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# COMPLETION REPORT FOR THE OIL/WATER SEPARATOR AND PIPING EVALUATION FOR THE SOLID WASTE MANAGEMENT UNIT 27F: 3D ENGINEER BRIGADE, NORTHWEST OF BUILDING 1340 AT FORT STEWART, GEORGIA

**Prepared for**

**U.S. ARMY CORPS OF ENGINEERS**
**SAVANNAH DISTRICT**

**Contract No. DACA21-02-D-0004**
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September 2007

**SCIENCE APPLICATIONS INTERNATIONAL CORPORATION**

contributed to the preparation of this document and should not be considered an eligible contractor for its review.

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# ACRONYMS

| | |
|---|---|
| AST | aboveground storage tank |
| BGS | below ground surface |
| DPW | Directorate of Public Works |
| FSMR | Fort Stewart Military Reservation |
| IWTP | Industrial Wastewater Treatment Plant |
| OWS | oil/water separator |
| PVC | polyvinyl chloride |
| RCRA | Resource Conservation and Recovery Act |
| SWMU | solid waste management unit |
| USACE | U. S. Army Corps of Engineers |
| UST | underground storage tank |

# 1.0 INTRODUCTION

This completion report documents the results of evaluation of the oil/water separator (OWS) and its associated piping at Solid Waste Management Unit (SWMU) 27F: 3d Engineer Brigade, Northwest of Building 1340 at Fort Stewart, Georgia. SWMU 27F is associated with a maintenance pad for a motor pool where maintenance activities for military vehicles are performed. Resource Conservation and Recovery Act (RCRA) facility investigations at the site have identified petroleum-contaminated subsurface soil and groundwater, which are believed to have originated from leakage from the waste oil underground storage tank (UST) that was removed in 1996. However, given the persistence of the subsurface soil and groundwater contamination associated with SWMU 27F, Fort Stewart Directorate of Public Works (DPW) and the U. S. Army Corps of Engineers (USACE), Savannah District requested that an evaluation of the OWS and all influent and effluent piping be performed to identify any potential additional sources for the subsurface contamination. The evaluation consisted of cleaning out the liquid and solid material in the OWS; cleaning the interior of the OWS; visually inspecting the OWS and piping; evaluating the integrity of the piping using a combination of visual inspection, smoke testing, low-pressure air testing, and static water testing; properly abandoning the pipe to the removed waste oil UST; and installing an aluminum, locked cover on top of the OWS to prevent its future use.

The scope of this completion report is to document the OWS and piping evaluation and results. This completion report has been prepared by Science Applications International Corporation for USACE, Savannah District under contract DACA21-02-D-0004, delivery order 0069. The OWS and piping evaluation was performed in accordance with the *Sampling and Analysis Plan for Phase II RCRA Facility Investigations of 16 Solid Waste Management Units at Fort Stewart, Georgia* (SAIC 1997) and *Addendum No. 7 to the Sampling and Analysis Plan for Phase II RCRA Facility Investigations of 16 Solid Waste Management Units at Fort Stewart, Georgia* (SAIC 2007), which were developed in accordance with USACE Guidance EM 200-1-3.

## 1.1 SITE BACKGROUND AND OPERATIONAL HISTORY

SWMU 27F, northwest of Building 1340, is 1 of 2 OWSs that support the vehicle maintenance activities of the 3d Engineer Brigade and 1 of 32 OWSs distributed across 29 sites that support the vehicle maintenance facilities within the garrison area (Figure 1). The OWS is located along the northwestern boundary of the motor pool area, approximately 650 ft northwest of Building 1340 (Figure 2) and adjacent to a covered maintenance area identified as Building 1390. Maintenance activities for military vehicles were performed at the maintenance pad up to 2001 when the facility was supposedly shut down. The maintenance pad consists of six bays, three of which have inspection pits that allow military personnel to access underneath the military vehicles. A floor drain is located in each of the inspection pits to collect any drainage (i.e., spills and water) that may collect in the inspection pit. The floor drains are piped to the OWS by way of a common 6-in. polyvinyl chloride (PVC) pipe (Pipe A on Figure 2). In addition, a sliding collection tray is located in each inspection pit that allows oil from maintenance of vehicles to be directly discharged into a 1,000-gal waste oil UST. A drain in the sliding collection tray flows to a trough located on the east side of each inspection pit. The troughs transition into a 3-in.-diameter steel pipe that flows below ground to a common 4-in.-diameter cast iron pipe (Pipe D in Figure 2) that discharges to a 1,000-gal waste oil UST located south of the OWS (Figure 2). The UST was removed in 1996 and the pipes supposedly abandoned.

A grated drainage trench approximately 4 in. wide × 12 in. deep × 116 ft long runs east to west along the south side of the maintenance pad. The drainage trench transitions into a 4-in.-diameter PVC pipe at the

western end of the trench, which then travels parallel along the length of the OWS and ties into the 6-in. PVC pipe (Pipe A on Figure 2) prior to it entering the OWS.

Oil discharged into the main chamber of the OWS is removed by the skimmer and flows (Pipe C on Figure 2) to the smaller holding chamber/reservoir located at the south end of the OWS. Waste oil was routinely pumped out of the holding unit and burned at the Central Energy Plant. The effluent from the OWS (Pipe E) is discharged to a 6-in.-diameter PVC pipe, which discharges to the Industrial Wastewater Treatment Plant (IWTP) by way of Manhole No. 27 (Figure 2).

The OWS was supposedly closed in 2001. The closure consisted of placing plywood over the metal grates covering the OWS. A site inspection of the facility in early calendar year 2007 indicated that the maintenance facility had been sporadically used since 2001. Vehicles have been observed at the facility and waste oil had accumulated in the OWS. In addition, the 3-in.-diameter pipe in the inspection pit closest to the OWS was found to be open. It is not known if the pipe was not plugged during the abandonment of the UST in 1996 or whether the plug had been removed. The 3-in.-diameter pipes in the other two inspection pits had grouted ends. Maintenance activities were also observed as late as July 2007. It is believed that these operations may have been the source of further contamination if the integrity of the OWS and its piping had been compromised; therefore, an evaluation of the integrity of the OWS and piping was needed.

# 2.0 OIL/WATER SEPARATOR AND PIPING EVALUATION

The OWS and piping evaluation was performed May 7 through 15, 2007, and was broken down into the following four tasks: (1) OWS cleanout, (2) OWS and pipe integrity testing, (3) pipeline abandonment, and (4) cover installation.

The following companies were subcontracted to support in the OWS evaluation:

- Charles Lane Construction: OWS cleanout and pipeline abandonment,
- ABE Utilities: pipe integrity testing, and
- Coastal Precision: metal fabricators for the OWS cover.

## 2.1 OIL/WATER SEPARATOR CLEANOUT

The cleanout of the OWS began on May 9, 2007. A vacuum truck was mobilized to pump out the contents of the OWS. Initial observation of the OWS indicated that the holding tank was full of waste oil and there was floating product on the water in the main chamber. Secondary containment was constructed around the back of the vacuum truck and pumping began at approximately 12:00 pm. Pumping of the oil from the holding chamber and oil floating on top of the water in the main chamber was performed to try to keep this separate from the solids that were accumulated in the bottom of the OWS. The initial vacuum truck was not drawing sufficient vacuum to adequately pump oil from the surface of the OWS; therefore, it was decided to bring in a more powerful vacuum truck. The second vacuum truck began pumping around 1:00 pm. The first vacuum truck emptied approximately 500 gal of waste oil into the aboveground storage tank (AST) located to the east of the maintenance pad. The second vacuum truck pumped until approximately 3:00 pm when the surface of the underlying sludge was exposed. At this time, little free floating oil was evident in the OWS. The waste oil and contaminated wastewater were pumped into the AST located to the east of the maintenance pad and into the AST located at the adjacent maintenance pad. Approximately 1,500 gal of waste oil was placed in the two 1,000-gal ASTs.

At this point, the surface of the sludge was exposed. The depth of the settled sludge in the OWS averaged approximately 2 ft across the bottom. The sludge had to be slurried using a pressure washer and a water jet to allow it to be pumped by the vacuum truck. After the slurried sludge was removed from the OWS, the interior surfaces and the surfaces of the ancillary piping in the OWS were pressure-cleaned from the surface using an extension wand on the pressure washer. Removal of the slurried sludge continued through May 14, 2007.

Originally, the slurried sludge and wastewater were to be discharged into the Fort Stewart IWTP by way of Manhole No. 27 located approximately 60 ft south of the OWS. However, because of concerns of plugging the industrial sewer system with the slurried sludge, it was decided with the concurrence of the Fort Stewart Military Reservation (FSMR) DPW to discharge the petroleum-contaminated slurried sludge and wastewater directly at the influent of the IWTP. The slurried wastewater collected in the vacuum trucks was discharged into a manhole with a trash screen located at the influent of the IWTP so that the wastewater could be treated by the IWTP. A total of five vacuum truckloads [one on May 10, two on May 11, and two on May 14 (included final truck decontamination)] were disposed of at the IWTP. Sludge remaining in the vacuum trucks after the water was discharged was placed in the IWTP sludge drying bed.

## 2.2 PIPE INTEGRITY TESTING

Pipe integrity testing was performed by the subcontractor, ABE Utilities, of Raleigh, North Carolina, who has been performing testing (i.e., smoke testing, cleaning, and videotaping) of the IWTP wastewater pipelines and manholes at FSMR over the last year.

