 2.36 | 896.71 | | Z |
| 31 | 33 | 887.30 | 885.69 | 192. | 6. | CP | 0.008 | 50 | 0 | 0.0050 | 0.0190 | 0.2880 | 0.07 | 0.87 | 1.30 | 2.27 | NF | A | Z |
| *AT MH 33 | | | | | | | | 88 | 0 | | | | | | | | | | |
| 33 | 34 | 885.69 | 882.64 | 242. | 6. | CP | 0.013 | 88 | 0 | 0.0088 | 0.0334 | 0.3529 | 0.09 | 1.20 | 1.77 | 2.78 | 891.15 | | Z |
| 34 | 12 | 882.64 | 882.20 | 315. | 6. | CP | 0.001 | 113 | 0 | 0.0113 | 0.0429 | 0.1175 | 0.37 | 0.59 | 0.85 | 0.93 | 888.02 | | Y |
| 12 | 10 | 882.20 | 876.88 | 220. | 6. | CP | 0.024 | 132 | 0 | 0.0132 | 0.0502 | 0.4887 | 0.10 | 1.70 | 2.51 | 3.85 | 882.20 | B | |
| 10 | 3 | 876.88 | 875.71 | 210. | 8. | CP | 0.006 | 144 | 0 | 0.0144 | 0.0547 | 0.5050 | 0.11 | 1.00 | 1.48 | 2.24 | 882.78 | | Z |
| *AT MH 3 | | | | | | | | 729 | 304 | | | | | | | | | | |
| 3 | 2 | 875.71 | 872.22 | 156. | 8. | CP | 0.022 | 729 | 304 | 0.0820 | 0.3117 | 1.0138 | 0.31 | 2.70 | 3.95 | 4.49 | 882.14 | | |
| 11 | 2 | 876.94 | 872.22 | 303. | 6. | CP | 0.016 | 38 | 0 | 0.0038 | 0.0144 | 0.3921 | 0.04 | 0.98 | 1.50 | 3.09 | 881.54 | | Z |
| *AT MH 2 | | | | | | | | 767 | 304 | | | | | | | | | | |
| 2 | 1 | 872.22 | 871.69 | 103. | 8. | CP | 0.005 | 767 | 304 | 0.0858 | 0.3261 | 0.4848 | 0.67 | 1.62 | 2.30 | 2.15 | 878.44 | | |
| 59 | 60 | 905.43 | 900.19 | 388. | 6. | CP | 0.013 | 63 | 0 | 0.0063 | 0.0239 | 0.3650 | 0.07 | 1.10 | 1.65 | 2.88 | 908.19 | | Z |
| 60 | 61 | 900.19 | 894.47 | 393. | 6. | CP | 0.015 | 107 | 0 | 0.0107 | 0.0407 | 0.3791 | 0.11 | 1.34 | 1.97 | 2.99 | 902.48 | | |
| 61 | 52 | 894.47 | 888.44 | 415. | 6. | CP | 0.015 | 145 | 0 | 0.0145 | 0.0551 | 0.3789 | 0.15 | 1.47 | 2.14 | 2.99 | 900.19 | | |
| 52 | 51 | 888.44 | 884.20 | 275. | 6. | CP | 0.015 | 176 | 0 | 0.0176 | 0.0669 | 0.3902 | 0.17 | 1.59 | 2.30 | 3.07 | 893.06 | | |
| 58 | 57 | 906.37 | 903.77 | 376. | 6. | CP | 0.007 | 57 | 0 | 0.0057 | 0.0217 | 0.2614 | 0.08 | 0.85 | 1.26 | 2.06 | 913.75 | | Z |
| 57 | 56 | 903.77 | 902.39 | 262. | 6. | CP | 0.005 | 88 | 0 | 0.0088 | 0.0334 | 0.2279 | 0.15 | 0.89 | 1.29 | 1.80 | 907.67 | | Z |
| 56 | 55 | 902.39 | 897.85 | 300. | 6. | CP | 0.015 | 151 | 0 | 0.0151 | 0.0574 | 0.3869 | 0.15 | 1.51 | 2.20 | 3.05 | 905.55 | | |
| 55 | 54 | 897.85 | 894.84 | 179. | 6. | CP | 0.017 | 164 | 0 | 0.0164 | 0.0623 | 0.4070 | 0.15 | 1.60 | 2.33 | 3.21 | 903.19 | | |
| 54 | 53 | 894.84 | 890.46 | 278. | 6. | CP | 0.016 | 201 | 0 | 0.0201 | 0.0764 | 0.3947 | 0.19 | 1.63 | 2.41 | 3.11 | 899.77 | | |
| 53 | 49 | 890.46 | 888.53 | 297. | 8. | CP | 0.007 | 258 | 0 | 0.0258 | 0.0980 | 0.5457 | 0.18 | 1.24 | 1.84 | 2.42 | 894.93 | | |

# WALKER VILLAGE

AREA 20,AS DEFINED BY THE SANITARY SEWER ANALYSIS, COMPLETED BY BOHANNAN-HUSTON, INC., SEPTEMBER 1984.

**COMMENT COLUMN "NOTES"**

EXCEPT AS NOTED:
> ELEVATIONS WERE OBTAINED THROUGH FIELD SURVEYS
> DISTANCES WERE GENERATED FROM COMPUTER PLOTS

A = INVERT BASED ON REPORT BY FREESE & NICHOLS (4/78)
B = DISTANCE BETWEEN MANHOLES IS SCALED
C = INVERT BASED ON "AS-BUILT" DRAWINGS
D = INVERT BASED ON TOPOGRAPHY & ADJACENT MANHOLE DATA
NA = NOT AVAILABLE
NF = NOT FOUND

**COMMENT COLUMN "WARNINGS"**

W = ZERO OR ADVERSE SLOPE PRESENT (PEAK FLOW MAY EXCEED PIPE CAPACITY)
X = PEAK FLOW EXCEEDS PIPE CAPACITY (LOW VELOCITIES MAY BE PRESENT)
Y = FULL PIPE VELOCITY BELOW 1.5 FPS (AVERAGE VELOCITY MAY ALSO BE LOW)
Z = AVERAGE VELOCITY BELOW 1.2 FPS

FORMER MANHOLE IDENTIFICATION NUMBERS ALSO APPEAR IN THE COMMENT COLUMN UNDER "NOTES"

| MANHOLES FROM MH ID | MANHOLES TO MH ID | INVERT ELEV FROM FT | INVERT ELEV TO FT | DIST FT | PIPE DIA IN | PIPE TYP | PIPE SLOPE FT/FT | POPULATION RES | POPULATION N-RES | RATE OF FLOW(MGD) AVERAGE QA | RATE OF FLOW(MGD) PEAK QP | RATE OF FLOW(MGD) CAPACITY QF | PIPE RATIO QP/QF | VELOCITY AVG FPS | VELOCITY PEAK FPS | VELOCITY CAP FPS | UPSTREAM MANHOLE MIN ELEV | COMMENTS NOTE | COMMENTS WARNING |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P1A | P1 | 916.17 | 913.25 | 288. | 6. | CP | 0.010 | 0 | 150 | 0.0045 | 0.0171 | 0.3164 | 0.05 | 0.90 | 1.35 | 2.49 | 920.10 | B | Z |
| P1 | P2 | 913.25 | 908.06 | 500. | 8. | VCP | 0.010 | 0 | 304 | 0.0091 | 0.0347 | 0.7953 | 0.04 | 1.18 | 1.76 | 3.53 | 917.10 | | Z |
| P2B | P2A | 908.15 | 908.08 | 296. | 8. | PVC | 0.000 | 0 | 0 | 0.0000 | 0.0000 | 0.1420 | 0.00 | 0.00 | 0.00 | 0.63 | 911.17 | | Y |
| P2A | P2 | 908.08 | 908.06 | 58. | 8. | PVC | 0.000 | 0 | 0 | 0.0000 | 0.0000 | 0.1715 | 0.00 | 0.00 | 0.00 | 0.76 | 910.93 | B | Y |
| *AT MH P2 | | | | | | | | 0 | 304 | | | | | | | | | | |
| P2 | P3 | 908.06 | 902.60 | 428. | 8. | VCP | 0.013 | 0 | 304 | 0.0091 | 0.0347 | 0.8821 | 0.04 | 1.27 | 1.89 | 3.91 | 911.08 | B | |
| P3 | P4 | 902.60 | 897.39 | 426. | 8. | VCP | 0.012 | 0 | 304 | 0.0091 | 0.0347 | 0.8636 | 0.04 | 1.25 | 1.87 | 3.83 | 905.28 | B | |
| P4 | P5 | 897.39 | 893.30 | 428. | 8. | VCP | 0.010 | 0 | 304 | 0.0091 | 0.0347 | 0.7634 | 0.05 | 1.15 | 1.71 | 3.38 | NF | A/B | Z |
| P5 | P6 | 893.30 | 889.20 | 428. | 8. | VCP | 0.010 | 0 | 304 | 0.0091 | 0.0347 | 0.7647 | 0.05 | 1.15 | 1.71 | 3.39 | 896.07 | | Z |
| P6 | 21 | 889.20 | 887.01 | 378. | 8. | CP | 0.006 | 0 | 304 | 0.0091 | 0.0347 | 0.5152 | 0.07 | 0.88 | 1.32 | 2.28 | 892.59 | | Z |
| 23C | 22 | 891.81 | 889.07 | 392. | 6. | CP | 0.007 | 50 | 0 | 0.0050 | 0.0190 | 0.2627 | 0.07 | 0.82 | 1.22 | 2.01 | NF | A | Z |
| 22 | 21 | 889.07 | 887.01 | 301. | 6. | CP | 0.007 | 69 | 0 | 0.0069 | 0.0262 | 0.2602 | 0.10 | 0.90 | 1.33 | 2.05 | 893.15 | | Z |
| *AT MH 21 | | | | | | | | 69 | 304 | | | | | | | | | | |
| 21 | 20 | 887.01 | 886.27 | 208. | 8. | CP | 0.004 | 75 | 304 | 0.0166 | 0.0632 | 0.4040 | 0.16 | 0.88 | 1.31 | 1.79 | 890.51 | | Z |
| 25 | 20 | 894.16 | 886.27 | 508. | 6. | CP | 0.016 | 63 | 0 | 0.0063 | 0.0239 | 0.3917 | 0.06 | 1.16 | 1.73 | 3.09 | 893.42 | | Z |
| *AT MH 20 | | | | | | | | 138 | 304 | | | | | | | | | | |
| 20 | 19 | 886.27 | 885.83 | 98. | 8. | CP | 0.004 | 151 | 304 | 0.0242 | 0.0920 | 0.4535 | 0.20 | 1.07 | 1.58 | 2.01 | 891.25 | | Z |
| 27 | 26 | 896.30 | 891.45 | 299. | 6. | CP | 0.016 | 44 | 0 | 0.0044 | 0.0167 | 0.4005 | 0.04 | 1.05 | 1.59 | 3.16 | NF | A/D | Z |
| 26 | 19 | 891.45 | 885.63 | 324. | 6. | CP | 0.018 | 63 | 0 | 0.0063 | 0.0239 | 0.4214 | 0.06 | 1.21 | 1.83 | 3.32 | 896.35 | | |
| *AT MH 19 | | | | | | | | 195 | 304 | | | | | | | | | | |
| 19 | 18 | 885.63 | 884.82 | 215. | 8. | CP | 0.004 | 195 | 304 | 0.0286 | 0.1088 | 0.4150 | 0.26 | 1.05 | 1.54 | 1.84 | 892.60 | | Z |
| 28 | 29 | 895.29 | 889.49 | 320. | 6. | CP | 0.018 | 31 | 0 | 0.0031 | 0.0118 | 0.4232 | 0.03 | 0.97 | 1.49 | 3.34 | 900.35 | | Z |
| 29 | 18 | 889.49 | 884.82 | 211. | 6. | CP | 0.022 | 38 | 0 | 0.0038 | 0.0144 | 0.4670 | 0.03 | 1.11 | 1.70 | 3.68 | 895.21 | | Z |
| *AT MH 18 | | | | | | | | 233 | 304 | | | | | | | | | | |

| MANHOLES FROM MH ID | TO MH ID | INVERT ELEV FROM FT | TO FT | DIST FT | PIPE DIA IN | TYP | SLOPE FT/FT | POPULATION RES | N-RES | RATE OF FLOW(MGD) AVERAGE QA | PEAK QP | CAPACITY QF | PIPE RATIO QP/QF | VELOCITY AVG FPS | PEAK FPS | CAP FPS | UPSTREAM MANHOLE RIM ELEV | COMMENTS NOTE WARNING |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 46 | 49 | 893.41 | 888.53 | 214. | 6. | CP | 0.023 | 50 | 0 | 0.0050 | 0.0190 | 0.4745 | 0.04 | 1.22 | 1.86 | 3.74 | 898.74 | |
| | | | | | | | | 308 | 0 | | | | | | | | | |
| *AT MH 49 | | | | | | | | | | | | | | | | | | |
| 49 | 50 | 888.53 | 886.44 | 142. | 8. | CP | 0.015 | 308 | 0 | 0.0308 | 0.1170 | 0.8208 | 0.14 | 1.74 | 2.60 | 3.84 | 896.21 | |
| 50 | 51 | 886.44 | 884.20 | 132. | 8. | CP | 0.017 | 321 | 0 | 0.0321 | 0.1220 | 0.8821 | 0.14 | 1.85 | 2.77 | 3.91 | 894.80 | |
| | | | | | | | | 497 | 0 | | | | | | | | | |
| *AT MH 51 | | | | | | | | | | | | | | | | | | |
| 51 | 41 | 884.20 | 882.81 | 222. | 8. | CP | 0.006 | 509 | 0 | 0.0509 | 0.1934 | 0.5359 | 0.36 | 1.50 | 2.18 | 2.38 | 890.11 | |
| 70 | 41 | 887.53 | 882.81 | 385. | 6. | CP | 0.012 | 63 | 0 | 0.0063 | 0.0239 | 0.3479 | 0.07 | 1.07 | 1.59 | 2.74 | 893.28 | Z |
| | | | | | | | | 572 | 0 | | | | | | | | | |
| *AT MH 41 | | | | | | | | | | | | | | | | | | |
| 41 | 39 | 882.81 | 881.27 | 301. | 8. | CP | 0.005 | 585 | 0 | 0.0585 | 0.2223 | 0.4843 | 0.46 | 1.45 | 2.10 | 2.15 | 888.30 | |
| 48 | 47 | 903.06 | 889.41 | 309. | 6. | CP | 0.044 | 44 | 0 | 0.0044 | 0.0167 | 0.6602 | 0.03 | 1.47 | 2.26 | 5.20 | 907.37 | |
| 47 | 45 | 899.41 | 892.75 | 369. | 6. | CP | 0.018 | 63 | 10 | 0.0066 | 0.0251 | 0.4223 | 0.06 | 1.23 | 1.85 | 3.33 | 903.68 | |
| 45 | 44 | 892.75 | 887.64 | 189. | 6. | CP | 0.027 | 88 | 10 | 0.0091 | 0.0346 | 0.5164 | 0.07 | 1.57 | 2.35 | 4.07 | 897.59 | |
| 44 | 42 | 887.64 | 882.35 | 294. | 6. | CP | 0.018 | 107 | 10 | 0.0110 | 0.0418 | 0.4215 | 0.10 | 1.45 | 2.14 | 3.32 | 895.44 | |
| 43 | 42 | 883.34 | 882.35 | 257. | 6. | CP | 0.004 | 50 | 0 | 0.0050 | 0.0190 | 0.1952 | 0.10 | 0.67 | 0.99 | 1.54 | 886.80 | Z |
| | | | | | | | | 157 | 10 | | | | | | | | | |
| *AT MH 42 | | | | | | | | | | | | | | | | | | |
| 42 | 39 | 882.35 | 881.27 | 193. | 6. | CP | 0.006 | 157 | 10 | 0.0160 | 0.0608 | 0.2348 | 0.26 | 1.06 | 1.55 | 1.85 | 887.47 | Z |
| | | | | | | | | 742 | 10 | | | | | | | | | |
| *AT MH 39 | | | | | | | | | | | | | | | | | | |
| 39 | 38 | 881.27 | 879.88 | 127. | 6. | CP | 0.011 | 748 | 10 | 0.0751 | 0.2854 | 0.3294 | 0.87 | 2.10 | 2.92 | 2.60 | 887.17 | |
| 38 | 40 | 879.88 | 874.74 | 272. | 8. | CP | 0.019 | 761 | 10 | 0.0764 | 0.2903 | 0.9297 | 0.31 | 2.49 | 3.64 | 4.12 | 885.53 | |
| 40 | 35 | 874.74 | 873.16 | 227. | 8. | CP | 0.007 | 773 | 10 | 0.0776 | 0.2949 | 0.5645 | 0.52 | 1.76 | 2.52 | 2.50 | 881.07 | |
| 37 | 36 | 877.72 | 876.85 | 159. | 6. | CP | 0.005 | 25 | 0 | 0.0025 | 0.0095 | 0.2322 | 0.04 | 0.60 | 0.92 | 1.83 | 880.93 | Z |
| 36 | 35 | 876.65 | 873.16 | 148. | 6. | CP | 0.024 | 44 | 0 | 0.0044 | 0.0167 | 0.4819 | 0.03 | 1.19 | 1.81 | 3.80 | 880.65 | Z |
| | | | | | | | | 817 | 0 | | | | | | | | | |
| *AT MH 35 | | | | | | | | | | | | | | | | | | |
| 35 | 1 | 873.16 | 871.69 | 276. | 8. | CP | 0.005 | 824 | 10 | 0.0827 | 0.3143 | 0.4941 | 0.64 | 1.63 | 2.32 | 2.19 | 879.16 | |
| | | | | | | | | 1591 | 314 | | | | | | | | | |
| *AT MH 1 | | | | | | | | | | | | | | | | | | |

* FLOW FROM MANHOLE 1 PASSES THROUGH METER "C" PRIOR TO ENTERING THE CITY OF KILLEEN COLLECTION SYSTEM.

| | | | | |
|---|---|---|---|---|
| * TOTAL AT METER "C" | 19283 | 1591 | 314 | |
| * | | | | |
| * | | | | |
| * | | | | |

TOTAL NUMBER OF REACHES BELOW 1.2 FPS = 34.
TOTAL NUMBER OF ADVERSE REACHES = 0.
TOTAL NUMBER OF REACHES EXCEEDING PIPE CAPACITY = 0.
TOTAL NUMBER OF REACHES WHICH HAVE FULL PIPE VELOCITIES BELOW 1.5 FPS= 4.

| P2B | P2A |
|---|---|
| P2A | P2 |
| 17 | 16 |
| 34 | 12 |

TOTAL NUMBER OF REACHES = 72.