Pipe integrity testing consisted of pipe cleaning (jet cleaning the pipes), smoke testing, videotaping, and low-pressure testing the pipes. Conditions in the field prevented all of the pipes identified in Figure 2 from being tested either because of their small size (<4 in. in diameter), accessibility problems, or the condition of the pipes. All pipes that were integrity-tested were jet cleaned prior to testing. The wastewater from the jet cleaning was discharged to the OWS or to Manhole No. 27 for treatment at the IWTP. The results of the testing are presented in the following sections.

### 2.2.1 Smoke Testing

Smoke testing was performed on: (1) the wastewater effluent pipe from the OWS to Manhole No. 27 approximately 60 ft away (Pipe E) and (2) the 6-in.-diameter waste pipe with three floor drains in the bottom of the inspection pits (Pipe B).

Industrial smoke bombs specific for underground pipe testing were placed in each individual drain located in the inspection pits. Forced air was used to drive the smoke down the pipe. Smoke was only observed coming out of the pipe's exit point in the OWS.

An industrial smoke blower was used to blow smoke down Manhole No. 27 through the effluent pipe from the OWS approximately 60 ft away. Smoke was only observed to come out the appurtenance in the OWS.

The results of the smoke testing did not indicate any short circuiting or pipe breaks; however, given the small length of run of the pipes and that the site is covered with concrete and or asphalt, this was not unexpected.

### 2.2.2 Videotaping of the Oil/Water Separator and Piping

The following pipes were inspected by video: a wastewater effluent pipe from the OWS to Manhole No. 27 approximately 60 ft away (Pipe E) and a 6-in.-diameter waste pipe with three floor drains in the bottom of the inspection pit (Pipe B). Video inspection is limited to straight runs of pipe with a diameter greater than 4 in. The following pipes could not be videotaped because of accessibility and their small size: (1) the approximately 4-ft length of 6-in.-diameter pipe from the trench drain on the maintenance pad to the OWS (Pipe A), (2) the 6-in.-diameter pipe from the water chamber to the oil chamber at the OWS (Pipe C), and (3) the 4- and 3-in.-diameter pipes (Pipe D) from the removed UST to the inspection pits. The tabular results of the videotaping and the videotape of the inspection performed by ABE Utilities are presented in Appendix A. The review of the video inspection is presented by pipeline in the following sections.

**Pipe from Manhole No. 27 to OWS:** The camera was inserted at Manhole No. 27 and run towards the OWS. The video camera encountered an offset joint at video count 58 that it could not get past. The video inspection was terminated at this point. However, this same length of pipe was video inspected in November 2006 during a site-wide sewer inspection using a different video camera. This video inspection is included in Appendix A and the evaluation of this section of piping is based on these results. There are three types of pipe in this section of piping and three questionable couplings (Fernco) between them. Starting at the manhole, the piping is assumed to be 6-in. Schedule 40 PVC pipe. At video count 57.4, there is a transition using a Fernco coupling from Schedule 40 PVC to green PVC SDR 35 sewer drain pipe. The Fernco coupling at this transition has shifted out of alignment. At video count 64.9, there is a transition using a Fernco coupling from the green PVC SDR 35 sewer drain pipe back to Schedule 40 PVC pipe. At video count 71.3, there is a transition using a Fernco coupling from Schedule 40 PVC pipe to the ductile iron piping of the OWS. It is believed that this green PVC SDR 35 sewer drain pipe replaced a section of Schedule 40 PVC pipe that was broken during the UST removal. Each of the transitions represent a potential leak. In addition, as seen in the videotape, the water level increases to as much as 10 to 15% in some sections of the piping indicating there is not sufficient grade to completely remove the water given the slope and alignment changes.

**Inspection Pit Section #A:** The drain in the easternmost inspection pit had shifted, thus preventing the camera from being inserted at this location. The camera was inserted in the floor drain of the middle inspection pit and run from west to east to examine this section of 6-in. pipe. No cracks or fractures were visible in this section of the piping.

**Inspection Pit Section #B:** The middle, Section B, of the drain piping did not show any cracks or damage.

**Inspection Pit Section #C:** The western section closest to the OWS indicated a significant longitudinal crack/fracture in the area where the 4-in. drain pipe from the trench drain intercepts (T) and transitions into the 6-in. pipe (Pipe A) from the floor drains in the inspection pits. It should be noted that compacted solids that could not be removed by jet cleaning were located from video count 26 to this point.

**Appurtenances Inside the OWS:** The video camera was lowered inside the OWS to inspect the seals around the piping coming into the OWS. Some of the sealing material was missing around where the effluent piping (Pipe E) transects the outside wall of the OWS. In addition, the inside rims of where Pipes A and C entered the wall of the OWS were chipped. The skimmer was connected through the wall with bolted gasketed flanges. These flanges were observed to be intact. No obvious breaches/leaks through the wall were evident around any of the pipes.

### 2.2.3 Low-Pressure Air Testing

The following pipes were low-pressure air tested: (1) the wastewater effluent pipe from the OWS to Manhole No. 27 approximately 60 ft away (Pipe E) and (2) the 6-in.-diameter waste pipe with three drains in the bottom of the inspection pit (Pipe B). Accessibility prevented Pipe A (the 6-in.-diameter pipeline from the trench drain at the maintenance pad to the OWS) and Pipe C (the 6-in.-diameter pipeline from the water chamber to the oil chamber at the OWS) from being tested.

Low-pressure testing consisted of plugging each end of the pipe with a pressurized plug, placing no more than 5 psi air pressure in the pipe, and then recording pressure over time. None of the pipes tested held pressure, but this is to be expected from gravity drain piping.

### 2.2.4 Visual Inspection and Static Water Test of Trench Drain

A visual inspection and a static water test were performed on the trench drain (Pipe B) that runs parallel along the south side of the maintenance pad on May 8, 2007. The visual inspection of the trench drain consisted of visually documenting, in 1-ft intervals, the condition of the trench starting from east to west. The results of the inspection are presented in Table 1. The visual inspection indicated a significantly damaged trench. Cracks, holes, and damage, with some exposing the dirt subsurface, were evident along the trench. In addition, an approximate 4-in.-diameter hole was observed in a 90° elbow located below where the trench connects to a 4-in. PVC piping (interval 116 ft) to direct the flow to the OWS.

The static water test consisted of plugging the discharge end of the drainage trench using a combination of a pressure plug and water-filled bladder and then filling the trench with water and measuring the water level with time. The bladder was installed before the 90° elbow that was observed to have a 4-in. hole in it. The results of the static water test are presented in Table 2. The drainage trench did not hold water, which was expected given the results (i.e., cracks, holes, etc.) of the visual inspection.

### 2.2.5 Static Water Testing of the Oil/Water Separator and Piping

A static water test to evaluate catastrophic failure of the OWS was performed on the OWS system on May 14, 2007. A pressure plug was installed in the 6-in.-diameter effluent pipe from the OWS at Manhole No. 27. The FSMR fire department personnel were called at 1:30 pm to fill up the OWS. The filling of the OWS and its piping was completed approximately at 3:30 pm. The water was allowed to stabilize for approximately 30 min. The final water level was approximately 1 ft above the grate of the floor drain located in the inspection pit farthest to the east of the OWS. Water levels were measured from a same place on the grate of the OWS beginning at 4:00 pm using a water level meter. Water level measurements continued every 10 min for 1 hr. The water was allowed to remain in the OWS over night. A final water level measurement was taken at 7:45 am on May 15, 2007, which was 57.9 in. The plug was removed and the elevated water released. The remaining water below the weir in the OWS was allowed to remain in the OWS. The results of the static water test on the OWS indicated no measurable change in water level over the approximate 15-hr period indicating that there are no significant breeches in the OWS system that would cause massive leaking or catastrophic failure to the subsurface if the fluid level was above that level. However, it is known from the videotaping that there is one significant fracture in the 6-in. pipe (Pipe A) near where it enters the OWS. Measurable changes in water level may not be evident given the combination of low head over the pipe, short time of the test, and potential tight backfill.

## 2.3 PIPELINE ABANDONMENT

Prior to arrival on-site, personnel from Fort Stewart DPW and USACE, Savannah District had found and marked the location of the end of a 4-in.-diameter buried cast iron pipe that went from each inspection pit to the removed waste oil UST (see Figure 2). In addition, FSMR DPW personnel had obtained utility clearances for the excavation of the end of the abandoned pipe.

From the inspection pit, the pipelines are 3-in.-diameter and feed into a 4-in.-diameter waste oil collection pipe (Pipe D) running perpendicular to the inspection pits. The pipe excavation began on the morning of May 5, 2007. The end of the 4-in. pipe was excavated using a small backhoe followed by hand excavation. The end of the pipe was discovered at approximately 4 ft below ground surface (BGS). The end of the pipe was plugged with grout. Plastic sheeting and absorbent pads were laid down in the excavation and then the pipe was cut approximately 18 in. from the end with a gas-operated circular saw. It was discovered that the pipe was not fully grouted. The end of the 4-in. pipe had absorbent pads stuffed in it and approximately 6 in. of grout. Approximately 1-L of oily water was released after cutting the end off of the 4-in. pipe. The oily water was captured on the absorbent pads lying above the plastic liner. Because it was determined that the end of the 4-in. pipe was not properly abandoned, the plugs in the two 3-in. pipes were checked. A chisel was used to remove the plugs in the two remaining 3-in. pipes in the maintenance bays. The 3-in. pipes were not properly abandoned. An approximate 3-in. grout plug and absorbent socks were removed from the end of each 3-in. pipe.

Grouting of the pipelines began on the morning of May 8, 2007. A compression transition coupling capable of accepting the fitting from the grout pump was installed on the end of the 4-in. pipe that was excavated. A grout pump was attached to the end of the 4-in. pipe and grout was pumped into the pipe. Flowable grout was pumped into the 4-in. waste pipes until grout was exiting the end of the 3-in. pipe in the maintenance bay located closest to the OWS. A compression plug was placed in the end of the 3-in. pipe closest to the OWS to force grout to exit the two remaining pipes. The initial material exiting the pipes included oily sludge, bolts, nuts, and metal shavings. After grout had exited all three pipelines, excess grout was continuously pumped into the pipes until a total of approximately 55 gal of grout had exited the three pipes. The sludge and excess grout were shoveled up and placed in a 55-gal drum.

## 2.4 COVER INSTALLATION ON THE OIL/WATER SEPARATOR

A local metal fabrication company, Coastal Precision, manufactured the cover for the OWS. The installation of the cover began on May 15, 2007, and was completed on May 16, 2007. The cover was constructed of eight pieces of 1/4-in. aluminum checker plate with an aluminum flat bar welded at the lap joints, and one piece of 1/4-in. aluminum checker plate with a 2- × 2-ft hinged cover over an 18- × 18-in. access hole (Figure 3). The cover was bolted down to the concrete wall of the OWS using 1/2-in. concrete wedge anchors. A thick bead of clear silicon caulk was placed between the concrete wall and cover and the lap joints of the aluminum sections to minimize rain from entering into the OWS. A lock with two keys was placed on the latch of the manhole. The keys to the locked access hatch were given to Mr. Dale Keifer of Fort Stewart DPW.

## 2.5 INVESTIGATION-DERIVED WASTE

Solids and sludge were generated during the cleaning of the drainage trench (Pipe B) and the floor drains (Pipe A) in the inspection pits, and grouting of the pipeline (Pipe D). The sludge and solids were placed in 55-gal drums for disposal by Fort Stewart DPW. Six drums were generated during the OWS and piping evaluation. Samples of the sludge/solids were collected and analyzed for Toxicity Characteristic Leaching

Procedure volatile organic compounds, semivolatile organic compounds, and RCRA metals. The results are presented in Table 3. The results, including chains-of-custody and certificates of analysis, were provided to Fort Stewart DPW in a transmittal dated June 12, 2007, to support their disposal of the investigation-derived waste.

# 3.0 CONCLUSIONS AND RECOMMENDATIONS

The following activities have been performed and/or scheduled (work order in) to be performed by FSMR DPW since the OWS and pipe integrity testing in May 2007.

- The trench drain has been grouted flush to surface, down its full length, to the OWS to prevent any potential use of the trench drain.

- Aluminum checker plate covers have been installed and bolted over the inspection pits to prevent easy excess to the inspection pits and to eliminate any potential discharge into the floor drains.

The following conclusions and recommendations are provided based on the assumption that the maintenance pad (Building 1390) will no longer be used and taking into account activities that have already been performed at the site since the performance of the OWS and piping integrity testing in May 2007.

The 3- and 4-in.-diameter steel piping from the three maintenance pads to the removed waste oil UST had not been properly abandoned during UST closure activities in 1996. The pipes are now properly abandoned with grout and can no longer be used.

Visual inspection indicated that the inside of the OWS is, overall, in good shape. There was some missing grout around one of the pipes; however, no obvious leaks were observed. In addition, grout could also be placed on the outside wall of OWS where it is penetrated. The static water test indicated no leaks were occurring.

The static water test of the OWS system did not indicate any measurable releases to the environment, even given the observed longitudinal fracture in the 6-in. pipe (Pipe A) near where it enters the OWS. However, the low-pressure air test failed on all of the pipes tested. This was probably due to the sensitivity of the test and the connections associated with gravity drain pipes.

An aluminum cover with a locked access hatch was installed over the OWS. This should prevent dumping of oil into the previously open OWS. The only access presently available to the OWS is through the three drains in the inspection pits.

Given the present continuing status for emergency use as observed in July 2007, it is recommended that the drains in the inspection pits remain usable to prevent any accumulation of water in the inspection pits, until the entire maintenance pad is either upgraded or removed. This allows any spill to at least be directed to the OWS. The bolted metal covers installed over the inspection pits will prevent easy access to the inspection pits, but still allow the drains to remain open However, at a minimum, the fracture in the 6-in. pipe as it goes into the OWS needs to be repaired. This would eliminate the potential for release to the environment of potential petroleum sources if a spill or waste material is directed to the drains in the inspection pits. This area needing repair is located in the grassy area between the maintenance pad and the OWS; therefore, it is easily accessed. However, it will require excavating to approximately 6 ft BGS in a narrow area, and shoring of the side walls of the excavation will probably be necessary.

The effluent pipe from the OWS to Manhole No. 27 should receive only petroleum-contaminated wastewater if the OWS is operating properly. This pipe did not test tight by the low-pressure air test. Video inspection indicated three piping transitions and slight misalignment of the piping. This pipe is probably of sufficient quality for a gravity drain sewer line. However, given the petroleum contamination in the subsurface at the site, the potential future remediation efforts to clean up this site, and, to be on the conservative side, if the OWS is to remain operational, this line should probably be repaired and the misaligned joints fixed to prevent any potential for low level leaking of petroleum-contaminated wastewater. In addition, any chemical injection remedial alternative could damage the Fernco couplings connecting the different sections of the drainage pipe.

Proper abandonment of the facility would consist of removal of the OWS and grouting of the remaining pipes.

# 4.0 REFERENCES


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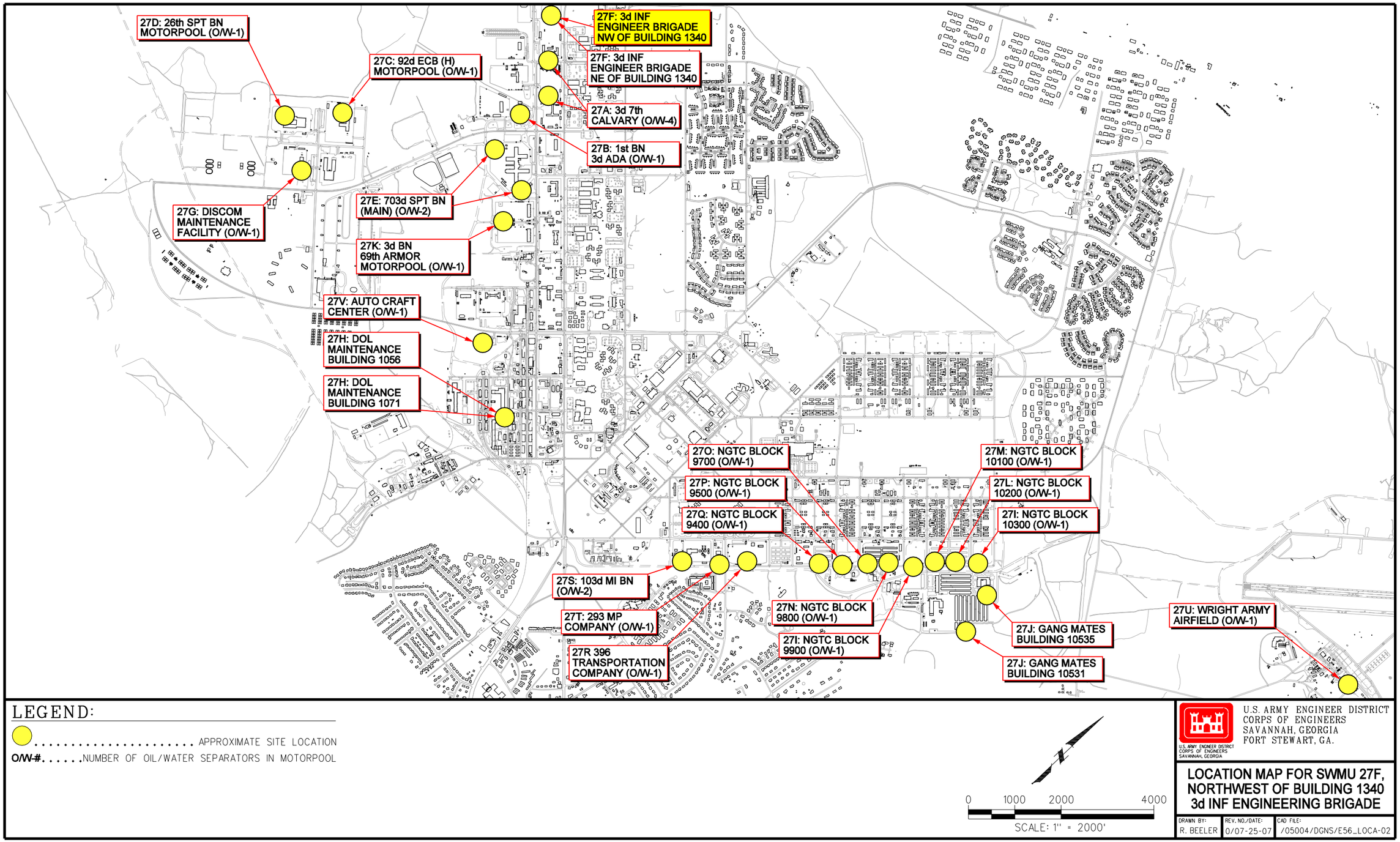