## SUBAREA 21

Subarea 21 consists of the western portion of the Hood Army Airfield. Flow is carried south, then east, along the reservation boundary to meter 'D', at Graves Drive, then enters the City of Killeen collection system.

Average flow velocities below the specified minimum 1.2 FPS occur in 30 of the 36 reaches, of which nearly 90% are concrete pipe(CP). Nine of them also have full pipe velocities below the specified minimum 1.5 FPS. The low velocities in Area 21 are due to the minimal loadings in the mainly day-use area.

An adverse grade was found in the reach between manholes Z-7 and Z-8A. This segment was constructed in 1975 in conjunction with the Aviation Operations Building #7018.

It is recommended that the segments between manholes Z-7, Z-8A, Z-8B, and Z-8 be reconstructed with a constant slope of .0026 Ft/Ft, using existing materials whenever possible. This will restore the flow conditions present prior to 1975.

No other reconstruction or repair is necessary unless television inspection reveals other pipe damage.

| | | | | |
|---|---|---|---|---|
| Trenching [1] | 264 L.F. | @ | $ 17.00 | $4,488.00 |
| Pipe Resloping | 264 L.F. | @ | $ 5.00 | 1,320.00 |
| MH Invert Reshaping | 4 EA | @ | $ 200.00 | 800.00 |
| | | | Sub-Total | $6,608.00 |
| | | | Contingency (20%) | 1,322.00 |
| | | | Engineering (6%) | 475.00 |
| | | | Test & Inspection (8%) | 635.00 |
| | | | **TOTAL** | **$9,040.00** |

[1] Assume use of existing AC pipe.

HOOD ARMY AIRFIELD
**********

AREA 21,AS DEFINED BY THE SANITARY SEWER ANALYSIS, COMPLETED BY BOHANNAN-HUSTON, INC., SEPTEMBER 1984.

COMMENT COLUMN "NOTES"
**********

EXCEPT AS NOTED:
> ELEVATIONS WERE OBTAINED THROUGH FIELD SURVEYS
> DISTANCES WERE GENERATED FROM COMPUTER PLOTS

A = INVERT BASED ON REPORT BY FREESE & NICHOLS (4/78)
B = DISTANCE BETWEEN MANHOLES IS SCALED
C = INVERT BASED ON "AS-BUILT" DRAWINGS
D = INVERT BASED ON TOPOGRAPHY & ADJACENT MANHOLE DATA
NA = NOT AVAILABLE
NF = NOT FOUND

FORMER MANHOLE IDENTIFICATION NUMBERS ALSO APPEAR IN THE COMMENT COLUMN UNDER "NOTES"

COMMENT COLUMN "WARNINGS"
**********

W = ZERO OR ADVERSE SLOPE PRESENT
(PEAK FLOW MAY EXCEED PIPE CAPACITY)
X = PEAK FLOW EXCEEDS PIPE CAPACITY
(LOW VELOCITIES MAY BE PRESENT)
Y = FULL PIPE VELOCITY BELOW 1.5 FPS
(AVERAGE VELOCITY MAY ALSO BE LOW)
Z = AVERAGE VELOCITY BELOW 1.2 FPS

| MANHOLES FROM MH ID | MANHOLES TO MH ID | INVERT ELEV FROM FT | INVERT ELEV TO FT | DIST FT | PIPE DIA IN | PIPE TYP | PIPE SLOPE FT/FT | POPULATION RES | POPULATION N-RES | RATE OF FLOW(MGD) AVERAGE QA | RATE OF FLOW(MGD) PEAK QP | RATE OF FLOW(MGD) CAPACITY QF | PIPE RATIO QP/QF | VELOCITY AVG FPS | VELOCITY PEAK FPS | VELOCITY CAP FPS | UPSTREAM MANHOLE RIM ELEV | COMMENTS NOTE | COMMENTS WARNING |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Z-1 | Z-1A | 883.11 | 882.74 | 75. | 8. | CP | 0.005 | 0 | 65 | 0.0020 | 0.0074 | 0.4762 | 0.02 | 0.51 | 0.80 | 2.11 | 898.73 | 1 | Z |
| Z-1A | Z-1B | 882.74 | 882.33 | 91. | 8. | CP | 0.005 | 0 | 65 | 0.0020 | 0.0074 | 0.4544 | 0.02 | 0.49 | 0.77 | 2.01 | 896.59 | | Z |
| Z-1B | Z-2 | 882.33 | 882.02 | 53. | 8. | CP | 0.006 | 0 | 65 | 0.0020 | 0.0074 | 0.5153 | 0.01 | 0.54 | 0.84 | 2.28 | 896.13 | | Z |
| Z-2 | Z-3 | 882.02 | 880.44 | 318. | 8. | CP | 0.005 | 0 | 115 | 0.0035 | 0.0131 | 0.4767 | 0.03 | 0.61 | 0.94 | 2.11 | 892.22 | 2 | Z |
| Z-3 | Z-5A | 880.44 | 878.40 | 484. | 8. | CP | 0.004 | 0 | 195 | 0.0059 | 0.0222 | 0.4396 | 0.05 | 0.69 | 1.02 | 1.95 | 893.02 | 3 | Z |
| Z-4A | Z-4 | 889.74 | 887.43 | 165. | 8. | PVC | 0.008 | 0 | 0 | 0.0000 | 0.0000 | 0.8233 | 0.00 | 0.40 | 0.00 | 3.65 | 894.64 | | |
| Z-4 | Z-5A | 887.43 | 886.60 | 83. | 8. | PVC | 0.010 | 0 | 0 | 0.0000 | 0.0000 | 0.9234 | 0.00 | 0.00 | 0.00 | 4.09 | 890.43 | 4 | |
| *AT MH Z-5A | | | | | | | | 0 | 195 | | | | | | | | | | |
| Z-5A | Z-5 | 878.40 | 876.82 | 210. | 8. | PVC | 0.008 | 0 | 195 | 0.0059 | 0.0222 | 0.8012 | 0.03 | 1.03 | 1.59 | 3.55 | 892.70 | | Z |
| Z-5 | Z-6 | 876.82 | 870.23 | 291. | 8. | CP | 0.023 | 0 | 295 | 0.0089 | 0.0336 | 1.0184 | 0.03 | 1.39 | 2.12 | 4.51 | 893.84 | 5 | |
| Z-6F | Z-6C | 873.98 | 871.84 | 124. | 8. | CP | 0.017 | 0 | 15 | 0.0005 | 0.0017 | 0.8907 | 0.00 | 0.48 | 0.79 | 3.95 | 877.99 | | Z |
| Z-6D | Z-6C | 873.21 | 871.84 | 205. | 8. | VCP | 0.007 | 0 | 80 | 0.0024 | 0.0091 | 0.6382 | 0.01 | 0.66 | 1.04 | 2.83 | 875.81 | 81 | Z |
| *AT MH Z-6C | | | | | | | | 0 | 95 | | | | | | | | | | |
| Z-6C | Z-6B | 871.84 | 870.99 | 345. | 8. | CP | 0.002 | 0 | 160 | 0.0048 | 0.0182 | 0.3358 | 0.05 | 0.54 | 0.79 | 1.49 | 875.25 | 82 | Y |
| Z-6B | Z-6 | 870.99 | 870.23 | 213. | 8. | CP | 0.004 | 0 | 160 | 0.0048 | 0.0182 | 0.4046 | 0.05 | 0.61 | 0.91 | 1.79 | 882.87 | 83 | Z |
| *AT MH Z-6 | | | | | | | | 0 | 455 | | | | | | | | | | |
| Z-6 | Z-6A | 870.23 | 870.15 | 182. | 8. | CP | 0.000 | 0 | 455 | 0.0137 | 0.0519 | 0.1418 | 0.37 | 0.40 | 0.58 | 0.63 | 888.51 | A6 | Y |
| Z-6A | Z-7A | 870.15 | 869.58 | 116. | 8. | CP | 0.005 | 0 | 505 | 0.0152 | 0.0576 | 0.4753 | 0.12 | 0.98 | 1.44 | 2.11 | 888.25 | 6A | Z |
| Z-7A | Z-7 | 869.58 | 869.15 | 101. | 8. | CP | 0.004 | 0 | 525 | 0.0158 | 0.0599 | 0.4414 | 0.14 | 0.92 | 1.38 | 1.96 | 888.83 | | Z |
| Z-7 | Z-8A | 869.15 | 869.38 | 54. | 8. | AC | -.004 | 0 | 525 | 0.0158 | 0.0599 | | | | | | | / | W |
| Z-8A | Z-8B | 869.38 | 868.78 | 190. | 8. | AC | 0.003 | 0 | 525 | 0.0158 | 0.0599 | 0.4388 | 0.14 | 0.92 | 1.37 | 1.95 | 882.50 | | Z |
| Z-8B | Z-8 | 868.78 | 868.42 | 32. | 8. | AC | 0.011 | 0 | 575 | 0.0173 | 0.0656 | 0.8329 | 0.08 | 1.50 | 2.23 | 3.69 | 882.66 | | |
| Z-8D | Z-8C | 875.96 | 875.25 | 169. | 8. | VCP | 0.004 | 0 | 130 | 0.0039 | 0.0148 | 0.5059 | 0.03 | 0.66 | 1.07 | 2.24 | 882.47 | | Z |
| Z-8C | Z-8 | 875.25 | 869.20 | 220. | 8. | VCP | 0.028 | 0 | 230 | 0.0069 | 0.0262 | 1.2961 | 0.02 | 1.51 | 2.34 | 5.74 | 882.64 | | |
| *AT MH Z-8 | | | | | | | | 0 | 805 | | | | | | | | | | |

| MANHOLES FROM MH ID | MANHOLES TO MH ID | INVERT ELEV FROM FT | INVERT ELEV TO FT | DIST FT | PIPE DIA IN | PIPE TYP | PIPE SLOPE FT/FT | POPULATION RES | POPULATION N-RES | RATE OF FLOW(MGD) AVERAGE QA | RATE OF FLOW(MGD) PEAK QP | RATE OF FLOW(MGD) CAPACITY QF | PIPE RATIO QP/QF | VELOCITY AVG FPS | VELOCITY PEAK FPS | VELOCITY CAP FPS | UPSTREAM MANHOLE RIM ELEV | COMMENTS NOTE | WARNING |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Z-8 | Z-9 | 868.42 | 866.10 | 400. | 8. | CP | 0.006 | 0 | 805 | 0.0242 | 0.0918 | 0.5155 | 0.18 | 1.17 | 1.73 | 2.28 | 881.42 | 8 | Z |
| Z-9 | Z-10 | 866.10 | 864.81 | 400. | 8. | CP | 0.003 | 0 | 805 | 0.0242 | 0.0918 | 0.3844 | 0.24 | 0.95 | 1.40 | 1.70 | NF | 9 | Z |
| Z-10 | Z-11 | 864.81 | 863.48 | 351. | 8. | CP | 0.004 | 0 | 830 | 0.0249 | 0.0946 | 0.4167 | 0.23 | 1.01 | 1.49 | 1.85 | 876.81 | 10 | Z |
| Z-11A | Z-11 | 873.68 | 863.48 | 238. | 8. | CP | 0.043 | 0 | 80 | 0.0024 | 0.0091 | 1.4009 | 0.01 | 1.12 | 1.80 | 6.21 | 876.66 | 11A | Z |
| *AT MH Z-11 | | | | | | | | 0 | 910 | | | | | | | | | | |
| Z-11 | Z-12 | 863.48 | 861.30 | 350. | 8. | CP | 0.006 | 0 | 917 | 0.0275 | 0.1045 | 0.5342 | 0.20 | 1.24 | 1.84 | 2.37 | 875.98 | 11 | |
| Z-12 | Z-13 | 861.10 | 860.50 | 400. | 10. | CP | 0.001 | 0 | 917 | 0.0275 | 0.1045 | 0.4753 | 0.22 | 0.73 | 1.08 | 1.35 | NF | 12 | Y |
| Z-13 | Z-14 | 860.50 | 860.29 | 400. | 10. | CP | 0.001 | 0 | 917 | 0.0275 | 0.1045 | 0.2812 | 0.37 | 0.51 | 0.74 | 0.80 | NF | 13 | Y |
| Z-14 | Z-15 | 860.29 | 859.41 | 399. | 10. | CP | 0.002 | 0 | 917 | 0.0275 | 0.1045 | 0.5766 | 0.18 | 0.84 | 1.25 | 1.64 | 873.13 | 14 | Z |
| Z-15 | Z-16 | 859.41 | 858.84 | 402. | 10. | CP | 0.001 | 0 | 917 | 0.0275 | 0.1045 | 0.4623 | 0.23 | 0.72 | 1.06 | 1.31 | 865.81 | 15 | Y |
| Z-16 | Z-17 | 858.84 | 858.28 | 400. | 10. | CP | 0.001 | 0 | 917 | 0.0275 | 0.1045 | 0.4593 | 0.23 | 0.72 | 1.05 | 1.30 | 865.34 | 16 | Y |
| Z-17 | Z-18 | 858.28 | 857.53 | 338. | 10. | CP | 0.002 | 0 | 917 | 0.0275 | 0.1045 | 0.5785 | 0.18 | 0.84 | 1.25 | 1.64 | 865.49 | 17 | Z |
| Z-18 | Z-19 | 857.53 | 857.04 | 433. | 10. | CP | 0.001 | 0 | 917 | 0.0275 | 0.1045 | 0.4130 | 0.25 | 0.66 | 0.97 | 1.17 | 865.99 | 18 | Y |
| Z-19 | Z-20 | 857.04 | 856.56 | 429. | 10. | CP | 0.001 | 0 | 917 | 0.0275 | 0.1045 | 0.4106 | 0.25 | 0.66 | 0.97 | 1.16 | 872.77 | 19 | Y |
| Z-20 | Z-21 | 856.56 | 855.57 | 433. | 10. | CP | 0.002 | 0 | 917 | 0.0275 | 0.1045 | 0.5867 | 0.18 | 0.85 | 1.26 | 1.66 | 869.56 | 20 | Z |
| Z-21 | MTR-D | 855.57 | 855.55 | 32. | 10. | CP | 0.001 | 0 | 917 | 0.0275 | 0.1045 | 0.3060 | 0.34 | 0.54 | 0.79 | 0.87 | 860.83 | 21 | Y |
| * AT METER D | | | | 9127 | | | | 0 | 917 | | | | | | | | | | |

* FLOW FROM MANHOLE Z-21 PASSES THROUGH METER "D" PRIOR TO ENTERING THE CITY OF KILLEEN COLLECTION SYSTEM.
*
*
*

TOTAL NUMBER OF REACHES BELOW 1.2 FPS = 30.
TOTAL NUMBER OF ADVERSE REACHES = 1.
Z-7 Z-8A
TOTAL NUMBER OF REACHES EXCEEDING PIPE CAPACITY = 0.
TOTAL NUMBER OF REACHES WHICH HAVE FULL PIPE VELOCITIES BELOW 1.5 FPS= 9.
Z-6C Z-6B
Z-6 Z-6A
Z-12 Z-13
Z-13 Z-14
Z-15 Z-16
Z-16 Z-17
Z-18 Z-19
Z-19 Z-20
Z-21 MTR-D
TOTAL NUMBER OF REACHES = 36.