**Figure 1. Location Map for SWMU 27F, Northwest of Building 1340**

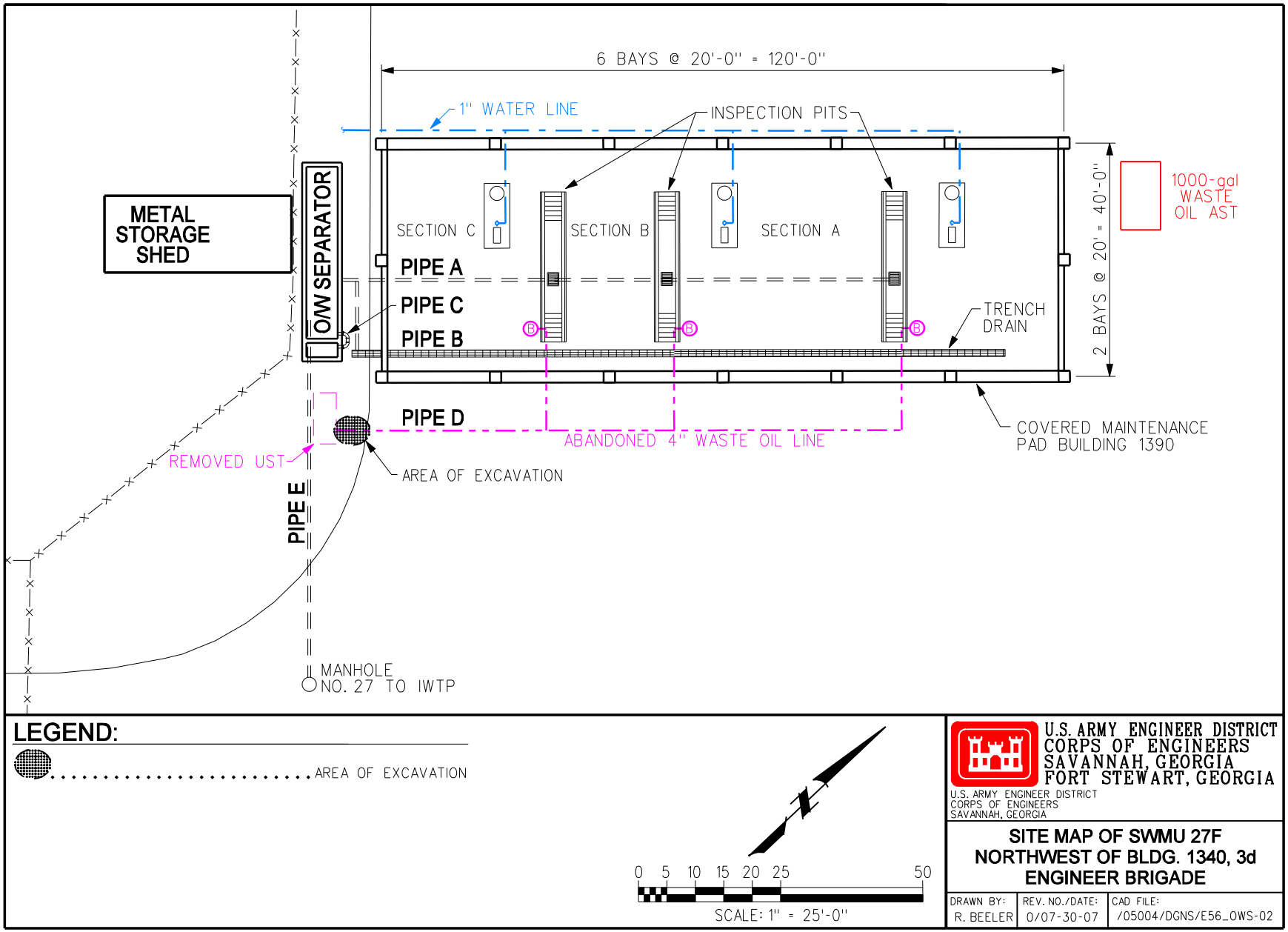



**Figure 2. OWS and Piping Layout of Maintenance Pad at SWMU 27F, Northwest of Building 1340**

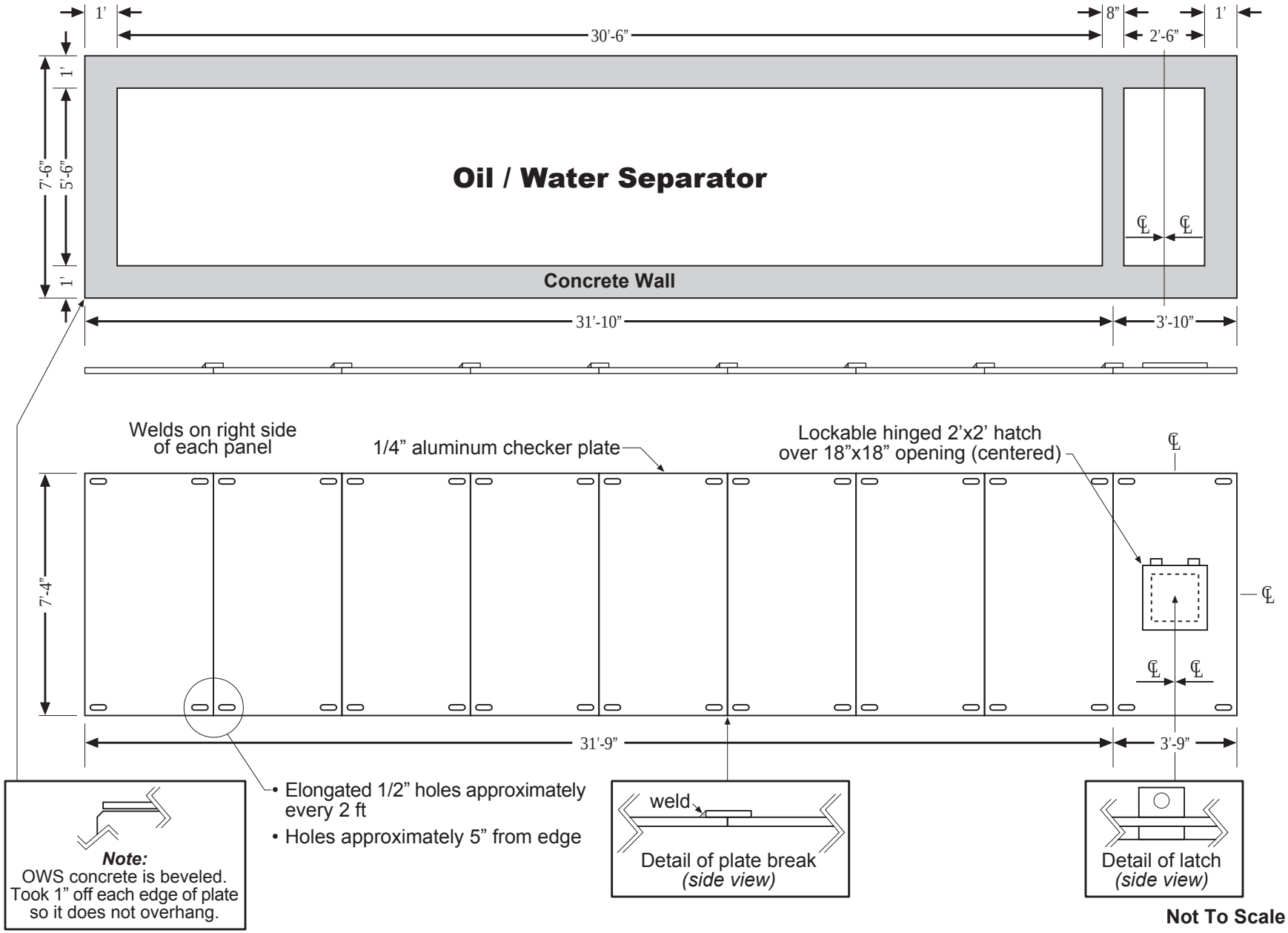



**Figure 3. OWS Cover Installation for SWMU 27F, Northwest of Building 1340**

**Table 1. Results of the Visual Inspection of the Trench Drain**

| Drainage Ditch Interval (ft) | Description of Drainage Trench | Drainage Ditch Interval (ft) | Description of Drainage Trench |
|---|---|---|---|
| 0 - 1 | 2- × 3/4-in. hole in sidewall | 53 - 55 | Good condition |
| 1 - 2 | Trench degraded near upper edge | 55 - 56 | 1/4-in. splice in bottom of trench |
| 2 - 3 | Trench degraded near upper edge | 56 - 59 | Good condition |
| 3 - 4 | Splice in bottom trench | 59 - 60 | Splice in bottom of trench |
| 5 - 6 | Good condition | 60 - 67 | Sidewall demolished, soil exposed to within 2 in. of bottom |
| 6 - 7 | Spice in bottom of trench | 67 - 68 | 4- × 2-in. hole in sidewall |
| 7 - 8 | 2- × 3/4-in. hole in sidewall | 68 - 69 | Good condition |
| 8 - 9 | Good condition | 69 - 70 | Splice in bottom of trench |
| 9 - 10 | Splice in bottom of trench | 70 - 72 | Good condition |
| 10 - 13 | Good condition | 72 - 73 | Splice in bottom of trench |
| 13 - 14 | Splice in bottom of trench | 73 - 75 | Good condition |
| 14 - 15 | Good condition | 75 - 76 | Splice in bottom of trench |
| 15 - 16 | Hole in sidewall | 76 - 78 | Good condition |
| 16 - 17 | Splice in bottom of trench | 78 - 79 | Splice in bottom of trench |
| 17 - 19 | Good condition | 79 - 82 | Good condition |
| 19 - 20 | Splice in bottom of trench | 82 - 83 | Splice in bottom of trench |
| 20 - 22 | Good condition | 83 - 85 | Good condition |
| 22 - 23 | Splice in bottom of trench | 85 - 86 | Splice in bottom of trench |
| 23 - 24 | 2- × 3/4-in. hole in sidewall | 86 - 88 | Good condition |
| 24 - 26 | Good condition | 88 - 89 | Splice in bottom of trench |
| 26 - 27 | Splice in bottom of trench | 89 - 92 | Good condition |
| 27 - 29 | Good condition | 92 - 93 | Splice in bottom of trench |
| 29 - 30 | Splice in bottom of trench | 93 - 95 | Good condition |
| 30 - 32 | Good condition | 95 - 96 | Splice in bottom of trench |
| 32 - 33 | Splice in bottom of trench | 96 - 97 | Good condition |
| 33 - 36 | Good condition | 97 - 98 | Small crack |
| 36 - 37 | Splice in bottom of trench 1/8 in. wide, 2-in. hole in sidewall | 98 - 99 | Splice in bottom of trench |
| 37 - 38 | Hole in sidewall | 99 - 101 | Good condition |
| 38 - 39 | 2- × 3/4-in. hole in sidewall | 101 - 102 | Splice in bottom of trench |
| 39 - 40 | Splice in bottom of trench | 102 - 105 | Good condition |
| 40 - 42 | Good condition | 105 - 106 | Splice in bottom of trench |
| 42 - 43 | Splice in bottom of trench | 106 - 108 | Good condition |
| 43 - 44 | Concrete missing along edge, underneath soil exposed in sidewalls | 108 - 109 | Splice in bottom of trench |
| 44 - 45 | Concrete missing along edge, underneath soil exposed in sidewalls | 109 - 110 | Good condition |
| 45 - 46 | Splice in bottom of trench | 110 - 111 | 1/8-in. crack |
| 46 - 49 | Good condition | 111 - 112 | Splice in bottom of trench, sidewalls degrading |
| 49 - 50 | Splice in bottom of trench | 112 - 114 | Liner missing |
| 50 - 52 | Good condition | 114 - 115 | ~2- × 3/4- × 6-in. long crack in bottom of trench |
| 52 - 53 | Splice in bottom of trench | 115 - 116 | ~4-in.-diameter hole in PVC connection pipe |

PVC = Polyvinyl chloride.

**Table 2. Results of the Static Water Test on the Trench Drain**

| Drainage Trench | | | OWS System | | |
|---|---|---|---|---|---|
| Date | Time | Water Level (cm) | Date | Time | Water Level (in.) |
| 05/08/07 | 3:40 pm | 24.0 | 05/14/07 | 4:00 pm | 57.9 |
| 05/08/07 | 3:43 pm | 23.0 | 05/14/07 | 4:10 pm | 57.9 |
| 05/08/07 | 3:45 pm | 22.0 | 05/14/07 | 4:20 pm | 57.9 |
| 05/08/07 | 3:47 pm | 21.5 | 05/14/07 | 4:30 pm | 57.9 |
| 05/08/07 | 3:50 pm | 19.5 | 05/14/07 | 4:40 pm | 57.9 |
| 05/08/07 | 3:55 pm | 17.8 | 05/14/07 | 4:50 pm | 57.9 |
| 05/08/07 | 4:00 pm | 17.8 | 05/14/07 | 5:00 pm | 57.9 |
| 05/08/07 | 4:05 pm | 16.0 | 05/14/07 | 5:10 pm | 57.9 |
| 05/08/07 | 4:10 pm | 16.0 | 05/14/07 | 5:20 pm | 57.9 |
| 05/08/07 | 4:15 pm | 15.0 | 05/14/07 | 7:45 am | 57.9 |
| 05/08/07 | 4:20 pm | 14.5 | | | |
| 05/08/07 | 4:25 pm | 13.7 | | | |
| 05/08/07 | 4:30 pm | 13.5 | | | |

OWS = Oil/water separator.

**Table 3. Analytes Detected in the TCLP Analysis of Water Samples Collected During the OWS Cleanout (May 2007), Building 1390**

| Media | TCLP | Waste | Waste | Waste | Waste | Waste | Waste |
|---|---|---|---|---|---|---|---|
| Sample ID | Criteria | IDW7J1 | IDW7J2 | IDW7J3 | IDW7J4 | IDW7J5 | IDW7J6 |
| Date | (mg/L) | 05/09/07 | 05/09/07 | 05/09/07 | 05/09/07 | 05/10/07 | 05/10/07 |
| ***Volatile Organic Compounds (mg/L)*** | | | | | | | |
| Acetone | | 0.0362 J | 0.0382 J | <0.05 U | 0.0261 J | 0.0538 | 0.0405 J |
| Ethylbenzene | | <0.01 U | <0.01 U | <0.01 U | <0.01 U | 0.00314 J | 0.00349 J |
| Toluene | | <0.01 U | <0.01 U | <0.01 U | <0.01 U | 0.0318 | 0.096 |
| Xylenes, Total | | <0.01 U | <0.01 U | <0.01 U | <0.01 U | 0.00828 J | 0.0212 |
| ***Semivolatile Organic Compounds (mg/L)*** | | | | | | | |
| 4-Methylphenol | 200 | <0.05 U | <0.05 U | <0.05 U | <0.05 U | 0.0396 J | 0.0377 J |
| ***Metals (mg/L)*** | | | | | | | |
| Arsenic | 5 | <0.04 U | <0.04 U | <0.04 U | <0.04 U | 0.058 B | 0.099 B |
| Barium | 100 | 0.41 | 0.6 | 0.12 | 0.14 | 0.79 | 0.75 |
| Cadmium | 1 | 1 [a] | 0.53 | <0.01 U | <0.01 U | <0.01 U | <0.01 U |
| Chromium | 5 | 0.014 B | <0.01 U | <0.01 U | <0.01 U | 0.12 | 0.092 |
| Lead | 5 | 0.23 | <0.05 U | 0.07 B | 0.056 B | <0.05 U | <0.05 U |

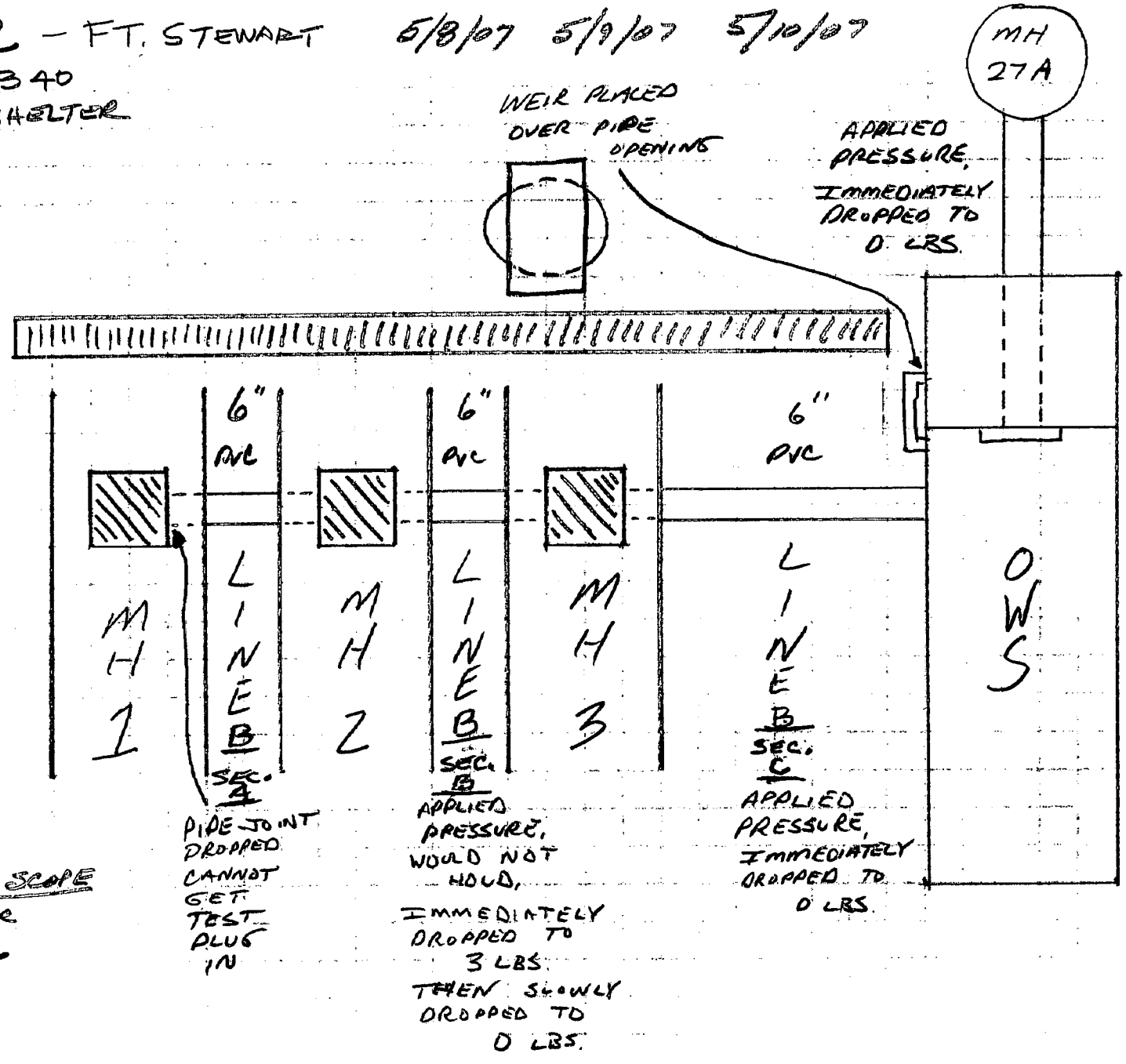
[a] TCLP concentration equal to TCLP criteria.
OWS = Oil/water separator.
TCLP = Toxicity Characteristic Leaching Procedure.
Qualifiers:
B = Result less than the contract-required detection limit, but greater than the instrument detection limit.
J = Estimated value.
U = Undetected value.