## NORTH FORT HOOD

The North Fort Hood sanitary sewer system is completely independent of the Main Post, including treatment. Flat slopes, sporadic use (summer training), and little or no maintenance have led to numerous problems with the sewers.

Specific recommendations for repairs and replacement have been made in the main body of the report, in the North Fort Hood sections.

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* THIS FILE CONTAINS THE SANITARY SEWER DATA FOR NORTH FORT HOOD.
* ALL ELEVATIONS WERE OBTAINED THROUGH FIELD SURVEYS, EXCEPT AS NOTED BELOW.
*       INVERT ELEVATIONS FOR THE FOLLOWING MANHOLES (AND MOST CLEANOUTS)
*          WERE BASED ON A PREVIOUS REPORT (FREESE & NICHOLS, MARCH,1978):
*                MANHOLES FOUND FILLED WITH DEBRIS: 4, 5, 7, 8, 11, 13, 14,
*                     17, 18, 28, 31, 33, 73, 155.
*                MANHOLES 2-19 & 2-30 COULD NOT BE OPENED.
*                MANHOLE 115 HAD ITS COVER WELDED SHUT.
*                MANHOLES NOT FOUND IN THE FIELD: 48, 65, 71, 76, 88, 95,
*                     106, 156, 157, 158, 172, 2-32.
* THE FOLLOWING MANHOLES (AND LINES ASSOCIATED WITH THEM) WERE FOUND ABANDONED:
*       7, 8, 12, 31, 39, 40, 41, 48, 55, 58, 59, 80, 81, 83, 84, 95, 151,
*       152, 155.
* OTHER MANHOLES WHICH WERE NOT FOUND, AND ASSUMED TO BE ABANDONED, ARE
*       AS FOLLOWS: 3, 50, 51, 54, 56, 57, OLD 60, 61, OLD 63, OLD 64, 66,
*       77, 78, 79, 148, 149, 150, 159, 184, 185, 2-32.
* THE EXISTING NUMBERING SYSTEM AT THE TIME OF THIS STUDY REQUIRED SOME CHANGES
*       DUE TO THE SAME NUMBERS BEING USED TWICE. MANHOLES ON SHEET 2 OF 2
*       OF THE GENERAL SANITARY SEWER MAP (AUG. 26, 1963) NOW HAVE A PREFIX
*       82 (30 = 2-30). THESE MANHOLES WERE LISTED IN THE REPORT BY FREESE &
*       NICHOLS, MARCH,1978 FOLLOWED BY THE LETTER "A" (30A = 2-30).
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AREA ,AS DEFINED BY THE SANITARY SEWER ANALYSIS, COMPLETED BY BOHANNAN-HUSTON, INC., SEPTEMBER 1984.

COMMENT COLUMN "NOTES"
**********

EXCEPT AS NOTED:
- > ELEVATIONS WERE OBTAINED THROUGH FIELD SURVEYS
- > DISTANCES WERE GENERATED FROM COMPUTER PLOTS

A = INVERT BASED ON REPORT BY FREESE & NICHOLS (4/78)
B = DISTANCE BETWEEN MANHOLES IS SCALED
C = INVERT BASED ON "AS-BUILT" DRAWINGS
D = INVERT BASED ON TOPOGRAPHY & ADJACENT MANHOLE DATA
NA = NOT AVAILABLE
NF = NOT FOUND

COMMENT COLUMN "WARNINGS"
**********

W = ZERO OR ADVERSE SLOPE PRESENT (PEAK FLOW MAY EXCEED PIPE CAPACITY)
X = PEAK FLOW EXCEEDS PIPE CAPACITY (LOW VELOCITIES MAY BE PRESENT)
Y = FULL PIPE VELOCITY BELOW 1.5 FPS (AVERAGE VELOCITY MAY ALSO BE LOW)
Z = AVERAGE VELOCITY BELOW 1.2 FPS

FORMER MANHOLE IDENTIFICATION NUMBERS ALSO APPEAR IN THE COMMENT COLUMN UNDER "NOTES"

| MANHOLES FROM MH ID | MANHOLES TO MH ID | INVERT ELEV FROM FT | INVERT ELEV TO FT | DIST FT | PIPE DIA IN | PIPE TYP | PIPE SLOPE FT/FT | POPULATION RES | POPULATION N-RES | RATE OF FLOW(MGD) AVERAGE QA | RATE OF FLOW(MGD) PEAK QP | RATE OF FLOW(MGD) CAPACITY QF | PIPE RATIO QP/QF | VELOCITY AVG FPS | VELOCITY PEAK FPS | VELOCITY CAP FPS | UPSTREAM MANHOLE RIM ELEV | COMMENTS NOTE | COMMENTS WARNING |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO-116 | 115 | 766.00 | 758.00 | 145. | 6. | RCP | 0.055 | 48 | 0 | 0.0048 | 0.0182 | 0.7382 | 0.02 | 1.63 | 2.51 | 5.82 | 767.45 | | |
| 115 | 115A | 761.00 | 756.17 | 155. | 8. | RCP | 0.031 | 124 | 0 | 0.0124 | 0.0471 | 1.1948 | 0.04 | 1.72 | 2.57 | 5.30 | 765.40 | | |
| 115A | 114 | 756.17 | 754.17 | 256. | 8. | RCP | 0.008 | 0 | 0 | 0.0000 | 0.0000 | 0.5982 | 0.00 | 0.00 | 0.00 | 2.85 | 765.40 | | Y |
| 114 | 113 | 754.17 | 753.86 | 137. | 8. | RCP | 0.002 | 240 | 0 | 0.0240 | 0.0912 | 0.3220 | 0.28 | 0.84 | 1.22 | 1.43 | 759.92 | | Z |
| 113 | 102 | 753.86 | 753.30 | 129. | 8. | RCP | 0.004 | 250 | 0 | 0.0250 | 0.0950 | 0.4459 | 0.21 | 1.07 | 1.57 | 1.98 | 761.23 | | Z |
| 102 | 88A | 753.30 | 752.02 | 313. | 8. | RCP | 0.004 | 400 | 0 | 0.0400 | 0.1520 | 0.4328 | 0.35 | 1.20 | 1.75 | 1.92 | 761.92 | | |
| 88A | 88 | 752.02 | 748.40 | 279. | 18. | SL | 0.013 | 400 | 0 | 0.0400 | 0.1520 | 9.1389 | 0.02 | 1.97 | 2.99 | 8.00 | 762.85 | | |
| 88 | 89 | 748.40 | 747.64 | 160. | 18. | SL | 0.005 | 400 | 0 | 0.0400 | 0.1520 | 5.5296 | 0.03 | 1.40 | 2.11 | 4.84 | NA | | |
| 89 | 90 | 747.64 | 746.83 | 196. | 18. | SL | 0.004 | 400 | 0 | 0.0400 | 0.1520 | 5.1577 | 0.03 | 1.34 | 2.01 | 4.52 | 763.89 | | |
| 83 | 84 | 752.92 | 752.86 | 225. | 8. | RCP | 0.000 | 0 | 0 | 0.0000 | 0.0000 | 0.1105 | 0.00 | 0.00 | 0.00 | 0.49 | 758.31 | | Y |
| 84 | 90 | 752.86 | 749.58 | 252. | 8. | RCP | 0.013 | 0 | 0 | 0.0000 | 0.0000 | 0.7722 | 0.00 | 0.00 | 0.00 | 3.42 | 759.35 | | |

| MANHOLES FROM MH ID | MANHOLES TO MH ID | INVERT ELEV FROM FT | INVERT ELEV TO FT | DIST FT | PIPE DIA IN | PIPE TYP | PIPE SLOPE FT/FT | POPULATION RES | POPULATION N-RES | RATE OF FLOW(MGD) AVERAGE QA | RATE OF FLOW(MGD) PEAK QP | RATE OF FLOW(MGD) CAPACITY QF | PIPE RATIO QP/QF | VELOCITY AVG FPS | VELOCITY PEAK FPS | VELOCITY CAP FPS | UPSTREAM MANHOLE RIM ELEV | COMMENTS NOTE | COMMENTS WARNING |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | 400 | 0 | | | | | | | | | | |
| * AT MH 90 | | | | | | | | 400 | 0 | 0.0400 | 0.1520 | 2.2980 | 0.07 | 0.77 | 1.14 | 2.01 | 762.93 | 1 | Z |
| 90 | 91 | 746.83 | 746.62 | 256. | 18. | SL | 0.001 | 400 | 0 | 0.0400 | 0.1520 | 3.3403 | 0.05 | 1.00 | 1.48 | 2.92 | 761.74 | | Z |
| 91 | 92 | 746.62 | 746.10 | 300. | 18. | SL | 0.002 | | | | | | | | | | | | |
| CO-120 | 119 | 767.10 | 763.64 | 145. | 6. | RCP | 0.024 | 48 | 0 | 0.0048 | 0.0182 | 0.4855 | 0.04 | 1.23 | 1.87 | 3.83 | NA | | |
| 119 | 119A | 763.64 | 761.86 | 133. | 8. | RCP | 0.013 | 124 | 0 | 0.0124 | 0.0471 | 0.7830 | 0.06 | 1.29 | 1.91 | 3.47 | 768.74 | | |
| 119A | 118 | 761.86 | 760.93 | 258. | 8. | RCP | 0.004 | 202 | 0 | 0.0202 | 0.0768 | 0.4064 | 0.19 | 0.94 | 1.39 | 1.80 | 768.34 | | Z |
| 118 | 117 | 760.93 | 760.40 | 117. | 8. | RCP | 0.005 | 240 | 0 | 0.0240 | 0.0912 | 0.4555 | 0.20 | 1.07 | 1.58 | 2.02 | 766.79 | | Z |
| 117 | 103 | 760.40 | 759.92 | 133. | 8. | RCP | 0.004 | 240 | 0 | 0.0240 | 0.0912 | 0.4066 | 0.22 | 0.99 | 1.45 | 1.80 | 766.98 | | Z |
| 103 | 104 | 759.92 | 757.96 | 362. | 8. | RCP | 0.005 | 240 | 0 | 0.0240 | 0.0912 | 0.4980 | 0.18 | 1.14 | 1.69 | 2.21 | 765.21 | | Z |
| CO-123 | 122 | 765.70 | 763.21 | 145. | 8. | RCP | 0.017 | 48 | 0 | 0.0048 | 0.0182 | 0.8869 | 0.02 | 1.04 | 1.61 | 3.93 | NA | | Z |
| 122 | 122A | 763.21 | 761.53 | 156. | 8. | RCP | 0.011 | 124 | 0 | 0.0124 | 0.0471 | 0.7024 | 0.07 | 1.20 | 1.80 | 3.11 | 768.08 | | |
| 122A | 121 | 761.53 | 760.63 | 329. | 8. | RCP | 0.003 | 202 | 0 | 0.0202 | 0.0768 | 0.3540 | 0.22 | 0.85 | 1.25 | 1.57 | 767.18 | | |
| 121 | 104 | 760.63 | 757.96 | 192. | 8. | RCP | 0.014 | 240 | 0 | 0.0240 | 0.0912 | 0.7981 | 0.11 | 1.61 | 2.37 | 3.54 | 765.27 | | |
| | | | | | | | | 480 | 0 | | | | | | | | | | |
| * AT MH 104 | | | | | | | | 480 | 0 | 0.0480 | 0.1824 | 0.8667 | 0.21 | 1.32 | 1.95 | 2.46 | 765.09 | | |
| 104 | 105 | 757.96 | 755.95 | 403. | 10. | RCP | 0.005 | | | | | | | | | | | | |
| CO-126 | 125 | 764.65 | 762.55 | 145. | 8. | RCP | 0.014 | 48 | 0 | 0.0048 | 0.0182 | 0.8145 | 0.02 | 0.98 | 1.51 | 3.61 | 765.71 | | Z |
| 125 | 125A | 762.55 | 760.27 | 154. | 8. | RCP | 0.015 | 124 | 0 | 0.0124 | 0.0471 | 0.8235 | 0.06 | 1.34 | 1.98 | 3.65 | 766.37 | | |
| 125A | 124 | 760.27 | 758.65 | 328. | 8. | RCP | 0.005 | 202 | 0 | 0.0202 | 0.0768 | 0.4757 | 0.16 | 1.05 | 1.56 | 2.11 | 765.73 | | Z |
| 124 | 105 | 758.65 | 755.95 | 223. | 10. | RCP | 0.012 | 240 | 0 | 0.0240 | 0.0912 | 1.3503 | 0.07 | 1.48 | 2.18 | 3.83 | 763.62 | | |
| | | | | | | | | 720 | 0 | | | | | | | | | | |
| * AT MH 10 | | | | | | | | 720 | 0 | 0.0720 | 0.2736 | 3.5920 | 0.08 | 2.84 | 4.18 | 7.08 | 762.70 | | |
| 105 | 92 | 755.95 | 746.10 | 304. | 12. | RCP | 0.032 | | | | | | | | | | | | |
| | | | | | | | | 1120 | 0 | | | | | | | | | | |
| * AT MH 92 | | | | | | | | 1120 | 0 | 0.1120 | 0.4070 | 2.8442 | 0.14 | 1.21 | 1.77 | 2.49 | 760.40 | | |
| 92 | 93 | 746.10 | 745.64 | 366. | 18. | SL | 0.001 | 1120 | 0 | 0.1120 | 0.4070 | 3.1267 | 0.13 | 1.29 | 1.89 | 2.74 | 758.35 | | |
| 93 | 94 | 745.64 | 744.99 | 428. | 18. | SL | 0.002 | 1120 | 0 | 0.1120 | 0.4070 | 2.9880 | 0.14 | 1.25 | 1.83 | 2.62 | 756.37 | | Z |
| 94 | 35 | 744.99 | 744.37 | 447. | 18. | SL | 0.001 | 1145 | 0 | 0.1145 | 0.4160 | 1.9587 | 0.21 | 0.94 | 1.36 | 1.71 | 753.80 | | |
| 35 | 35A | 744.37 | 744.19 | 302. | 18. | SL | 0.001 | 1145 | 0 | 0.1145 | 0.4160 | 4.5434 | 0.09 | 1.69 | 2.48 | 3.98 | 751.59 | | W |
| 35A | 36 | 744.19 | 743.09 | 343. | 18. | SL | 0.003 | 1145 | 0 | 0.1145 | 0.4160 | | | | | | 751.03 | | |
| 36 | 37 | 743.09 | 743.25 | 318. | 18. | SL | -.001 | 1145 | 0 | 0.1145 | 0.4160 | 3.7035 | 0.11 | 1.46 | 2.15 | 3.24 | 752.37 | | |
| 37 | 30 | 743.25 | 742.37 | 413. | 18. | SL | 0.002 | 1145 | 0 | 0.1145 | 0.4160 | 3.0774 | 0.14 | 1.28 | 1.88 | 2.69 | 750.49 | | |
| 30 | 26 | 742.37 | 741.73 | 435. | 18. | SL | 0.001 | 1145 | 0 | 0.1145 | 0.4160 | 3.6540 | 0.11 | 1.45 | 2.12 | 3.20 | 748.99 | | |
| 26 | 23 | 741.73 | 741.06 | 323. | 18. | SL | 0.002 | | | | | | | | | | | | |
| CO-130 | 129 | 762.10 | 759.52 | 145. | 6. | RCP | 0.018 | 48 | 0 | 0.0048 | 0.0182 | 0.4192 | 0.04 | 1.11 | 1.68 | 3.30 | 763.67 | | Z |
| 129 | 129A | 759.52 | 758.00 | 154. | 8. | RCP | 0.010 | 124 | 0 | 0.0124 | 0.0471 | 0.6724 | 0.07 | 1.17 | 1.74 | 2.98 | 763.73 | | Z |
| 129A | 128 | 758.00 | 756.41 | 252. | 8. | RCP | 0.006 | 202 | 0 | 0.0202 | 0.0768 | 0.5376 | 0.14 | 1.14 | 1.70 | 2.38 | 763.86 | | Z |
| 128 | 127 | 756.41 | 755.45 | 147. | 8. | RCP | 0.007 | 240 | 0 | 0.0240 | 0.0912 | 0.5469 | 0.17 | 1.21 | 1.80 | 2.42 | 762.37 | | |
| 127 | 107 | 755.45 | 754.59 | 134. | 8. | RCP | 0.006 | 240 | 0 | 0.0240 | 0.0912 | 0.5422 | 0.17 | 1.21 | 1.79 | 2.40 | 761.37 | | |
| 106 | 107 | 755.00 | 754.59 | 80. | 8. | RCP | 0.005 | 10 | 0 | 0.0010 | 0.0038 | 0.4845 | 0.01 | 0.41 | 0.66 | 2.15 | NA | | Z |
| | | | | | | | | 250 | 0 | | | | | | | | | | |
| * AT MH 107 | | | | | | | | 250 | 0 | 0.0250 | 0.0950 | 0.4949 | 0.19 | 1.15 | 1.70 | 2.19 | 760.60 | | Z |
| 107 | 108 | 754.59 | 752.97 | 303. | 8. | RCP | 0.005 | | | | | | | | | | | | |
| CO-133 | 132 | 759.70 | 757.60 | 145. | 6. | RCP | 0.014 | 48 | 0 | 0.0048 | 0.0182 | 0.3782 | 0.05 | 1.03 | 1.56 | 2.98 | 762.12 | | Z |
| 132 | 132A | 757.60 | 755.73 | 152. | 8. | RCP | 0.012 | 124 | 0 | 0.0124 | 0.0471 | 0.7507 | 0.06 | 1.26 | 1.85 | 3.33 | 762.36 | | |
| 132A | 131 | 755.73 | 754.06 | 333. | 8. | RCP | 0.005 | 202 | 0 | 0.0202 | 0.0768 | 0.4793 | 0.16 | 1.05 | 1.56 | 2.12 | 762.12 | | Z |
| 131 | 108 | 754.06 | 753.18 | 204. | 8. | RCP | 0.004 | 240 | 0 | 0.0240 | 0.0912 | 0.4445 | 0.21 | 1.05 | 1.55 | 1.97 | 760.46 | | Z |
| | | | | | | | | 490 | 0 | | | | | | | | | | |
| * AT MH 108 | | | | | | | | 490 | 0 | 0.0490 | 0.1862 | 0.7593 | 0.25 | 1.21 | 1.78 | 2.15 | 758.93 | | |
| 108 | 109 | 752.97 | 751.27 | 444. | 10. | RCP | 0.004 | | | | | | | | | | | | |
| CO-137 | 136 | 758.10 | 755.74 | 145. | 6. | RCP | 0.016 | 48 | 0 | 0.0048 | 0.0182 | 0.4009 | 0.05 | 1.08 | 1.63 | 3.16 | 761.23 | | Z |
| 136 | 136A | 755.74 | 753.96 | 152. | 8. | RCP | 0.012 | 124 | 0 | 0.0124 | 0.0471 | 0.7324 | 0.06 | 1.24 | 1.82 | 3.25 | 760.78 | | |
| 136A | 134 | 753.96 | 751.27 | 330. | 8. | RCP | 0.008 | 202 | 0 | 0.0202 | 0.0768 | 0.6111 | 0.13 | 1.27 | 1.86 | 2.71 | 760.15 | 136 | Z |
| 134 | 109 | 751.97 | 751.27 | 210. | 8. | RCP | 0.003 | 240 | 0 | 0.0240 | 0.0912 | 0.3908 | 0.23 | 0.96 | 1.41 | 1.73 | 758.68 | | |