# APPENDIX A

# RESULTS OF VIDEO INSPECTION

SAIC – FT. STEWART 6/8/07 5/9/07 5/10/07

BLDG 1340
SERVICE SHELTER




TEST SCOPE
5 LBS FOR 30 MIN.

A-2

UTILITIES

SKETCH SHEET

DRAWN BY
DATE
SHEET NO.
CONTRACT

**Tabular Report of PSR** OWS X **for bit**

| | | | | | |
|---|---|---|---|---|---|
| ***Setup*** 1 | ***Surveyor*** Bradley | ***Certificate #*** U-604-1416 | ***System Owner*** | | |
| ***Drainage*** | ***Survey Customer*** | | | | |
| ***P/O #*** | ***Date*** 05/08/2007 | ***Time*** 15:25:00 | ***Street*** McFarland Ave. | | |
| ***Locality*** Inside Fence | ***Further location details*** | | | | |
| ***Start*** 27A | ***Rim to invert*** | ***Grade to invert*** | ***Rim to grade*** | ***Ft*** | |
| ***Finish*** OWS | ***Rim to invert*** | ***Grade to invert*** | ***Rim to grade*** | ***Ft*** | |
| ***Use*** | ***Direction*** Up | ***Flow control*** | ***Tape/Media #*** 1 | | |
| ***Shape*** Circular | ***Height*** 6 | ***Width*** | ***ins*** ***Preclean*** J | ***Year Cleaned*** | |
| ***Material*** Polyvinyl Chloride | ***Joint length*** | ***Ft*** ***Total length*** 5.0 | ***Ft*** ***Length Surveyed*** 63.9 | | |
| ***Lining*** | ***Year laid*** | ***Year rehabilitated*** | ***Weather*** | | |
| ***Purpose*** | | ***Cat*** | | | |
| ***Additional info*** | | Structural | O&M | Constructional | |
| ***Location*** | | Miscellaneous | Hydraulic | | |

| Count | Video | CD | Code | | In1 | In2 | % | Jnt | Fr | To | ImRef | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.0 | 00000 | | ST | Start of Survey | | | | | | | | |
| 0.0 | 00000 | | AMH | Manhole | | | | | | | | 27A |
| 0.0 | 00000 | | MWL | Water Level | | | 5 | | | | | |
| 18.3 | | | MWL | Water Level | | | 15 | | | | | |
| 24.2 | | | MWL | Water Level | | | 05 | | | | | |
| 24.2 | | | LU | Alignment Up | | | 05 | | | | | |
| 30.6 | | | MWL | Water Level | | | 10 | | | | | |
| 32.9 | | | MWL | Water Level | | | 05 | | | | | |
| 43.2 | | | MWL | Water Level | | | 10 | | | | | |
| 46.5 | | | MWL | Water Level | | | 05 | | | | | |
| 58.0 | | | JOM | Joint Offset Medium | | | | | | | | |
| 63.9 | | | MSA | Abandoned Survey | | | | | | | | END OF PIPE IS VISABLE FROM CUR |

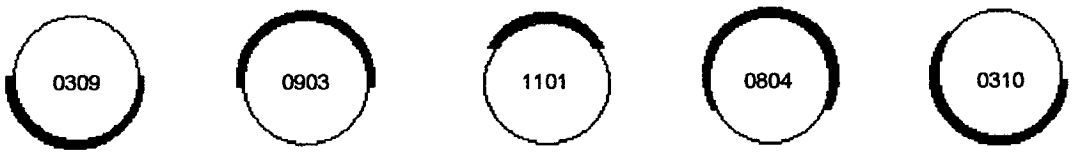
63.9 ***Ft*** ***Total Length Surveyed***

***Scores***

| | | | | |
|---|---|---|---|---|
| ***Structural:*** | ***Total*** | ***Mean Defect*** | ***Peak*** | ***Mean Pipe*** |
| ***Service:*** | ***Total*** | ***Mean Defect*** | ***Peak*** | ***Mean Pipe*** |

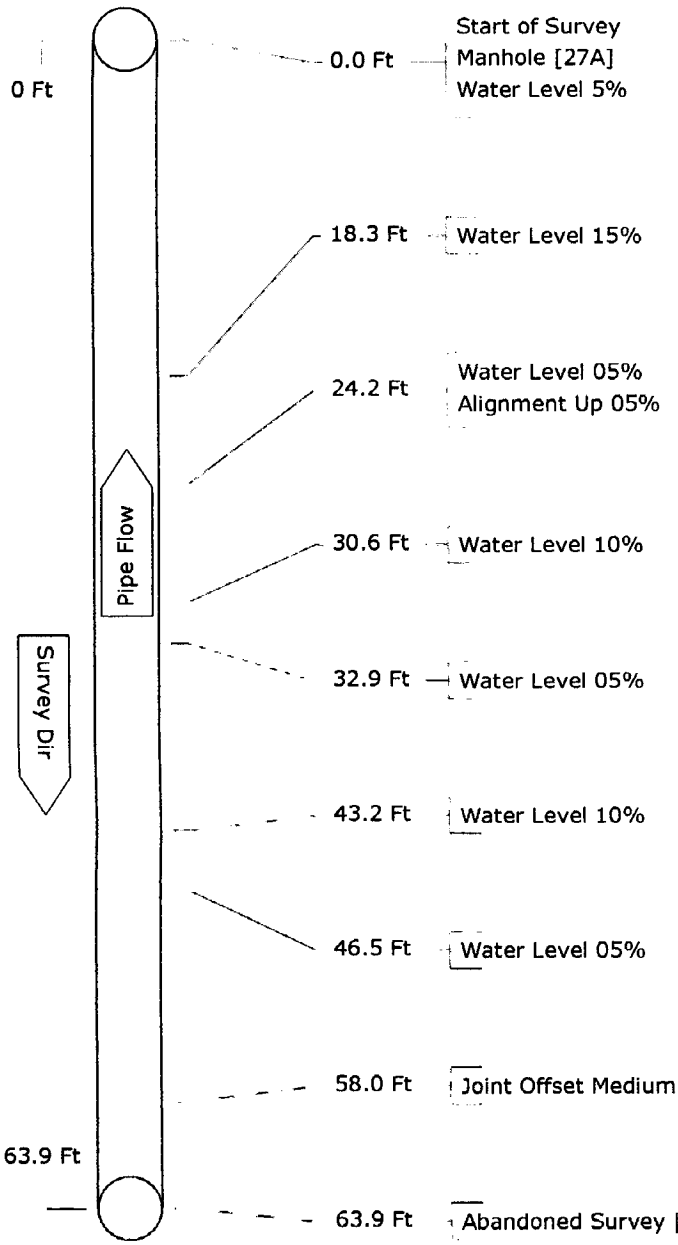
***Notes***

Clock references: Clock references are given clockwise ie from 10 o'clock to 2 o'clock = 1002. The upper part of a pipe is 0903 and the lower half is 0309. See Illustration below



## Pipe Graphic Report of PLR OWS X for blt

| | | | | |
|---|---|---|---|---|
| **Setup** 1 | **Surveyor** Bradley | **Certificate #** U-604-1416 | **System Owner** | |
| **Drainage** | **Survey Customer** | | | |
| **P/O #** | **Date** 2007/05/08 | **Time** 15:25:00 | **Street** McFarland Ave. | |
| **Locality** Inside Fence | **Further location details** | | | |
| **Start** 27A | **Rim to invert** | **Grade to invert** | **Rim to grade** | **Ft** |
| **Finish** OWS | **Rim to invert** | **Grade to invert** | **Rim to grade** | **Ft** |
| **Use** | **Direction** Upstream | **Flow control** | **Tape/Media #** 1 | |
| **Shape** Circular | **Height** 6 **Width** | **ins Preclean** J | **Year Cleaned** | |
| **Material** Polyvinyl Chloride | **Joint length** | **Ft Total length** 5.0 **Ft** | **Length Surveyed** 63.90 | |
| **Lining** | **Year laid** | **Year rehabilitated** | **Weather** | |
| **Purpose** | | **Cat** | | |
| **Additional info** | | Structural O&M Constructional | | |
| **Location** | | Miscellaneous Hydraulic | | |



## Tabular Report of PSR 27 X for SAIC

| | | | | | |
|---|---|---|---|---|---|
| **Setup** 6 | **Surveyor** Bradley | **Certificate #** U-604-1416 | **System Owner** | | |
| **Drainage** | **Survey Customer** | | | | |
| **P/O #** | **Date** 11/17/2006 | **Time** 9:13:00 | **Street** McFarland Ave. | | |
| **Locality** Inside Fence | **Further location details** | | | | |
| **Start** 27 | **Rim to invert** | **Grade to invert** | **Rim to grade** | **Ft** | |
| **Finish** 27A | **Rim to invert** | **Grade to invert** | **Rim to grade** | **Ft** | |
| **Use** | **Direction** Down | **Flow control** | **Tape/Media #** 1 | | |
| **Shape** Circular | **Height** 6 **Width** | **ins** **Preclean** J | **Year Cleaned** | | |
| **Material** Polyvinyl Chloride | **Joint length** **Ft** | **Total length** 79.4 **Ft** | **Length Surveyed** 79.4 | | |
| **Lining** | **Year laid** | **Year rehabilitated** | **Weather** | | |
| **Purpose** | | **Cat** | | | |
| **Additional Info** | | Structural | O&M | Constructional | |
| **Location** | | Miscellaneous | Hydraulic | | |

| Count | Video | CD | Code | | In1 | In2 | % | Jnt | Fr | To | ImRef | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.0 | 00000 | | ST | Start of Survey | | | | | | | | |
| 0.0 | 00000 | | AMH | Manhole | | | | | | | | 27 |
| 0.0 | 00000 | | MWL | Water Level | | | 5 | | | | | |
| 17.7 | | | MWL | Water Level | | | 10 | | | | | |
| 24.0 | | | MWL | Water Level | | | 05 | | | | | |
| 24.0 | | | LU | Alignment Up | | | 15 | | | | | |
| 32.9 | | | LU | Alignment Up | | | 10 | | | | | |
| 46.7 | | | LU | Alignment Up | | | 05 | | | | | |
| 57.4 | | | JOM | Joint Offset Medium | | | | | | | | |
| 71.3 | | | JOM | Joint Offset Medium | | | | | | | | |
| 71.3 | | | MMC | Material change | | | | | | | | PVC TO DIP |
| 79.4 | | | AMH | Manhole | | | | | | | | 27A |
| 79.4 | | | FH | End of Survey | | | | | | | | |

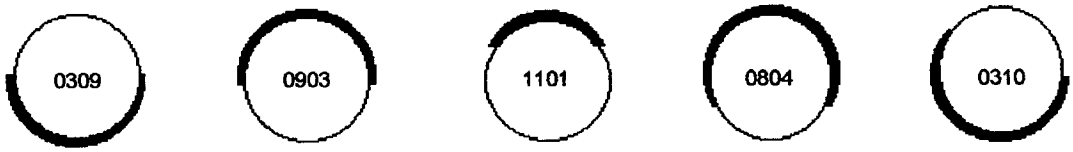
79.4 **Ft** ***Total Length Surveyed***

***Scores***

| | | | | |
|---|---|---|---|---|
| ***Structural:*** | ***Total*** | ***Mean Defect*** | ***Peak*** | ***Mean Pipe*** |
| ***Service:*** | ***Total*** | ***Mean Defect*** | ***Peak*** | ***Mean Pipe*** |

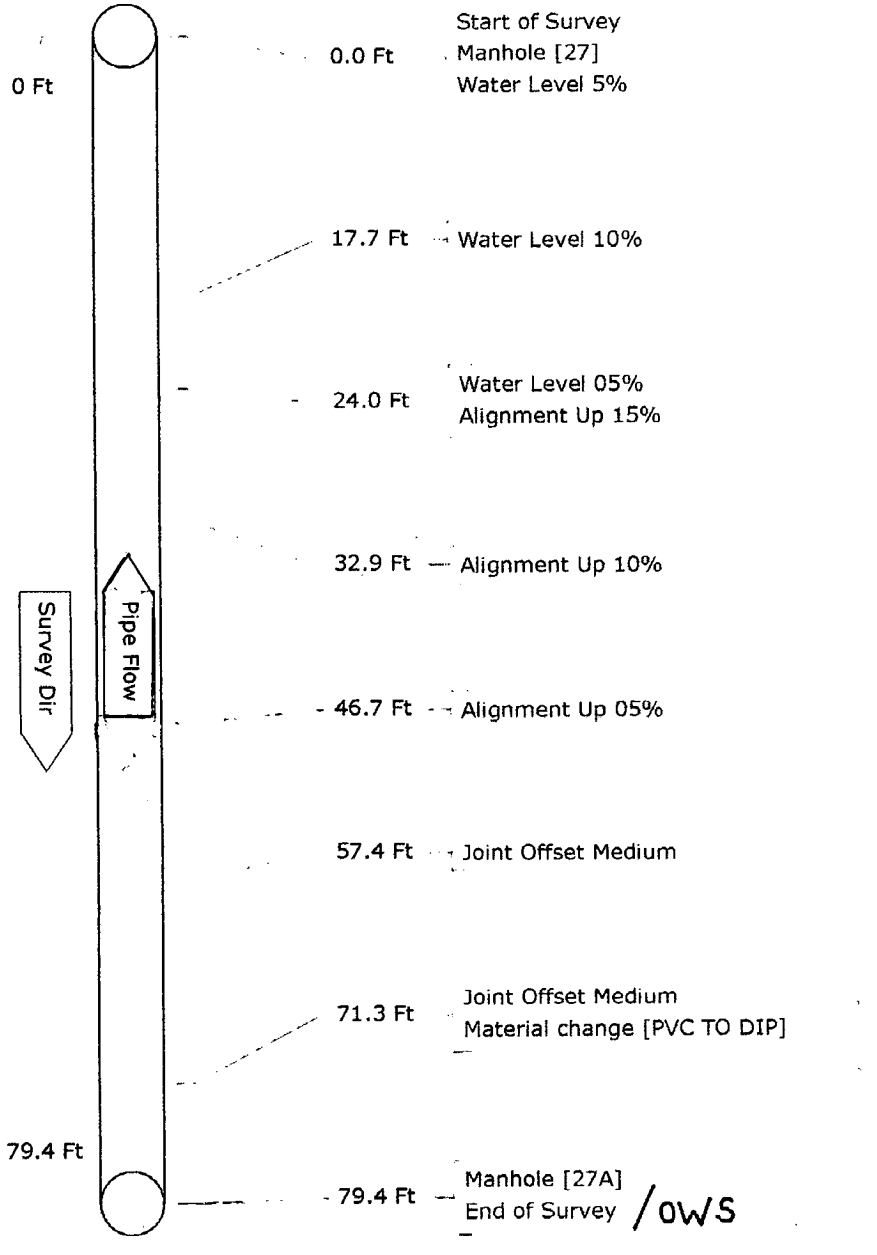
***Notes***

Clock references: Clock references are given clockwise ie from 10 o'clock to 2 o'clock = 1002. The upper part of a pipe is 0903 and the lower half is 0309. See Illustration below



## Pipe Graphic Report of PLR 27 X for SAIC

| | | | | |
|---|---|---|---|---|
| **Setup** 6 | **Surveyor** Bradley | **Certificate #** U-604-1416 | **System Owner** | |
| **Drainage** | **Survey Customer** | | | |
| **P/O #** | **Date** 2006/11/17 | **Time** 09:13:00 | **Street** McFarland Ave. | |
| **Locality** Inside Fence | **Further location details** | | | |
| **Start** 27 | **Rim to invert** | **Grade to invert** | **Rim to grade** | **Ft** |
| **Finish** 27A | **Rim to invert** | **Grade to invert** | **Rim to grade** | **Ft** |
| **Use** | **Direction** Downstream | **Flow control** | **Tape/Media #** 1 | |
| **Shape** Circular | **Height** 6 **Width** | **ins Preclean** J | **Year Cleaned** | |
| **Material** Polyvinyl Chloride | **Joint length** **Ft** | **Total length** 79.4 **Ft** | **Length Surveyed** 79.40 | |
| **Lining** | **Year laid** | **Year rehabilitated** | **Weather** | |
| **Purpose** | | **Cat** | | |
| **Additional info** | | Structural O&M Constructional | | |
| **Location** | | Miscellaneous Hydraulic | | |



## Tabular Report of PSR 1 X for SAIC

| | | | | | |
|---|---|---|---|---|---|
| **Sheet** 2 | **Surveyor** Bradley | **Certificate #** U-604-1416 | **System Owner** | | |
| **Drainage** | **Survey Customer** | | | | |
| **P/O #** | **Date** 05/09/2007 | **Time** 16:58:00 | **Street** McFarland Ave. | | |
| **Locality** Inside Fence | **Further location details** | | | | |
| **Start** 2 | **Rim to invert** | **Grade to invert** | **Rim to grade** | **Ft** | |
| **Finish** 1 | **Rim to invert** | **Grade to invert** | **Rim to grade** | **Ft** | |
| **Use** | **Direction** Up | **Flow control** | **Tape/Media #** 1 | | |
| **Shape** Circular | **Height** 6 **Width** | **ins** **Preclean** J | **Year Cleaned** | | |
| **Material** Polyvinyl Chloride | **Joint length** **Ft** | **Total length** 16.4 **Ft** | **Length Surveyed** 16.4 | | |
| **Lining** | **Year laid** | **Year rehabilitated** | **Weather** | | |
| **Purpose** | | **Cat** | | | |
| **Additional Info** | | Structural | O&M | Constructional | |
| **Location** | | Miscellaneous | Hydraulic | | |

| Count | Video | CD | Code | | In1 | In2 | % | Jnt | Fr | To | ImRef | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.0 | 00000 | | ST | Start of Survey | | | | | | | | |
| 0.0 | 00000 | | AMH | Manhole | | | | | | | | 2 |
| 0.0 | 00000 | | MWL | Water Level | | | 0 | | | | | |
| 6.0 | | | MWL | Water Level | | | 10 | | | | | |
| 16.4 | | | AMH | Manhole | | | | | | | | 1 |
| 16.4 | | | FH | End of Survey | | | | | | | | EDGE OF PIPE ABOVE BOTTOM OF |