| MANHOLES FROM MH ID | TO MH ID | INVERT ELEV FROM FT | TO FT | DIST FT | PIPE DIA IN | TYP | SLOPE FT/FT | POPULATION RES | N-RES | RATE OF FLOW(MGD) AVERAGE QA | PEAK QP | CAPACITY QF | PIPE RATIO QP/QF | VELOCITY AVG FPS | PEAK FPS | CAP FPS | UPSTREAM MANHOLE RIM ELEV | COMMENTS NOTE WARNING |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | 730 | 0 | | | | | | | | | |
| * AT MH 109 | | | | | | | | | | | | | | | | | | |
| 109 | 97 | 751.27 | 750.38 | 306. | 10. | RCP | 0.003 | 730 | 0 | 0.0730 | 0.2774 | 0.6618 | 0.42 | 1.24 | 1.79 | 1.88 | 757.90 | |
| 96A | 96 | 752.35 | 751.73 | 121. | 8. | VCP | 0.005 | 740 | 0 | 0.0740 | 0.2812 | 0.5590 | 0.50 | 1.72 | 2.47 | 2.48 | 756.15 | |
| 96 | 97 | 751.73 | 750.38 | 369. | 8. | VCP | 0.004 | 765 | 0 | 0.0765 | 0.2907 | 0.4724 | 0.62 | 1.54 | 2.20 | 2.09 | 756.17 | |
| | | | | | | | | 765 | 0 | | | | | | | | | |
| * AT MH 97 | | | | | | | | | | | | | | | | | | |
| 97 | 98 | 750.38 | 749.42 | 324. | 12. | VCP | 0.003 | 765 | 0 | 0.0765 | 0.2907 | 1.2534 | 0.23 | 1.36 | 2.01 | 2.47 | 755.86 | |
| 98 | 99 | 749.42 | 748.10 | 351. | 12. | VCP | 0.004 | 765 | 0 | 0.0765 | 0.2907 | 1.4120 | 0.21 | 1.48 | 2.19 | 2.78 | 754.98 | |
| CO-141 | 140A | 758.20 | 753.33 | 145. | 6. | VCP | 0.034 | 48 | 0 | 0.0048 | 0.0182 | 0.6646 | 0.03 | 1.52 | 2.33 | 5.24 | NA | |
| 140A | 140 | 753.33 | 752.21 | 159. | 8. | VCP | 0.007 | 124 | 0 | 0.0124 | 0.0471 | 0.6554 | 0.07 | 1.15 | 1.71 | 2.91 | 759.43 | Z |
| 140 | 139 | 752.21 | 750.40 | 256. | 8. | VCP | 0.007 | 202 | 0 | 0.0202 | 0.0768 | 0.6567 | 0.12 | 1.34 | 1.96 | 2.91 | 757.75 | |
| 139 | 110 | 750.40 | 749.32 | 254. | 8. | VCP | 0.004 | 240 | 0 | 0.0240 | 0.0912 | 0.5092 | 0.18 | 1.15 | 1.71 | 2.26 | 756.02 | Z |
| 110 | 99 | 749.32 | 748.10 | 254. | 8. | VCP | 0.005 | 240 | 0 | 0.0240 | 0.0912 | 0.5412 | 0.17 | 1.21 | 1.79 | 2.40 | 754.97 | |
| | | | | | | | | 1005 | 0 | | | | | | | | | |
| * AT MH 99 | | | | | | | | | | | | | | | | | | |
| 99 | 100 | 748.10 | 746.79 | 388. | 12. | VCP | 0.003 | 1005 | 0 | 0.1005 | 0.3656 | 1.3379 | 0.27 | 1.55 | 2.24 | 2.64 | 754.16 | |
| 100 | 101 | 746.79 | 745.79 | 324. | 12. | VCP | 0.003 | 1005 | 0 | 0.1005 | 0.3656 | 1.2792 | 0.29 | 1.50 | 2.17 | 2.52 | 752.29 | |
| CO-144 | 143A | 757.40 | 753.36 | 145. | 6. | RCP | 0.028 | 48 | 0 | 0.0048 | 0.0182 | 0.5246 | 0.03 | 1.29 | 1.97 | 4.13 | NA | |
| 143A | 143 | 753.36 | 751.95 | 147. | 8. | RCP | 0.010 | 124 | 0 | 0.0124 | 0.0471 | 0.6629 | 0.07 | 1.15 | 1.72 | 2.94 | 758.32 | Z |
| 143 | 142 | 751.95 | 749.66 | 337. | 8. | RCP | 0.007 | 202 | 0 | 0.0202 | 0.0768 | 0.5579 | 0.14 | 1.17 | 1.75 | 2.47 | 757.20 | Z |
| 142 | 111 | 749.66 | 748.84 | 198. | 8. | RCP | 0.004 | 240 | 0 | 0.0240 | 0.0912 | 0.4355 | 0.21 | 1.03 | 1.53 | 1.93 | 754.57 | Z |
| 111 | 112 | 748.84 | 747.44 | 406. | 10. | RCP | 0.003 | 240 | 0 | 0.0240 | 0.0912 | 0.7206 | 0.13 | 0.94 | 1.41 | 2.04 | 753.66 | Z |
| CO-147 | 146A | 754.50 | 751.34 | 145. | 6. | RCP | 0.022 | 28 | 0 | 0.0028 | 0.0106 | 0.4639 | 0.02 | 1.00 | 1.54 | 3.66 | NA | Z |
| 146A | 146 | 751.34 | 749.79 | 152. | 8. | RCP | 0.010 | 104 | 0 | 0.0104 | 0.0395 | 0.6835 | 0.06 | 1.11 | 1.65 | 3.03 | 756.74 | Z |
| 146 | 145 | 749.79 | 748.89 | 332. | 8. | RCP | 0.003 | 140 | 0 | 0.0140 | 0.0532 | 0.3524 | 0.15 | 0.76 | 1.13 | 1.56 | 755.84 | Z |
| 145 | 112 | 748.89 | 747.44 | 226. | 8. | RCP | 0.006 | 200 | 0 | 0.0200 | 0.0760 | 0.5421 | 0.14 | 1.14 | 1.71 | 2.40 | 754.07 | Z |
| | | | | | | | | 440 | 0 | | | | | | | | | |
| * AT MH 112 | | | | | | | | | | | | | | | | | | |
| 112 | 101 | 747.44 | 745.79 | 309. | 12. | RCP | 0.005 | 440 | 0 | 0.0440 | 0.1672 | 1.4562 | 0.11 | 1.29 | 1.91 | 2.87 | 753.30 | |
| | | | | | | | | 1445 | 0 | | | | | | | | | |
| * AT MH 101 | | | | | | | | | | | | | | | | | | |
| 101 | 101A | 745.79 | 744.91 | 245. | 12. | VCP | 0.004 | 1445 | 0 | 0.1445 | 0.5238 | 1.3800 | 0.38 | 1.76 | 2.53 | 2.72 | 752.74 | |
| 101A | 72 | 744.91 | 744.09 | 225. | 12. | VCP | 0.004 | 1445 | 0 | 0.1445 | 0.5238 | 1.3900 | 0.38 | 1.77 | 2.54 | 2.74 | 751.64 | |
| 72 | 69 | 744.09 | 742.02 | 468. | 12. | VCP | 0.004 | 1445 | 0 | 0.1445 | 0.5238 | 1.5313 | 0.34 | 1.90 | 2.73 | 3.02 | 750.33 | |
| 60 | 64 | 751.82 | 747.44 | 343. | 8. | VCP | 0.013 | 50 | 0 | 0.0050 | 0.0190 | 0.8825 | 0.02 | 1.05 | 1.62 | 3.91 | 757.38 | Z |
| 64 | 63 | 747.44 | 746.87 | 165. | 8. | VCP | 0.003 | 50 | 0 | 0.0050 | 0.0190 | 0.4590 | 0.04 | 0.67 | 1.00 | 2.03 | 756.40 | Z |
| 63 | 62 | 746.87 | 746.17 | 226. | 8. | VCP | 0.003 | 80 | 0 | 0.0080 | 0.0304 | 0.4346 | 0.07 | 0.75 | 1.13 | 1.93 | 757.96 | Z |
| 62 | 65 | 746.17 | 745.40 | 295. | 8. | VCP | 0.003 | 80 | 0 | 0.0080 | 0.0304 | 0.3990 | 0.08 | 0.71 | 1.06 | 1.77 | 753.90 | Z |
| 65 | 71 | 745.40 | 744.30 | 45. | 8. | VCP | 0.024 | 80 | 0 | 0.0080 | 0.0304 | 1.2210 | 0.02 | 1.52 | 2.34 | 5.41 | NA | Z |
| 71 | 70 | 744.30 | 743.36 | 320. | 8. | VCP | 0.003 | 100 | 0 | 0.0100 | 0.0380 | 0.4233 | 0.09 | 0.79 | 1.18 | 1.88 | NA | Z |
| 70 | 69 | 743.36 | 742.02 | 438. | 8. | VCP | 0.003 | 100 | 0 | 0.0100 | 0.0380 | 0.4320 | 0.09 | 0.80 | 1.19 | 1.91 | 754.06 | Z |
| | | | | | | | | 1545 | 0 | | | | | | | | | |
| * AT MH 69 | | | | | | | | | | | | | | | | | | |
| 69 | 68 | 742.02 | 741.67 | 353. | 12. | VCP | 0.001 | 1555 | 0 | 0.1555 | 0.5632 | 0.7251 | 0.78 | 1.14 | 1.58 | 1.43 | 747.57 | |
| 68 | 67 | 741.67 | 741.24 | 192. | 12. | VCP | 0.002 | 1565 | 0 | 0.1565 | 0.5667 | 1.0897 | 0.52 | 1.53 | 2.17 | 2.15 | 746.12 | |
| 67 | 23 | 741.24 | 741.06 | 155. | 12. | VCP | 0.001 | 1565 | 0 | 0.1565 | 0.5667 | 0.7846 | 0.72 | 1.21 | 1.68 | 1.55 | 745.52 | |
| | | | | | | | | 2710 | 0 | | | | | | | | | |
| * AT MH 23 | | | | | | | | | | | | | | | | | | |
| 23 | 19 | 741.03 | 737.33 | 427. | 21. | VCP | 0.009 | 2710 | 0 | 0.2710 | 0.9723 | 9.5324 | 0.10 | 2.70 | 3.94 | 6.13 | 747.31 | |
| 19 | 15 | 737.33 | 733.17 | 402. | 21. | VCP | 0.010 | 2710 | 0 | 0.2710 | 0.972 | 10.4172 | 0.09 | 2.87 | 4.20 | 6.70 | 742.05 | |
| 15 | 10 | 733.17 | 730.80 | 393. | 21. | VCP | 0.006 | 2730 | 0 | 0.2730 | 0.9793 | 7.9523 | 0.12 | 2.38 | 3.48 | 5.12 | 738.76 | |
| 10 | 6 | 730.80 | 727.79 | 402. | 21. | VCP | 0.007 | 2730 | 0 | 0.2730 | 0.9793 | 8.8611 | 0.11 | 2.57 | 3.75 | 5.70 | 737.04 | |
| 34 | 33 | 746.16 | 742.80 | 243. | 8. | RCP | 0.014 | 100 | 0 | 0.0100 | 0.0380 | 0.7959 | 0.05 | 1.22 | 1.81 | 3.53 | 750.92 | Z |
| 33 | 32 | 742.80 | 741.76 | 233. | 10. | RCP | 0.004 | 240 | 0 | 0.0240 | 0.0912 | 0.8199 | 0.11 | 1.03 | 1.53 | 2.33 | 748.96 | Z |
| 32 | 27 | 741.76 | 739.23 | 397. | 10. | RCP | 0.006 | 240 | 0 | 0.0240 | 0.0912 | 0.9797 | 0.09 | 1.19 | 1.74 | 2.78 | 748.64 | |

| MANHOLES FROM MH ID | MANHOLES TO MH ID | INVERT ELEV FROM FT | INVERT ELEV TO FT | DIST FT | PIPE DIA IN | PIPE TYP | PIPE SLOPE FT/FT | POPULATION RES | POPULATION N-RES | RATE OF FLOW(MGD) AVERAGE QA | RATE OF FLOW(MGD) PEAK QP | RATE OF FLOW(MGD) CAPACITY QF | PIPE RATIO QP/QF | VELOCITY AVG FPS | VELOCITY PEAK FPS | VELOCITY CAP FPS | UPSTREAM MANHOLE RIM ELEV | COMMENTS NOTE | COMMENTS WARNING |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 29 | 28 | 743.36 | 741.30 | 231. | 8. | RCP | 0.009 | 100 | 0 | 0.0100 | 0.0380 | 0.6392 | 0.06 | 1.05 | 1.55 | 2.83 | 749.27 | | Z |
| 28 | 27 | 741.30 | 739.23 | 250. | 8. | RCP | 0.008 | 240 | 0 | 0.0240 | 0.0912 | 0.6159 | 0.15 | 1.32 | 1.97 | 2.73 | 746.05 | | |
| * AT MH 27 | | | | | | | | 480 | 0 | | | | | | | | | | |
| 27 | 25 | 739.23 | 737.24 | 335. | 10. | RCP | 0.006 | 480 | 0 | 0.0480 | 0.1824 | 0.9458 | 0.19 | 1.40 | 2.08 | 2.68 | 745.16 | | |
| 24 | 25 | 738.96 | 737.24 | 254. | 8. | RCP | 0.007 | 0 | 0 | 0.0000 | 0.0000 | 0.5570 | 0.00 | 0.00 | 0.00 | 2.47 | 743.92 | | |
| * AT MH 25 | | | | | | | | 480 | 0 | | | | | | | | | | |
| 25 | 20 | 737.24 | 735.63 | 264. | 10. | RCP | 0.006 | 480 | 0 | 0.0480 | 0.1824 | 0.9583 | 0.19 | 1.42 | 2.10 | 2.72 | 742.00 | | |
| 22 | 21 | 741.65 | 736.35 | 400. | 8. | RCP | 0.013 | 100 | 0 | 0.0100 | 0.0380 | 0.7791 | 0.05 | 1.20 | 1.79 | 3.45 | 747.24 | | |
| 21 | 20 | 736.35 | 735.63 | 103. | 8. | RCP | 0.007 | 240 | 0 | 0.0240 | 0.0912 | 0.5659 | 0.16 | 1.24 | 1.85 | 2.51 | 741.01 | | |
| * AT MH 20 | | | | | | | | 720 | 0 | | | | | | | | | | |
| 20 | 16 | 735.63 | 733.11 | 402. | 10. | RCP | 0.006 | 720 | 0 | 0.0720 | 0.2736 | 0.9716 | 0.28 | 1.61 | 2.37 | 2.76 | 740.97 | | |
| 18 | 17 | 737.50 | 734.70 | 227. | 8. | RCP | 0.012 | 0 | 0 | 0.0000 | 0.0000 | 0.7517 | 0.00 | 0.00 | 0.00 | 3.33 | 741.37 | | |
| 17 | 16 | 734.70 | 733.11 | 249. | 8. | RCP | 0.006 | 0 | 0 | 0.0000 | 0.0000 | 0.5409 | 0.00 | 0.00 | 0.00 | 2.40 | 739.15 | | |
| * AT MH 16 | | | | | | | | 720 | 0 | | | | | | | | | | |
| 16 | 12 | 733.11 | 730.97 | 414. | 10. | RCP | 0.005 | 720 | 0 | 0.0720 | 0.2736 | 0.8823 | 0.31 | 1.51 | 2.21 | 2.50 | 737.91 | | |
| 14 | 13 | 734.00 | 731.60 | 402. | 8. | RCP | 0.006 | 0 | 0 | 0.0000 | 0.0000 | 0.5230 | 0.00 | 0.00 | 0.00 | 2.32 | 737.03 | | |
| 13 | 12 | 731.60 | 730.97 | 92. | 8. | RCP | 0.007 | 0 | 0 | 0.0000 | 0.0000 | 0.5601 | 0.00 | 0.00 | 0.00 | 2.48 | 736.14 | | |
| * AT MH 12 | | | | | | | | 720 | 0 | | | | | | | | | | |
| 12 | 9 | 730.97 | 730.15 | 374. | 10. | RCP | 0.002 | 720 | 0 | 0.0720 | 0.2736 | 0.5746 | 0.48 | 1.11 | 1.61 | 1.63 | 736.17 | | Z |
| 9 | 4 | 730.15 | 729.30 | 425. | 10. | RCP | 0.002 | 720 | 0 | 0.0720 | 0.2736 | 0.5488 | 0.50 | 1.08 | 1.55 | 1.56 | 735.77 | | Z |
| 3A | 4 | 731.77 | 729.30 | 147. | 8. | RCP | 0.017 | 0 | 0 | 0.0000 | 0.0000 | 0.8773 | 0.00 | 0.00 | 0.00 | 3.89 | 735.44 | | |
| * AT MH 4 | | | | | | | | 720 | 0 | | | | | | | | | | |
| 4 | 5 | 729.30 | 728.80 | 296. | 10. | VCP | 0.002 | 720 | 0 | 0.0720 | 0.2736 | 0.5820 | 0.47 | 1.12 | 1.62 | 1.65 | 734.16 | | Z |
| 5 | 6 | 728.80 | 727.79 | 328. | 10. | VCP | 0.003 | 720 | 0 | 0.0720 | 0.2736 | 0.7857 | 0.35 | 1.39 | 2.03 | 2.23 | 734.64 | | |
| * AT MH 6 | | | | | | | | 3440 | 0 | | | | | | | | | | |
| 6 | 2 | 727.79 | 727.15 | 384. | 21. | VCP | 0.002 | 3450 | 0 | 0.3450 | 1.2304 | 4.1805 | 0.29 | 1.62 | 2.34 | 2.69 | 734.46 | | |
| 2 | 1 | 727.15 | 725.77 | 393. | 21. | VCP | 0.004 | 3450 | 0 | 0.3450 | 1.2304 | 6.0682 | 0.20 | 2.11 | 3.06 | 3.90 | 733.65 | | |
| 1 | 2-26 | 725.77 | 725.34 | 418. | 21. | VCP | 0.001 | 3450 | 0 | 0.3450 | 1.2304 | 3.2844 | 0.37 | 1.37 | 1.96 | 2.11 | 731.68 | | |
| 2-26 | 2-25 | 725.34 | 725.58 | 399. | 21. | VCP | -.001 | 3450 | 0 | 0.3450 | 1.2304 | | | | | | 731.24 | 26 | W |
| 54 | 52 | 743.70 | 742.82 | 360. | 10. | RCP | 0.002 | 10 | 0 | 0.0010 | 0.0038 | 0.6067 | 0.01 | 0.31 | 0.49 | 1.72 | NA | A | Z |
| 52 | 47 | 742.82 | 742.12 | 183. | 10. | RCP | 0.004 | 10 | 0 | 0.0010 | 0.0038 | 0.7590 | 0.01 | 0.36 | 0.58 | 2.15 | 750.17 | | Z |
| 49 | 48 | 750.43 | 742.90 | 230. | 8. | RCP | 0.033 | 20 | 0 | 0.0020 | 0.0076 | 1.2246 | 0.01 | 0.97 | 1.56 | 5.43 | 754.05 | A | Z |
| 48 | 47 | 742.90 | 742.12 | 174. | 10. | RCP | 0.004 | 20 | 0 | 0.0020 | 0.0076 | 0.8217 | 0.01 | 0.47 | 0.75 | 2.33 | NA | | Z |
| * AT MH 47 | | | | | | | | 30 | 0 | | | | | | | | | | |
| 47 | 44 | 742.12 | 741.52 | 307. | 10. | RCP | 0.002 | 30 | 0 | 0.0030 | 0.0114 | 0.5425 | 0.02 | 0.41 | 0.62 | 1.54 | 750.74 | | Z |
| 44 | 42 | 741.52 | 740.64 | 312. | 10. | RCP | 0.003 | 30 | 0 | 0.0030 | 0.0114 | 0.6517 | 0.02 | 0.46 | 0.70 | 1.85 | 749.36 | | Z |
| 46 | 45 | 749.12 | 747.35 | 288. | 8. | RCP | 0.006 | 10 | 0 | 0.0010 | 0.0038 | 0.5306 | 0.01 | 0.44 | 0.70 | 2.35 | 753.93 | | Z |
| 45 | 43 | 747.35 | 746.69 | 267. | 8. | RCP | 0.002 | 20 | 0 | 0.0020 | 0.0076 | 0.3246 | 0.02 | 0.40 | 0.61 | 1.44 | 756.89 | | Y |
| 43 | 42A | 746.69 | 744.85 | 326. | 8. | RCP | 0.006 | 30 | 0 | 0.0030 | 0.0114 | 0.5085 | 0.02 | 0.61 | 0.95 | 2.25 | 757.22 | | Z |
| 42A | 42 | 744.85 | 740.64 | 99. | 10. | RCP | 0.043 | 30 | 0 | 0.0030 | 0.0114 | 2.5306 | 0.00 | 1.15 | 1.87 | 7.18 | 752.61 | | Z |
| * AT MH 42 | | | | | | | | 60 | 0 | | | | | | | | | | |

| MANHOLES FROM NH ID | TO NH ID | INVERT ELEV FROM FT | TO FT | DIST FT | PIPE DIA IN | TYP | SLOPE FT/FT | POPULATION RES | N-RES | RATE OF FLOW(MGD) AVERAGE QA | PEAK QP | CAPACITY QF | PIPE RATIO QP/QF | VELOCITY AVG FPS | PEAK FPS | CAP FPS | UPSTREAM MANHOLE RIM ELEV | COMMENTS NOTE | WARNING |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 42 | 38 | 740.64 | 739.01 | 338. | 12. | RCP | 0.005 | 60 | 0 | 0.0060 | 0.0228 | 1.3858 | 0.02 | 0.67 | 1.02 | 2.73 | 747.99 | | Z |
| 38 | 2-31 | 739.01 | 738.83 | 340. | 12. | RCP | 0.001 | 60 | 0 | 0.0060 | 0.0228 | 0.4591 | 0.05 | 0.32 | 0.47 | 0.90 | 746.76 | | Y |
| 2-31 | 2-30 | 738.83 | 738.00 | 353. | 12. | RCP | 0.002 | 60 | 0 | 0.0060 | 0.0228 | 0.9676 | 0.02 | 0.53 | 0.79 | 1.91 | 745.52 | 31 | Z |
| 2-30 | 2-29 | 738.00 | 733.51 | 172. | 10. | RCP | 0.026 | 60 | 0 | 0.0060 | 0.0228 | 1.9827 | 0.01 | 1.23 | 1.94 | 5.62 | 743.97 | 30 | |
| 2-29 | 2-28 | 733.51 | 728.57 | 254. | 10. | RCP | 0.019 | 60 | 0 | 0.0060 | 0.0228 | 1.7114 | 0.01 | 1.11 | 1.70 | 4.86 | 738.58 | 29 | Z |
| 2-28 | 2-27 | 728.57 | 726.88 | 216. | 10. | RCP | 0.008 | 60 | 0 | 0.0060 | 0.0228 | 1.0855 | 0.02 | 0.82 | 1.24 | 3.08 | 732.81 | 28 | Z |
| 2-27 | 2-25 | 726.88 | 724.92 | 348. | 10. | VCP | 0.006 | 60 | 0 | 0.0060 | 0.0228 | 1.0627 | 0.02 | 0.81 | 1.22 | 3.01 | 731.07 | 27 | Z |
| * NOTE: PIPE SIZE CHANGES BETWEEN MANHOLES 2-27 AND 2-25 FROM A 10" C TO A 12" C. | | | | | | | | | | | | | | | | | | | |
| * AT MH 2-25 | | | | | | | | 3500 | 0 | | | | | | | | | | |
| 2-25 | 2-24 | 724.58 | 723.18 | 401. | 21. | VCP | 0.003 | 3500 | 0 | 0.3500 | 1.2477 | 6.0508 | 0.21 | 2.12 | 3.07 | 3.89 | 730.70 | 25 | |
| 2-24 | 2-13A | 723.18 | 723.00 | 400. | 21. | VCP | 0.000 | 3500 | 0 | 0.3500 | 1.2477 | 2.1720 | 0.57 | 1.01 | 1.44 | 1.40 | 729.03 | 24 | Z |
| 2-13A | 2-13 | 723.00 | 722.65 | 141. | 21. | VCP | 0.002 | 3500 | 0 | 0.3500 | 1.2477 | 7.2841 | 0.17 | 1.85 | 2.68 | 3.59 | 728.94 | | |
| 2-13 | 2-14 | 722.65 | 722.48 | 456. | 21. | VCP | 0.000 | 3500 | 0 | 0.3500 | 1.2477 | 1.9695 | 0.63 | 0.95 | 1.35 | 1.77 | 728.83 | 13 | Y |
| 2-14 | 2-15 | 722.48 | 722.32 | 399. | 21. | VCP | 0.000 | 3500 | 0 | 0.3500 | 1.2477 | 2.0478 | 0.61 | 0.97 | 1.38 | 1.31 | 727.12 | 14 | Y |
| 2-15 | 2-16A | 722.32 | 722.16 | 405. | 21. | VCP | 0.000 | 3500 | 0 | 0.3500 | 1.2477 | 2.0220 | 0.62 | 0.97 | 1.38 | 1.30 | 730.15 | 15 | Y |
| 2-16A | 2-16 | 722.16 | 721.97 | 245. | 21. | VCP | 0.001 | 3500 | 0 | 0.3500 | 1.2477 | 4.0716 | 0.31 | 1.23 | 1.76 | 2.01 | 732.88 | | |
| 2-16 | 2-17 | 721.97 | 721.54 | 351. | 21. | VCP | 0.001 | 3500 | 0 | 0.3500 | 1.2477 | 5.1173 | 0.24 | 1.44 | 2.08 | 2.52 | 733.82 | 16 | |
| 2-17 | 2-18 | 721.54 | 721.63 | 504. | 21. | VCP | -0.000 | 3500 | 0 | 0.3500 | 1.2477 | | | | | | 728.54 | | W |
| 152A | 153 | 746.62 | 738.59 | 200. | 10. | RCP | 0.040 | 10 | 0 | 0.0010 | 0.0038 | 2.4589 | 0.00 | 0.79 | 1.31 | 6.98 | 756.14 | 0 | Z |
| 160 | 153 | 740.40 | 738.59 | 202. | 12. | PVC | 0.009 | 140 | 0 | 0.0140 | 0.0532 | 2.5759 | 0.02 | 1.34 | 2.03 | 5.07 | 753.04 | | |
| * AT MH 153 | | | | | | | | 140 | 0 | | | | | | | | | | |
| 153 | 162 | 738.59 | 737.50 | 101. | 12. | PVC | 0.011 | 140 | 0 | 0.0140 | 0.0532 | 2.8269 | 0.02 | 1.43 | 2.16 | 5.57 | 756.29 | | |
| 161 | 162 | 741.13 | 737.50 | 401. | 12. | PVC | 0.009 | 140 | 0 | 0.0140 | 0.0532 | 2.5890 | 0.02 | 1.34 | 2.03 | 5.10 | 751.11 | | |
| * AT MH 162 | | | | | | | | 290 | 0 | | | | | | | | | | |
| 162 | 163 | 737.50 | 737.79 | 191. | 12. | PVC | -.002 | 290 | 0 | 0.0290 | 0.1102 | | | | | | 753.19 | | W |
| 164 | 163 | 740.89 | 737.77 | 400. | 12. | PVC | 0.008 | 280 | 0 | 0.0280 | 0.1064 | 2.4033 | 0.04 | 1.60 | 2.38 | 4.73 | 749.22 | | |
| * AT MH 163 | | | | | | | | 570 | 0 | | | | | | | | | | |
| 163 | 154 | 737.66 | 735.24 | 182. | 12. | PVC | 0.013 | 570 | 0 | 0.0570 | 0.2166 | 3.1378 | 0.07 | 2.41 | 3.54 | 6.18 | 752.04 | | |
| 165 | 154 | 740.56 | 735.24 | 390. | 12. | PVC | 0.014 | 280 | 0 | 0.0280 | 0.1064 | 3.1782 | 0.03 | 1.93 | 2.89 | 6.26 | 748.19 | | |
| * AT MH 154 | | | | | | | | 850 | 0 | | | | | | | | | | |
| 154 | 166 | 735.24 | 735.80 | 230. | 12. | PVC | -.002 | 850 | 0 | 0.0850 | 0.3230 | | | | | | 748.94 | | W |
| 166 | 179 | 735.80 | 735.21 | 221. | 12. | PVC | 0.003 | 850 | 0 | 0.0850 | 0.3230 | 1.4060 | 0.23 | 1.53 | 2.25 | 2.77 | 745.13 | | |
| 177 | 179 | 736.13 | 735.21 | 191. | 12. | PVC | 0.005 | 140 | 0 | 0.0140 | 0.0532 | 1.8886 | 0.03 | 1.09 | 1.63 | 3.72 | 746.43 | | Z |
| * AT MH 179 | | | | | | | | 990 | 0 | | | | | | | | | | |
| 179 | 169 | 735.21 | 734.78 | 111. | 12. | PVC | 0.004 | 990 | 0 | 0.0990 | 0.3762 | 1.6937 | 0.22 | 1.82 | 2.68 | 3.34 | 742.41 | | |
| 178 | 169 | 736.56 | 734.78 | 403. | 12. | PVC | 0.004 | 140 | 0 | 0.0140 | 0.0532 | 1.8085 | 0.03 | 1.05 | 1.58 | 3.56 | 747.21 | | Z |
| * AT MH 169 | | | | | | | | 1130 | 0 | | | | | | | | | | |
| 169 | 169A | 734.78 | 734.02 | 180. | 12. | PVC | 0.004 | 1130 | 0 | 0.1130 | 0.4106 | 1.7682 | 0.23 | 1.95 | 2.83 | 3.48 | 741.51 | | |

| MANHOLES FROM MH ID | TO MH ID | INVERT ELEV FROM FT | TO FT | DIST FT | PIPE DIA IN | TYP | SLOPE FT/FT | POPULATION RES | N-RES | RATE OF FLOW(MGD) AVERAGE QA | PEAK QP | CAPACITY QF | PIPE RATIO QP/QF | VELOCITY AVG FPS | PEAK FPS | CAP FPS | UPSTREAM MANHOLE RIM ELEV | COMMENTS NOTE | WARNING |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 169B | 169A | 736.31 | 734.02 | 400. | 12. | PVC | 0.006 | 280 | 0 | 0.0280 | 0.1064 | 2.0589 | 0.05 | 1.44 | 2.13 | 4.06 | 746.11 | | |
| * AT MH 169A | | | | | | | | 1410 | 0 | | | | | | | | | | |
| 169A | 170 | 734.02 | 733.40 | 279. | 12. | PVC | 0.002 | 1410 | 0 | 0.1410 | 0.5112 | 1.2828 | 0.40 | 1.66 | 2.38 | 2.53 | 738.37 | | |
| 180 | 170 | 739.87 | 733.40 | 402. | 10. | PVC | 0.016 | 280 | 0 | 0.0280 | 0.1064 | 2.1230 | 0.05 | 2.12 | 3.14 | 6.02 | 745.12 | | |
| * AT MH 170 | | | | | | | | 1690 | 0 | | | | | | | | | | |
| 170 | 181 | 733.40 | 733.05 | 163. | 12. | PVC | 0.002 | 1690 | 0 | 0.1690 | 0.6114 | 1.2610 | 0.48 | 1.73 | 2.46 | 2.48 | 741.11 | | |
| 182 | 181 | 741.06 | 733.13 | 408. | 10. | VCP | 0.019 | 280 | 0 | 0.0280 | 0.1064 | 1.9741 | 0.05 | 2.01 | 2.98 | 5.60 | 745.80 | | |
| * AT MH 181 | | | | | | | | 1970 | 0 | | | | | | | | | | |
| 181 | 171 | 733.13 | 732.57 | 174. | 12. | PVC | 0.003 | 1970 | 0 | 0.1970 | 0.7111 | 1.5437 | 0.46 | 2.09 | 2.97 | 3.04 | 740.82 | | |
| 172B | 172A | 735.06 | 732.48 | 400. | 8. | VCP | 0.006 | 45 | 0 | 0.0045 | 0.0171 | 0.6272 | 0.03 | 0.80 | 1.24 | 2.78 | 740.52 | | Z |
| 172A | 171A | 732.48 | 731.83 | 264. | 21. | VCP | 0.002 | 0 | 0 | 0.0000 | 0.0000 | 5.0811 | 0.00 | 0.00 | 0.00 | 3.27 | 740.66 | 172 | |
| 183 | 171A | 735.08 | 732.91 | 200. | 8. | VCP | 0.011 | 45 | 0 | 0.0045 | 0.0171 | 0.8135 | 0.02 | 0.96 | 1.49 | 3.61 | 741.76 | | Z |
| * AT MH 171A | | | | | | | | 90 | 0 | | | | | | | | | | |
| 171A | 171 | 731.83 | 731.71 | 76. | 21. | VCP | 0.002 | 90 | 0 | 0.0090 | 0.0342 | 4.0690 | 0.01 | 0.52 | 0.80 | 2.62 | 739.96 | | Z |
| * AT MH 171 | | | | | | | | 2060 | 0 | | | | | | | | | | |
| 171 | 168 | 731.71 | 729.59 | 309. | 21. | VCP | 0.007 | 2060 | 0 | 0.2060 | 0.7430 | 8.4821 | 0.09 | 2.29 | 3.36 | 5.46 | 740.29 | | |
| 168 | 82 | 729.59 | 729.19 | 320. | 21. | VCP | 0.001 | 2060 | 0 | 0.2060 | 0.7430 | 3.6206 | 0.21 | 1.26 | 1.83 | 2.33 | 735.92 | | Z |
| 82 | 76 | 729.19 | 728.80 | 507. | 24. | RCP | 0.001 | 2060 | 0 | 0.2060 | 0.7430 | 3.5144 | 0.21 | 0.95 | 1.37 | 1.73 | 733.65 | | Z |
| 76 | 75 | 728.80 | 728.32 | 505. | 24. | RCP | 0.001 | 2060 | 0 | 0.2060 | 0.7430 | 3.9064 | 0.19 | 1.02 | 1.48 | 1.92 | 732.96 | | Z |
| 75 | 74 | 728.32 | 727.58 | 495. | 24. | RCP | 0.001 | 2060 | 0 | 0.2060 | 0.7430 | 4.8992 | 0.15 | 1.19 | 1.74 | 2.41 | 733.10 | | Z |
| 74 | 2-23 | 727.58 | 727.02 | 498. | 24. | RCP | 0.001 | 2060 | 0 | 0.2060 | 0.7430 | 4.2491 | 0.17 | 1.08 | 1.58 | 2.09 | 732.42 | | Z |
| 2-32 | 2-33 | 750.00 | 745.91 | 253. | 6. | RCP | 0.016 | 0 | 0 | 0.0000 | 0.0000 | 0.3996 | 0.00 | 0.00 | 0.00 | 3.15 | NA | 32 | |
| 2-33 | 73 | 745.91 | 733.50 | 313. | 6. | RCP | 0.040 | 0 | 0 | 0.0000 | 0.0000 | 0.6258 | 0.00 | 0.00 | 0.00 | 4.93 | 752.91 | 33 | |
| 73 | 2-23 | 733.50 | 727.02 | 653. | 8. | RCP | 0.010 | 0 | 0 | 0.0000 | 0.0000 | 0.6742 | 0.00 | 0.00 | 0.00 | 2.99 | 751.58 | | |
| * AT MH 2-23 | | | | | | | | 2060 | 0 | | | | | | | | | | |
| 2-23 | 2-22 | 727.02 | 726.87 | 423. | 24. | RCP | 0.000 | 2060 | 0 | 0.2060 | 0.7430 | 2.3863 | 0.31 | 0.72 | 1.04 | 1.18 | 733.52 | 23 | Y |
| 2-22 | 2-21 | 726.87 | 726.34 | 512. | 24. | RCP | 0.001 | 2060 | 0 | 0.2060 | 0.7430 | 4.0767 | 0.18 | 1.05 | 1.53 | 2.01 | 733.94 | 22 | Z |
| 2-21 | 2-20 | 726.34 | 725.44 | 545. | 24. | RCP | 0.002 | 2060 | 0 | 0.2060 | 0.7430 | 5.1493 | 0.14 | 1.24 | 1.80 | 2.54 | 733.19 | 21 | |
| 2-20 | 2-19 | 725.44 | 724.70 | 567. | 24. | RCP | 0.001 | 2060 | 0 | 0.2060 | 0.7430 | 4.5776 | 0.16 | 1.14 | 1.66 | 2.25 | 731.94 | 20 | Z |
| 2-19 | 2-18 | 724.70 | 721.63 | 379. | 24. | RCP | 0.008 | 2060 | 0 | 0.2060 | 0.743 | 11.4042 | 0.07 | 2.16 | 3.17 | 5.62 | 729.91 | 19 | |
| * AT MH 2-18 | | | | | | | | 5650 | 0 | | | | | | | | | | |
| * MANHOLE 2-18 DISCHARGES THROUGH A 16" ASBESTOS CEMENT PIPE TO A | | | | | | | | | | | | | | | | | | | |
| * DISTRIBUTION BOX AT THE UPSTREAM END OF TWO SEWAGE LAGOONS. | | | | | | | | | | | | | | | | | | | |
| 2-18 | PT-A | 721.63 | 720.16 | 840. | 16. | AC | 0.002 | 5650 | 0 | 0.5650 | 1.9794 | 2.0745 | 0.95 | 1.96 | 2.62 | 2.30 | 731.85 | 18 | |
| PT-A | BOX | 720.16 | 719.01 | 651. | 16. | AC | 0.002 | 5650 | 0 | 0.5650 | 1.9794 | 2.0842 | 0.95 | 1.97 | 2.63 | 2.31 | 721.54 | | |
| * AT DISTRIBUTION BOX | | | | 53293 | | | | 5650 | 0 | | | | | | | | | | |

TOTAL NUMBER OF REACHES BELOW 1.2 FPS = 84.
TOTAL NUMBER OF ADVERSE REACHES = 5.

| | |
|---|---|
| 36 | 37 |
| 2-26 | 2-25 |
| 2-17 | 2-18 |
| 162 | 163 |
| 154 | 166 |

TOTAL NUMBER OF REACHES EXCEEDING PIPE CAPACITY = 0.
TOTAL NUMBER OF REACHES WHICH HAVE FULL PIPE VELOCITIES BELOW 1.5 FPS= 10.

| | |
|---|---|
| 114 | 113 |
| 83 | 84 |
| 69 | 68 |
| 45 | 43 |
| 3 | 2 |

| | |
|---|---|
| 2-13 | 2-14 |
| 2-14 | 2-15 |
| 2-15 | 2-16A |
| 2-17 | 2-18 |
| 2-23 | 2-22 |

TOTAL NUMBER OF REACHES = 184.

# APPENDIX E

## FLOW MEASUREMENTS AT METER A

## FORT HOOD, TEXAS

## APPENDIX E

## FLOW MEASUREMENTS AT METER A

Meter A was field verified by installing a separate meter downstream to check low flow, peak flow, and total flow. Velocities were measured using a pygmy meter and measuring at 6" depths. The results are listed below and agree to within 2.75%.

| DATE | TIME | METER A (fps) | MH R-15 (fps) |
|---|---|---|---|
| 5-9-84 | 3:00 PM | 5.33 | 5.41 |
| | 3:40 PM | 4.90 | 5.04 |
| 5-10-84 | 10:47 AM | 5.16 | 5.40 |
| | 12:00 AM | 5.26 | 5.21 |
| | 12:56 PM | 5.19 | 5.49 |
| | **TOTAL** | **25.84** | **26.55** |

$$\frac{(26.55 - 25.84)}{25.84} \times 100 = 2.748\%$$

# APPENDIX F

## RAINFALL EFFECT ON SEWAGE FLOW

## FORT HOOD, TEXAS

## APPENDIX F

## RAINFALL EFFECT ON SEWAGE FLOW

On Figure F.1 the daily sewer meter readings taken during 1982 have been plotted with the yearly rainfall pattern for 1982. With few exceptions, it appears that the rainfall pattern has little or no effect upon sewer flowrates. Those instances where a correlation does seem to exist are marked on the chart. The wide variances in the daily meter readings are such that ascertaining a firm connection beteen the two measurements is difficult, especially if quantifying the rainfall effects upon the readings is the goal.

In addition to the normal fluctuations found in sewer flows caused by varying usage of water by customers, reading of the flow meter is also critical. A reading taken several hours late on a given day causes the flow for that period to be high. If taken the proper time the following day, that period is low. While this fact has no effect on flow amounts for billing purposes, since variances cancel and balance, it greatly affects the plotting of a graph such as Figure F.1.

The most readily discernible feature of the chart is the intensity of rainfall required to increase the sewer flow noticeably. This fact indicates that inflow into the sanitary system, while it does exist, is not a major problem at this time.

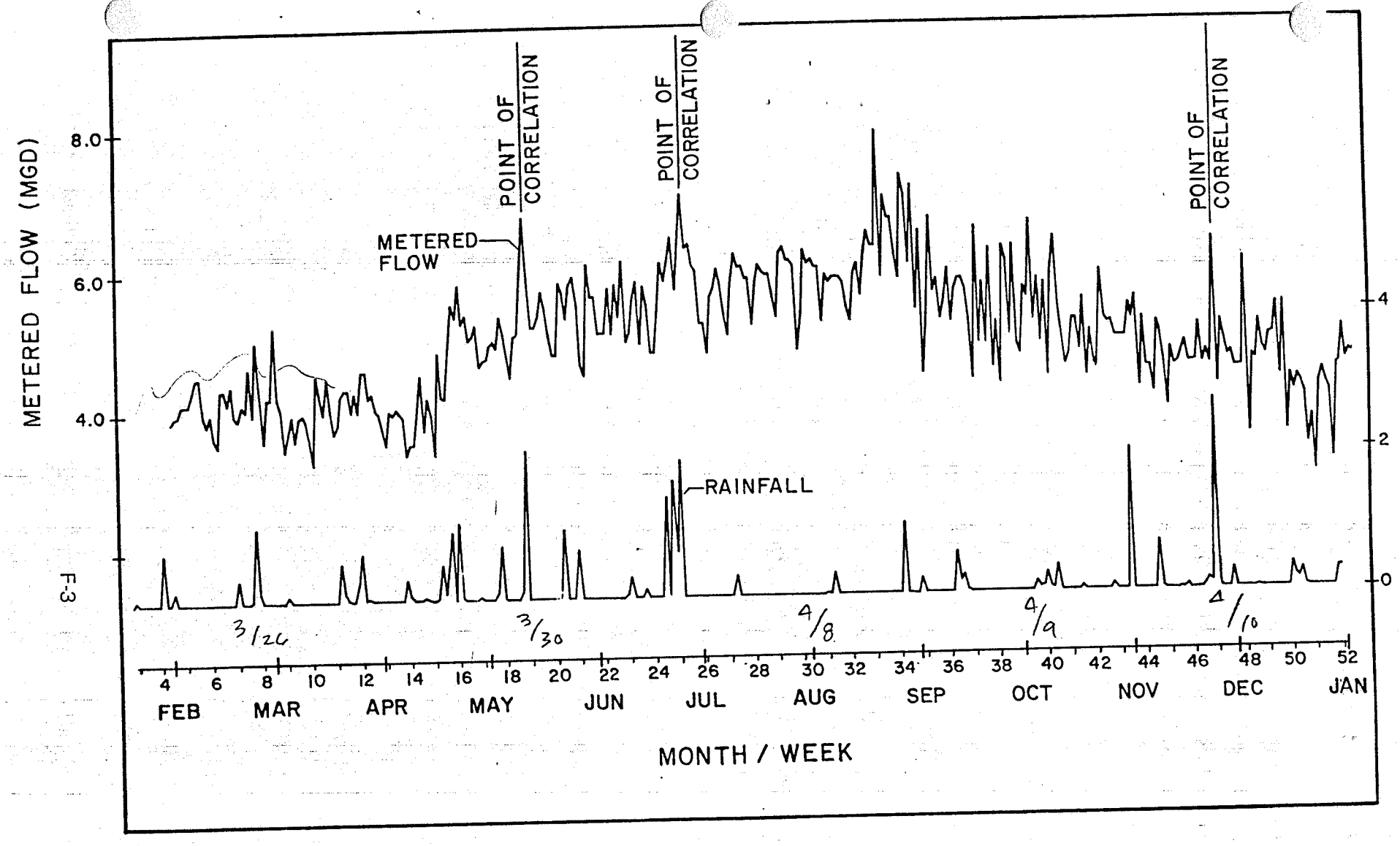


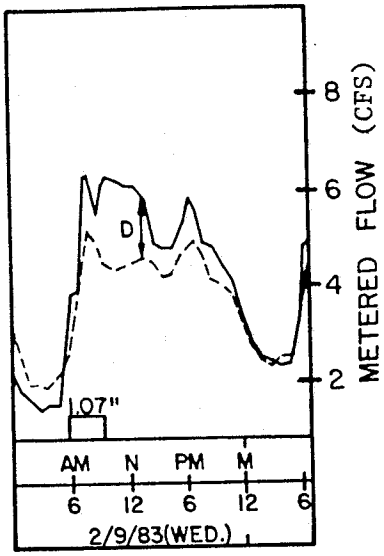

FIGURE F.I
RAINFALL EFFECT ON
SEWAGE FLOW
FORT HOOD, TEXAS
APPENDIX F

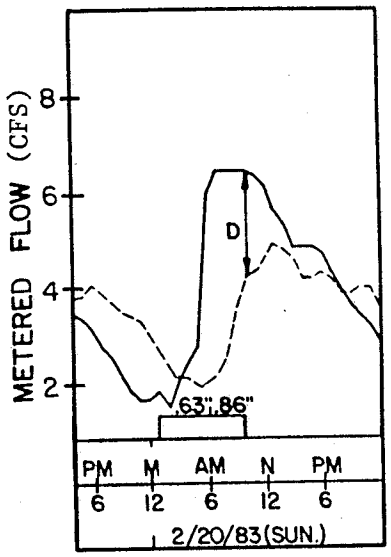
# APPENDIX G

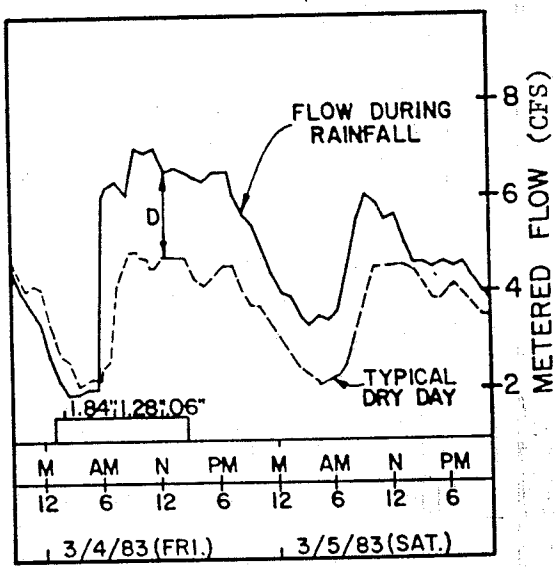
## DRY-DAY/WET-DAY HYDROGRAPHS

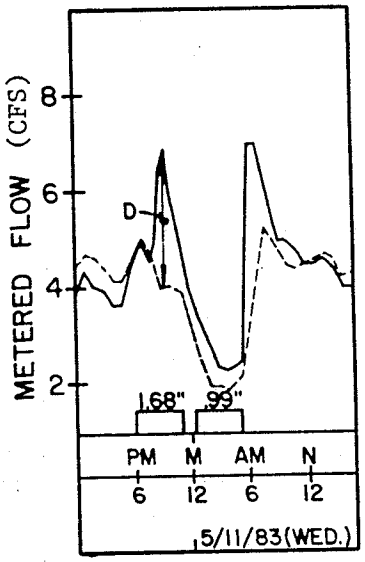
## FORT HOOD, TEXAS

APPENDIX G
DRY-DAY/WET-DAY HYDROGRAPHS
FORT HOOD, TEXAS




Each of the four figures above demonstrates the effect of heavy rainfall upon the Fort Hood sanitary sewers. As the duration of each storm (represented by the bar graph) increases, the increased flow begins to show in the hourly meter readings for the sewer. The average differential (shown as D above) represents the inflow into the sewers caused by the storm. The phenomenon is virtually nonexistent during less intense rainfall periods. The annual cost savings realized by eliminating the inflow would take many years to offset the costs associated with locating and correcting the sources.

# APPENDIX H

## CONSTRUCTION COSTS
## FOR
## SEPTIC TANKS

## FORT HOOD, TEXAS

APPENDIX H

ESTIMATED CONSTRUCTION COSTS FOR TYING
SEPTIC TANK SYSTEMS INTO GRAVITY SEWERS

| Item | Total Quantity | Unit Cost | Building Number 5000 | 56001 56011 | 92060 92065 92066 92068 92072 92076 92080 | 90001 |
|---|---|---|---|---|---|---|
| 1) 4' Dia. Manhole | 38 Ea. | $1,100.00 | $ 6,600.00 | $ 6,600.00 | $ 19,800.00 | $ 8,800.00 |
| 2) 12" VCP Pipe | 3,700 LF | 18.00 | -- | -- | 66,600.00 | -- |
| 3) Trenching and Backfill | 3,700 LF | 18.00 | -- | -- | 66,600.00 | -- |
| 4) 8" VCP Pipe | 7,150 LF | 10.00 | 21,000.00 | 22,500.00 | -- | 28,000.00 |
| 5) Trenching and Backfill | 7,150 LF | 10.00 | 21,000.00 | 22,500.00 | -- | 28,000.00 |
| 6) Connecting Existing Lines | 24 Ea. | 110.00 | 220.00 | 220.00 | 1,980.00 | 220.00 |
| 7) Grout Coating | 7,800 SF | 6.00 | 7,200.00 | 7,200.00 | 22,800.00 | 9,600.00 |
| Subtotals | | | $56,020.00 | $59,020.00 | $177,780.00 | $74,620.00 |
| Combined Sub-total | | | | | $367,440.00 | |
| Contingency (20%) | | | | | 73,488.00 | |
| Engineering (6%) | | | | | 26,455.68 | |
| Testing & Inspection (8%) | | | | | 37,390.69 | |
| | | | | **Total** | **$504,774.37** | |
| | | | | **Rounded** | **$504,800.00** | |

# APPENDIX I

## LIFT STATION SPECIFICATIONS

## FORT HOOD, TEXAS

## APPENDIX I

### I.1 Lift Station 4115

Lift Station 4115 is located west of 76th Street and north of Tank Destroyer Boulevard due west of Building 40001, basic detail mapping sheet L-24. The lift station serves 2 motor repair shops and vehicle washes in subarea 6.

One 4-inch force main runs approximately 370 feet discharging into MH HH49 at elevation 946.0. The station is equipped with 2 pumps operating in parallel with the following characteristics:

PUMPS: 2 - HYDROMATIC PUMP
MODEL #30 MP
SERIAL #'S: 17348, 17349
IMPELLER DIA: 8 13/32
150 gpm @ 25 TDH

MOTORS: 2 - GOULD CENTURY MOTOR TYPE 50
PART: 6-332868-03 FRAME S2137
3hp 60/3 1170 RPM
230/460 V 9.6/4.8 AMP

From field investigations and as-built information, Lift Station 4115 has the following specifications:

| | |
|---|---|
| Wet Well Inflow | |
| Rim Elevation | 936.34 |
| Inside Dimension | 4.0' x 8.0' |
| Wet Well Water Surface Elevations | |
| Pump On | 930.70 |
| Pump Off | 928.20 |
| Static Head | 946.0-928.20 = 17.8' |

## APPENDIX I

### I.2 Lift Station 8001

Lift Station 8001 is located east of 20th Street and north of Battalion Avenue, basic detail mapping sheet P-24. The lift station serves a portion of subarea 17. Population as of July 31, 1983, was 2876 residential and 1947 nonresidential personnel.

Twin 8-inch force mains run approximately 710 feet, discharging into MH A-36 which gravity flows south. The high point in the line is at the manhole discharge, elevation 887.07. The station is equipped with 3 pumps operating in parallel with the following characteristics:

PUMPS: 3 - HYDROMATIC PUMP MODEL #40MP
SERIAL #'S: 17951, 17352, 15959
IMPELLER DIA: 9 5/32, 7 3/4, 9 5/32
300 gpm @ 45 TDH

MOTORS: 3 - GOULD CENTURY MOTOR
PART #'S: 6-330772-02, 6-330772-01, 6-330772-02
10hp 60/3 1750 RPM
230/460 V 25/12.5 AMP

From field investigations and as-built information, Lift Station 8001 has the following specifications:

| | |
|---|---|
| Wet Well Inflow | 878.58 |
| Rim Elevation | 885.14 |
| Inside Dimension | 7'x12' |
| Wet Well Water Surface Elevations | |
| Pump On | 878.07 |
| Pump Off | 874.27 |
| Static Head | |
| East Pipe | 12.29' |
| West Pipe | 12.80' |
| Use | 13.0' |

## APPENDIX I

### I.3 Lift Station 9534

Lift Station 9534 is located north of East Park Avenue and east of 19th Street, basic detail mapping Sheet Q-25 in subarea 17. The lift station serves five motor pools north of East Park Avenue.

One 6-inch force main runs approximately 337 feet, discharging into MH A-121 at elevation 897.35. The station is equipped with one ejector pump and motor of the following characteristics:

PUMPS: 1 - CLOW-YEOMANS ROTARY AIR COMPRESSOR
MODEL# 452 A72909
50 260 49 2

MOTORS: 1 - BALDER MOTOR
SPEC. 58744 FRAME 62718M
MODEL 284 5hp
240/480 V 12.6/6.3 AMP 60/3
1140 RPM Rating & Glass 75C
SERIAL: 10/55

From field investigation and as-built information, Lift Station 9534 has the following specifications:

| | |
|---|---|
| Wet Well Rim Elevation | 896.22 |
| Pump Invert | 880.42 |
| Static Head | 16.93' |

## APPENDIX I

### I.3 Lift Station 9534

Lift Station 9534 is located north of East Park Avenue and east of 19th Street, basic detail mapping Sheet Q-25 in subarea 17. The lift station serves five motor pools north of East Park Avenue.

One 6-inch force main runs approximately 337 feet, discharging into MH A-121 at elevation 897.35. The station is equipped with one ejector pump and motor of the following characteristics:

PUMPS: 1 - CLOW-YEOMANS ROTARY AIR COMPRESSOR
MODEL# 452 A72909
50 260 49 2

MOTORS: 1 - BALDER MOTOR
SPEC. 58744 FRAME 62718M
MODEL 284 5hp
240/480 V 12.6/6.3 AMP 60/3
1140 RPM Rating & Glass 75C
SERIAL: 10/55

From field investigation and as-built information, Lift Station 9534 has the following specifications:

| | |
|---|---|
| Wet Well Rim Elevation | 896.22 |
| Pump Invert | 880.42 |
| Static Head | 16.93' |

## APPENDIX I

### I.4 Lift Station 38020

Lift Station 38020 is located north of Park Avenue near Building 38023, basic detail mapping sheet K-26. The lift station serves Building 38023 only and is situated in subarea 4.

One 4-inch force main runs approximately 100 feet, discharging into MH H-95E at elevation 912.11. The station is equipped with one pump and motor of the following characteristics:

PUMPS: 1 - FAIRBANKS MORSE PUMP SIZE 4x4
150 GPM TOTAL HEAD 25
IMPELLER DIA: 7 5/8

MOTORS: 1 - MARATHON ELECTRIC
MOD: EL 215TBDR7080BDWCCW FRAME 215TC
3hp 1160 RPM 60 CYCLE
230 V 14.5 AMP

From field investigations and as-built information, Lift Station 38020 has the following specifications:

| | |
|---|---|
| Wet Well Inflow | |
| Rim Elevation | 908.47 |
| Inside Dimension | 3.0' Dia. |
| Pump Inverts | 887.97 |
| Wet Well Surface Elevation | |
| Pump On | 895.00 |
| Pump Off | 890.09 |
| Static Head | 22.02' |

APPENDIX I

## I.5 Lift Station 41012

Lift Station 41012 is located south and east of the intersection of Battalion Avenue and Clear Creek Road, basic detail mapping sheet K-26. The lift station serves the enlisted barracks and support facilities of subarea 4. This lift station includes the discharge from Lift Station 38020. Population as of July 31, 1983, was 1683 residential and 2057 nonresidential personnel.

One 8-inch force main runs approximately 4507 feet and discharges into MH W-241A, which gravity flows west. The high point in the line is 4507 feet from the lift station at elevation 942.5. The station is equipped with 3 pumps operating in parallel with three motors of the following characteristics:

PUMPS: 3 - FAIRBANKS MORSE 1750 RPM
365 GPM @ 80' TDH MODEL 5442-B-28
9-1/2 DIA IMPELLERS

MOTORS: 3 - UNICLOSED MOTOR
20hp 1800 RPM

From field records and as-built information, Lift Station 41012 has the following specifications:

| | |
|---|---|
| Wet Well Inflow | 886.93 |
| Rim Elevation | 893.43 |
| Inside Dimension | 6.0' x 13.3' |
| Outside Dimension | 15.5' x 8.2' |
| Pump Invert | 876.63 |
| Wet Well Water Surface Elevations | |
| Pump On | 879.98 |
| Pump Off | 878.14 |
| Static Head | 64.36' |

## APPENDIX I

### I.6 Lift Station 51400

Lift Station 51400 is located between 1 & 2 fairways of the Clear Creek Golf Course, basic detail mapping sheet J-26 in sub-areas 2 and 3. The lift station serves all of Comanche Village II & III residential family housing units. As of July 31, 1984, population was 4622 people; available housing is 4712 people. The station also picks up the 10-inch force main from Comanche Village I (L.S. 52380), serving available housing for 3804 people.

One 12-inch force main runs approximately 7947 feet, discharging into MH W-79B8 which gravity flows west. The high point in the line is 6800 feet from the station at elevation 945.00. The station is equipped with 3 pumps operating in parallel and motors of the following characteristics:

PUMPS: 3 - HYDROMATIC SELF-PRIMING SEWAGE & TRASH PUMP
MODEL #60 MPH
SERIAL #'S 16688, 16687, 19352
IMPELLER DIA: 12 3/4
3-1000 gpm @ 125 TDH

MOTORS: 3 - GOULD CENTURY MOTOR 75hp 1770 RPM
3 PHASE 230/460 V 174/87 & (2) 172/86 AMP
PART #'S: 6-321178-06, 6341841-01, 6-341841-02

From field records and as-built information, Lift Station 51400 has the following specifications:

| | |
|---|---|
| Wet Well #1 Inflow | 826.67 |
| Rim Elevation | 835.16 |
| Inside Dimensions | 8.25' x 9.25' |
| Outside Dimensions | 9.35' x 10.25' |
| Wet Well #2 Inflow | 828.85 |
| Rim Elevation | 835.10 |
| Inflow from LS 52380 | 829.62 |
| Inside Dia. | 6.0' |
| Pump Invert | 836.80 |
| MH# W-79B8 Invert | 930.82 |
| High Point (6800 ft.) | 945.00 |
| Wet Well #1 Water Surface Elevations | |
| Pump On | 829.12 |
| Pump Off | 827.03 |
| Static Head | 117.97' |
| Overflow Elevation | 832.52 |

## APPENDIX I

### I.7 Lift Station 52380

Lift Station 52380 is located northeast of Comanche Village III between number 10 and 13 fairways of the Clear Creek Golf Course, basic detail mapping sheet J-26 in subarea 1. The lift station serves all of Comanche Village III, approximately 3723 people; available 900 residential family units to house 3804 people.

One 10-inch force main runs 805 feet to Lift Station 51400. The high point in the line is at Station 91+00 at 862.5. The station is equipped with 3 pumps operating in parallel coupled with three motors of the following characteristics:

PUMPS: 3 - CRANE PUMP SIZE 4x4x9 1/2
500 GPM/57 FT. TDH/1750 RPM
SERIAL #'S DP-739089, 739088,
(NAME PLATE MISSING ON BOTH
PUMP AND MOTOR)

MOTORS: UNICLOSED MOTOR 15 HP
3 PHASE CO CYCLE
FRAME 254JMV 230/460 V
1750 RPM ID# 9528720-729

From field records and as-built information, Lift Station 52380 has the following specifications:

| | |
|---|---|
| Wet Well Inflow | 813.56 |
| Overflow Invert | 815.27 |
| Rim Elevation | 821.78 |
| Inside Diameter | 8.10' |
| Outside Diameter | 9.55' |
| Wet Well Water Surface Elevation | |
| Pump On | 810.75 |
| Pump Off | 809.54 |
| Static Head | 52.96' |

APPENDIX I

## I.8 Lift Station 90012

Lift Station 90012 is located at West Fort Hood, south of HQ Avenue and west of the Base Area road, basic detail mapping sheet H-14. The lift station serves a portion of subarea 9.

One 4-inch force main runs approximately 120 feet, discharging into MH L-173B, at elevation 1018.12, which gravity flows to Lift Station 93040. The station is equipped with two pumps, operating in parallel, with motors of the following characteristics:

PUMPS: 2 - HYDROMATIC PUMP MODEL: 30MP
SERIAL: 17354, 17353
IMPELLER DIA: 8 13/32, 8 13/32
150 gpm @ 25TDH

MOTORS: 2 - GOULD CENTURY MOTOR
PART 6-334412-03 FRAME S215T CP
3hp 60/1 PHASE
1150 RPM 115/230 V 40/20 AMP

From field investigations and as-built information, Lift Station 90012 has the following specifications:

| | |
|---|---|
| Wet Well Inflow | |
| Rim Elevations | 1019.50 |
| Inside Diameter | 4.0' x 7.0' |
| Pump Invert | 1021.00 |
| Wet Well Water Surface Elevation | |
| Pump On | 1011.50 |
| Pump Off | 1009.50 |
| Static Head | 8.62' |

## APPENDIX I

### I.9 Lift Station 90049

Lift Station 90049 is located in the Robert Gray Army Airfield control tower, basic detail mapping sheet H-13. The lift station serves only a small portion of subarea 9, specifically the control tower and fire station.

One 6-inch force main runs approximately 631 feet and discharges into MH L-168, at elevation 1019.89, which gravity flows to Lift Station 93040. The station is equipped with two pumps, operating in parallel, and motors of the following characteristics:

PUMPS: 2 - HYDROMATIC PUMP MODEL# 40MP
SERIAL #'S: 17351, 17350
IMPELLER DIA: 7, 7 5/16
300 gpm @ 40TDH

MOTORS: 2 - GOULD CENTURY MOTOR
PART #'S: 6-330772-01 S215T SC
10hp 60/3 1750 RPM
230/460 V 25/12.5 AMP

From field investigations and as-built information, Lift Station 90049 has the following specifications:

| | |
|---|---|
| Wet Well Inflow | Undetermined |
| Rim Elevation | 1007.26 |
| Inside Diameter | 5.00' |
| Pump Invert | 1008.56 |
| Wet Well Water Surface Elevation | |
| Pump On | Unknown |
| Pump Off | 1002.76 |
| Static Head | 17.13' |

APPENDIX I

## I.10 Lift Station 93040

Lift Station 93040 is located south of U.S. Highway 190 and east of Clement Drive, basic detail mapping sheet I-21. The lift station services subareas 8 and 9, Montague Village and West Fort Hood respectively. Population as of July 31, 1983 was 1518 residential and 1197 nonresidential.

One 10-inch force main runs approximately 9671 feet, discharging into MH L-26, at elevation 970.96, which gravity flows west. The station is equipped with two pumps, one normal operation and one standby, coupled with one motor of the following characteristics:

PUMPS: 2 - ENPO CORNELL PUMP
MODEL #'S 4x4x14 TRHVTF8 & 4NHTVF8
SERIAL #'S: E3015, E2268
IMPELLER DIA: 13 1/4, 12 1/2
1000 gpm @ 160 TDH

MOTORS: 2 - U.S. ELECTRIC MOTOR 144/72 AMP
60hp 3 PHASE 60 cyc.
TYPE RV 1770 RPM

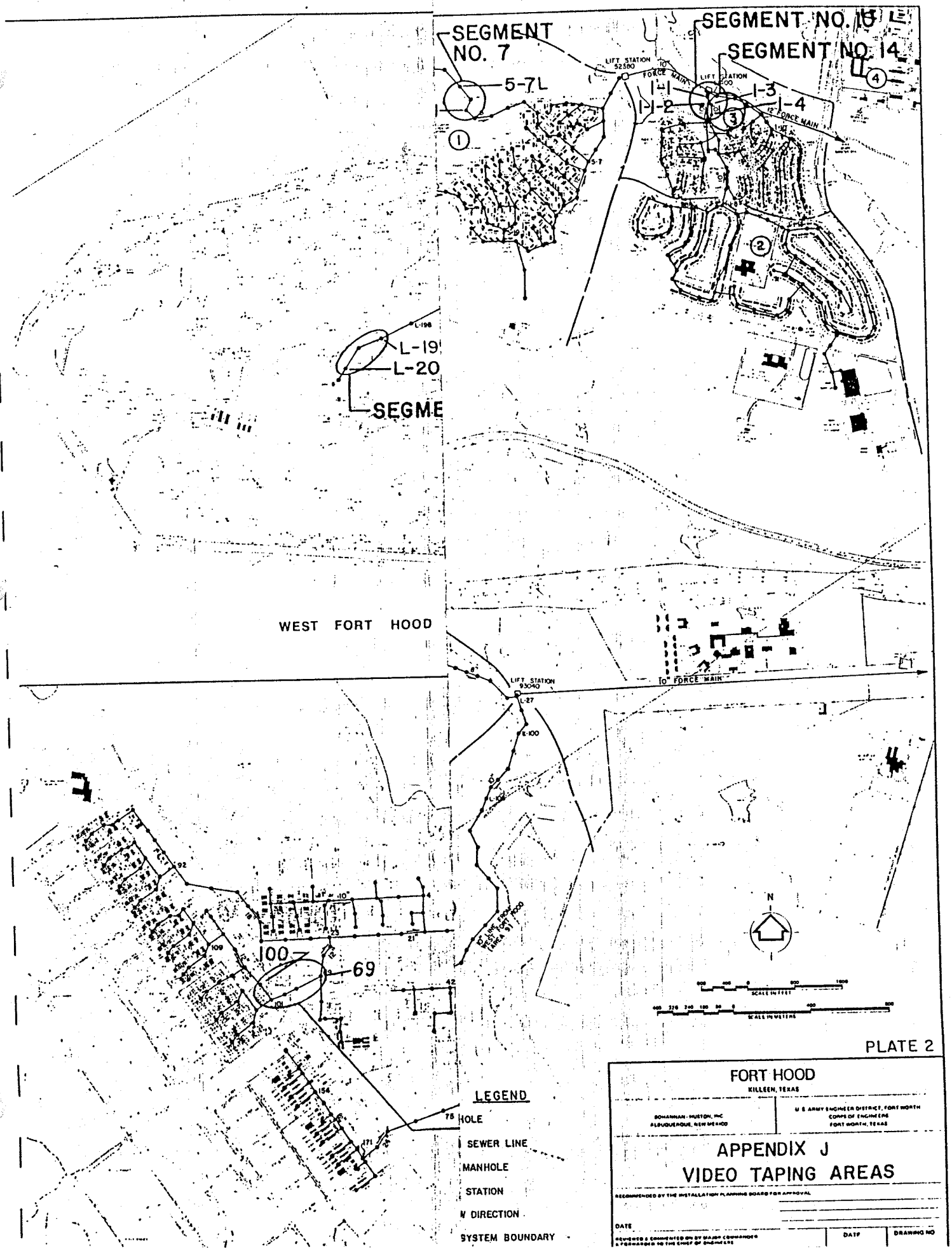
From field investigations and as-built information, Lift Station 93040 has the following specifications:

| | |
|---|---|
| Wet Well Inflow | 864.23 |
| Rim Elevation | 870.53 |
| Inside Dimensions | 8.55' x 9.1' |
| Pump Invert | 858.43 |
| Wet Well Water Surface Elevations | |
| Pump On | 865.25 |
| Pump Off | 861.60 |
| Static Head | 109.36' |

# APPENDIX J

## LOCATION MAPS
## VIDEO TAPING

## FORT HOOD, TEXAS


SEGMENT NO. 7
5-7L
LIFT STATION 52580
10" FORCE MAIN
SEGMENT NO. 15
SEGMENT NO. 14
LIFT STATION
I-1
I-2
I-3
I-4
FORCE MAIN
L-19
L-20
SEGME
WEST FORT HOOD
LIFT STATION 93040
10" FORCE MAIN
L-27
L-100
100
69
N
SCALE IN FEET
SCALE IN METERS
LEGEND
HOLE
SEWER LINE
MANHOLE
STATION
N DIRECTION
SYSTEM BOUNDARY
PLATE 2
FORT HOOD
KILLEEN, TEXAS
BOHANNAN-HUSTON, INC
ALBUQUERQUE, NEW MEXICO
U S ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS
APPENDIX J
VIDEO TAPING AREAS
RECOMMENDED BY THE INSTALLATION PLANNING BOARD FOR APPROVAL
DATE
DATE
DRAWING NO

# APPENDIX K

## NORTH FORT HOOD REPAIR COSTS

## FORT HOOD, TEXAS

## APPENDIX K

### ESTIMATED COSTS TO REPAIR SANITARY SEWER PROBLEMS
### NORTH FT. HOOD

The existing collection system requires minimal maintenance to insure all areas can have sewer service available. Listed below are the cost estimates to perform that maintenance and to flush and clean the system.

### MAINTENANCE PROGRAM

| | | | |
|---|---|---|---|
| 1) | Cleaning System (labor) | Lump Sum | $ 28,000.00 |
| 2) | Purchase Hydrojet Cleaning Vehicle | Lump Sum | $100,000.00 |
| | Subtotal | | $128,800.00 |
| | Contingency 20% | | $ 25,760.00 |
| | Inspection & Testing 6 % | | $ 9,273.60 |
| | Total | | $163,833.60 |
| | Rounded | | $164,000.00 |

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The existing system will require repair as identified in Table 8.

### Repair Existing Collection System

| | | | | |
|---|---|---|---|---|
| 1) | Clean & regrout manholes | 14 Ea @ | $1500.00 = | $ 21,000.00 |
| 2) | Replace & adjust MH frame & lid | 4 Ea @ | 300.00 = | 1,200.00 |
| 3) | Concrete pipe encasement | 60 CY @ | 120.00 = | 7,200.00 |
| 4) | 10" AC or VCP in place | 348 LF @ | 10.00 = | 3,480.00 |
| 5) | Trenching & backfilling < 16" | 348 LF @ | 10.00 = | 3,480.00 |
| 6) | Trenching & backfilling > 16" | 200 LF @ | 12.00 = | 2,400.00 |
| | Subtotal | | | $ 38,760.00 |
| | Contingency 20 % | | | $ 7,752.00 |
| | Engineering 6 % | | | $ 2,790.72 |
| | Test & Insp. 8 % | | | $ 3,720.96 |
| | Total | | | $ 53,023.68 |
| | Rounded | | | $ 53,100.00 |

## APPENDIX K

Pipe capacity problem exists between manholes 36 and 37 as shown in Table 9 and Appendix D (D-133):

### PROBLEM REACH 36 TO 37

| | | | |
|---|---|---|---|
| MANHOLE# | 36 | 37 | 30 |
| RIM ELEV | 751.03 | 752.37 | 750.49 |
| INV ELEV | 743.09 | 743.25 | 742.37 |
| DEPTH | 15.80' | 13.12' | |
| DIST/MHS | | 318' | 413' |
| DIA | 18" SL | RECONSTRUCTED SLOPE = 0.0010 FT/FT | |

ESTIMATED CONSTRUCTION COSTS TO REPAIR ADVERSE GRADE FROM 36 TO 37

| | | | | |
|---|---|---|---|---|
| 1) | Trenching & backfilling | 731 LF @ | $ 17.00 = | $12,427.00 |
| 2) | Removal existing manhole | 2 ea.@ | 175.00 = | 350.00 |
| 3) | Removal 18" SL | 731 LF @ | 5.00 = | 3,655.00 |
| 4) | 18" PVC in place | 731 LF @ | 20.50 = | 14,985.50 |
| 5) | 4' Dia. manhole | 2 ea.@ | 1450.00 = | 2,900.00 |
| 6) | Connecting existing lines | 2 ea.@ | 110.00 = | 220.00 |
| 7) | Grout coatings | 800 SF @ | 6.00 = | 4,800.00 |
| | | SUBTOTAL | | = $39,337.50 |
| | | 20% Contingency | | = $ 7,867.50 |
| | | 6% Engineering | | = $ 2,832.30 |
| | | 8% Testing & Inspection | | = $ 4,002.98 |
| | | TOTAL | | = $54,040.28 |
| | | ROUNDED | | = $54,100.00 |

## APPENDIX K

Pipe capacity problem exists between manholes 2-26 and 2-25 as shown in Table 9 and Appendix D (D-135):

PROBLEM REACH 2-26 TO 2-25

| | | | |
|---|---|---|---|
| MANHOLE# | 2-26 | 2-25 | 2-24 |
| RIM ELEV | 731.24 | 730.70 | 729.03 |
| INV ELEV | 725.34 | 725.58 | 723.18 |
| DIST/MHS | | 399' | 401' |
| DIA | 21" VCP | RECONSTRUCTED SLOPE = 0.0027 FT/FT | |

ESTIMATED CONSTRUCTION COSTS TO REPAIR ADVERSE GRADE FROM 2-26 TO 2-25

| | | | | |
|---|---|---|---|---|
| 1) | Trenching & backfilling | 800 LF @ $ | 17.00 = | $13,600.00 |
| 2) | Removal existing manhole | 2 ea.@ | 175.00 = | 350.00 |
| 3) | Removal 21" VCP | 800 LF @ | 5.00 = | 4,000.00 |
| 4) | 21" PVC in place | 800 LF @ | 21.00 = | 16,800.00 |
| 5) | 4' Dia. manhole | 2 ea.@ | 1450.00 = | 2,900.00 |
| 6) | Connecting existing lines | 2 ea.@ | 110.00 = | 220.00 |
| 7) | Grout coatings | 800 SF @ | 6.00 = | 4,800.00 |

| | |
|---|---|
| SUBTOTAL | = $42,670.00 |
| 20% Contingency | = $ 8,534.00 |
| 6% Engineering | = $ 3,072.24 |
| 8% Testing & Inspection | = $ 4,342.10 |
| TOTAL | = $58,618.34 |
| ROUNDED | = $58,600.00 |

## APPENDIX K

Pipe capacity problem exists between manholes 2-17 and 2-18 as shown in Table 9 and Appendix D (D-136):

PROBLEM REACH 2-17 TO 2-18

| | | | |
|---|---|---|---|
| MANHOLE# | 2-17 | 2-18 | PT-A |
| RIM ELEV | 728.54 | 731.85 | 721.54 |
| INV ELEV | 721.54 | 721.63 | 720.16 |
| DIST/MHS | | 504' | 840' |
| DIA | 21" VCP | RECONSTRUCTED SLOPE = 0.0010 FT/FT | |

ESTIMATED CONSTRUCTION COSTS TO REPAIR ADVERSE GRADE FROM 2-17 TO 2-18

| | | | | |
|---|---|---|---|---|
| 1) | Trenching & backfilling | 1344 LF @ | $ 15.00 = | $20,160.00 |
| 2) | Removal existing manhole | 2 ea.@ | 175.00 = | 350.00 |
| 3) | Removal 21" VCP | 1344 LF @ | 5.00 = | 6,720.00 |
| 4) | 21" PVC in place | 1344 LF @ | 15.50 = | 20,832.00 |
| 5) | 4' Dia. manhole | 2 ea.@ | 1450.00 = | 2,900.00 |
| 6) | Connecting existing lines | 2 ea.@ | 110.00 = | 220.00 |
| 7) | Grout coatings | 800 SF @ | 6.00 = | 4,800.00 |

| | |
|---|---|
| SUBTOTAL | = $55,982.00 |
| 20% Contingency | = $11,196.40 |
| 6% Engineering | = $ 4,030.70 |
| 8% Testing & Inspection | = $ 5,696.73 |
| TOTAL | = $76,905.83 |
| ROUNDED | = $76,900.00 |

## APPENDIX K

Pipe capacity problem exists between manholes 162 and 163 as shown in Table 9 and Appendix D (D-136):

PROBLEM REACH 162 TO 163

| | | | |
|---|---|---|---|
| MANHOLE# | 162 | 163 | 154 |
| RIM ELEV | 753.19 | 752.04 | 748.94 |
| INV ELEV | 737.50 | 737.79 | 735.24 |
| DIST/MHS | | 191' | 182' |
| DIA | 12" PVC | RECONSTRUCTED SLOPE = 0.0061 FT/FT | |

ESTIMATED CONSTRUCTION COSTS TO REPAIR ADVERSE GRADE FROM 162 TO 163

| | | | | |
|---|---|---|---|---|
| 1) | Trenching & backfilling | 373 LF @ | $ 14.00 = | $ 5,222.00 |
| 2) | Removal existing manhole | 1 ea.@ | 175.00 = | 175.00 |
| 3) | Removal 12" PVC | 373 LF @ | 5.00 = | 1,865.00 |
| 4) | 12" PVC in place | 373 LF @ | 12.00 = | 4,476.00 |
| 5) | 4' Dia. manhole | 1 ea.@ | 1450.00 = | 1,450.00 |
| 6) | Connecting existing lines | 2 ea.@ | 110.00 = | 220.00 |
| 7) | Grout coatings | 400 SF @ | 6.00 = | 2,400.00 |

| | |
|---|---|
| SUBTOTAL | = $15,808.00 |
| 20% Contingency | = $ 3,161.60 |
| 6% Engineering | = $ 1,138.18 |
| 8% Testing & Inspection | = $ 1,608.62 |
| TOTAL | = $21,716.40 |
| ROUNDED | = $21,700.00 |

## APPENDIX K

Pipe capacity problem exists between manholes 154 and 166 as shown in Table 9 and Appendix D (D-136):

PROBLEM REACH 154 TO 166

| | | | | |
|---|---|---|---|---|
| MANHOLE# | 154 | 166 | 179 | 169 |
| RIM ELEV | 748.94 | 745.13 | 742.41 | 741.51 |
| INV ELEV | 735.24 | 735.80 | 735.21 | 734.78 |
| DIST/MHS | 230' | 221' | 111' | |
| DIA | 12" PVC | RECONSTRUCTED SLOPE = 0.0008 FT/FT | | |

ESTIMATED CONSTRUCTION COSTS TO REPAIR ADVERSE GRADE FROM 154 TO 166

| | | | | |
|---|---|---|---|---|
| 1) Trenching & backfilling | 562 LF @ | $ 14.00 | = | $ 7,868.00 |
| 2) Removal existing manhole | 2 ea.@ | 175.00 | = | 350.00 |
| 3) Removal 12" PVC | 562 LF @ | 5.00 | = | 2,810.00 |
| 4) 12" PVC in place | 562 LF @ | 12.00 | = | 6,744.00 |
| 5) 4' Dia. manhole | 1 ea.@ | 1450.00 | = | 2,900.00 |
| 6) Connecting existing lines | 2 ea.@ | 110.00 | = | 220.00 |
| 7) Grout coatings | 800 SF @ | 6.00 | = | 4,800.00 |

| | |
|---|---|
| SUBTOTAL | = $25,692.00 |
| 20% Contingency | = $ 5,138.40 |
| 6% Engineering | = $ 1,849.82 |
| 8% Testing & Inspection | = $ 2,614.42 |
| TOTAL | = $35,294.64 |
| ROUNDED | = $35,300.00 |

## APPENDIX K

Shown in Table K.1 is the sewage lagoon capacity and volume calculations as well as the equipment used.

TABLE K.1
SEWAGE LAGOON
CAPACITY CALCULATIONS

| Pond No. | Surface Area | Elevation | Acres | Volume |
|---|---|---|---|---|
| 1 | 216,392 Ft2 | 720.0 Ft. | 4.968 | |
| | 200,116 Ft2 | 715.5 Ft. | 4.594 | 7.009 MG |
| 2 | 250,820 Ft2 | 720.0 Ft. | 5.758 | |
| | 243,000 Ft2 | 715.5 Ft. | 5.579 | 1.111 MG |
| Total | 467,212 Ft2 | - | 10.726 Ac | 15.32 MG |

1,111,095 cu. Ft.
x 7.482 gals/cu.Ft
8,313,213 gallons

8.313 MG

8.313
7.009
15.32 ✓

Aerators - Pond Number 1
Four @ 15 BHP

| | |
|---|---|
| Minimum Flow | 6000 GPM |
| Minimum Circulation | 72,000 GPM |
| Minimum Operating Depth | 3 Ft. |
| Minimum LBS 02R/Hr. | 40 LBS. |
| Weight | 1300 LBS. |

Electrical 3 Phase, 60 Cycle, 460 Volt

Chlorine Contact Chamber

| | |
|---|---|
| Overflow Elevation | 721.63 |
| Pump-Off Switch Elevation | 719.50 |
| Discharge Into Inlet Trough Elevation | 720.80 |

# APPENDIX L

## SANITARY SEWER LOCATION MAPS

## FORT HOOD, TEXAS