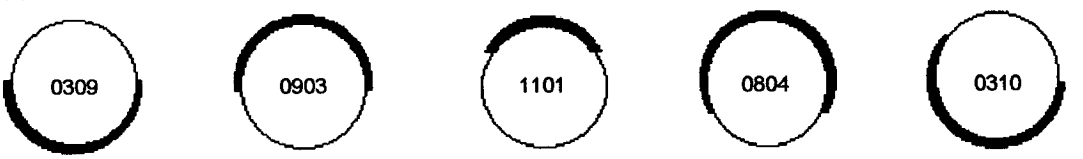
16.4 ***Ft*** ***Total Length Surveyed***

***Scores***

| | | | | |
|---|---|---|---|---|
| ***Structural:*** | ***Total*** 0 | ***Mean Defect*** 0 | ***Peak*** 0 | ***Mean Pipe*** 0 |
| ***Service:*** | ***Total*** 0 | ***Mean Defect*** 0 | ***Peak*** 0 | ***Mean Pipe*** 0 |

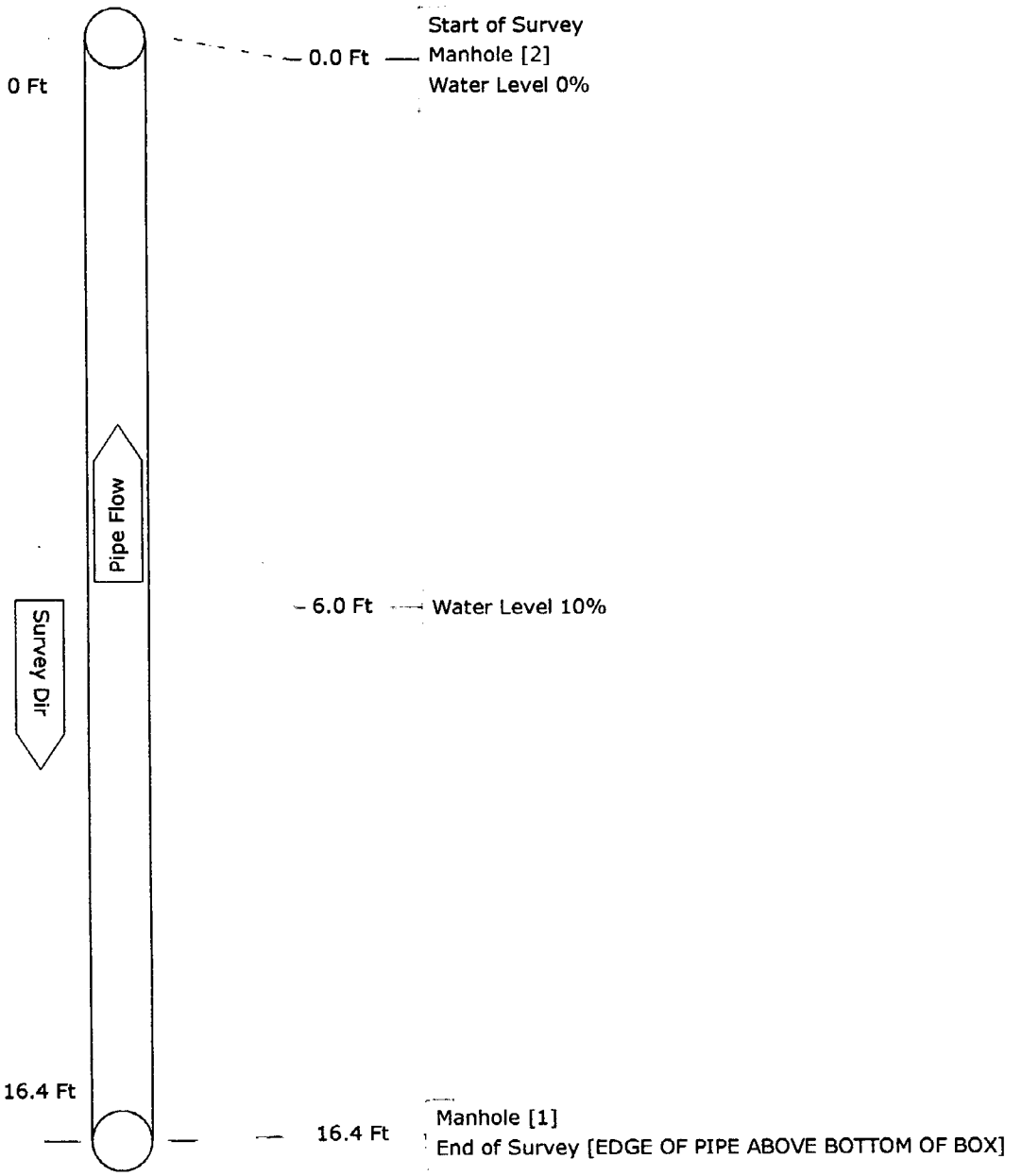
***Notes***

Clock references: Clock references are given clockwise ie from 10 o'clock to 2 o'clock = 1002. The upper part of a pipe is 0903 and the lower half is 0309. See Illustration below



## Pipe Graphic Report of PLR 1 X for SAIC

| | | | | |
|---|---|---|---|---|
| **Sheet** 2 | **Surveyor** Bradley | **Certificate #** U-604-1416 | **System Owner** | |
| **Drainage** | **Survey Customer** | | | |
| **P/O #** | **Date** 2007/05/09 | **Time** 16:58:00 | **Street** McFarland Ave. | |
| **Locality** Inside Fence | **Further location details** | | | |
| **Start** 2 | **Rim to invert** | **Grade to invert** | **Rim to grade** | **Ft** |
| **Finish** 1 | **Rim to invert** | **Grade to invert** | **Rim to grade** | **Ft** |
| **Use** | **Direction** Upstream | **Flow control** | **Tape/Media #** 1 | |
| **Shape** Circular | **Height** 6 **Width** | **ins** **Preclean** J | **Year Cleaned** | |
| **Material** Polyvinyl Chloride | **Joint length** **Ft** | **Total length** 16.4 **Ft** | **Length Surveyed** 16.40 | |
| **Lining** | **Year laid** | **Year rehabilitated** | **Weather** | |
| **Purpose** | | **Cat** | | |
| **Additional info** | | Structural O&M Constructional | | |
| **Location** | | Miscellaneous Hydraulic | | |



**Tabular Report of PSR** 2 X **for SAIC**

| | | | | | |
|---|---|---|---|---|---|
| ***Sheet*** 3 | ***Surveyor*** Bradley | ***Certificate #*** U-604-1416 | ***System Owner*** | | |
| ***Drainage*** | ***Survey Customer*** | | | | |
| ***P/O #*** | ***Date*** 05/09/2007 | ***Time*** 17:03:00 | ***Street*** McFarland Ave. | | |
| ***Locality*** Inside Fence | ***Further location details*** | | | | |
| ***Start*** 2 | ***Rim to Invert*** | ***Grade to Invert*** | ***Rim to grade*** | ***Ft*** | |
| ***Finish*** 3 | ***Rim to invert*** | ***Grade to invert*** | ***Rim to grade*** | ***Ft*** | |
| ***Use*** | ***Direction*** Down | ***Flow control*** | ***Tape/Media #*** 1 | | |
| ***Shape*** Circular | ***Height*** 6 ***Width*** | ***ins*** ***Preclean*** J | ***Year Cleaned*** | | |
| ***Material*** Polyvinyl Chloride | ***Joint length*** ***Ft*** | ***Total length*** 37.6 ***Ft*** | ***Length Surveyed*** 37.6 | | |
| ***Lining*** | ***Year laid*** | ***Year rehabilitated*** | ***Weather*** | | |
| ***Purpose*** | | ***Cat*** | | | |
| ***Additional Info*** | | Structural | O&M | Constructional | |
| ***Location*** | | Miscellaneous | Hydraulic | | |

| Count | Video | CD | Code | | In1 | In2 | % | Jnt | Fr | To | ImRef | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.0 | 00000 | | ST | Start of Survey | | | | | | | | |
| 0.0 | 00000 | | AMH | Manhole | | | | | | | | 2 |
| 0.0 | 00000 | | MWL | Water Level | | | 5 | | | | | |
| 37.6 | | | AMH | Manhole | | | | | | | | 3 |
| 37.6 | | | FH | End of Survey | | | | | | | | |

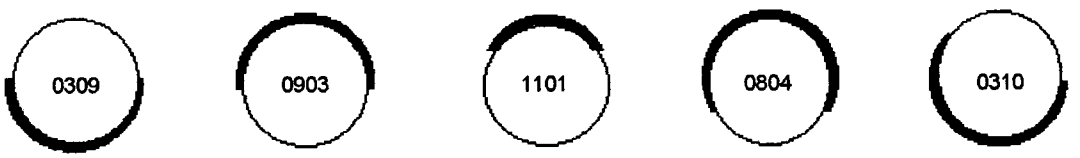
37.6 ***Ft*** ***Total Length Surveyed***

***Scores***

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| ***Structural:*** | ***Total*** 0 | ***Mean Defect*** 0 | ***Peak*** 0 | ***Mean Pipe*** 0 |
| ***Service:*** | ***Total*** 0 | ***Mean Defect*** 0 | ***Peak*** 0 | ***Mean Pipe*** 0 |

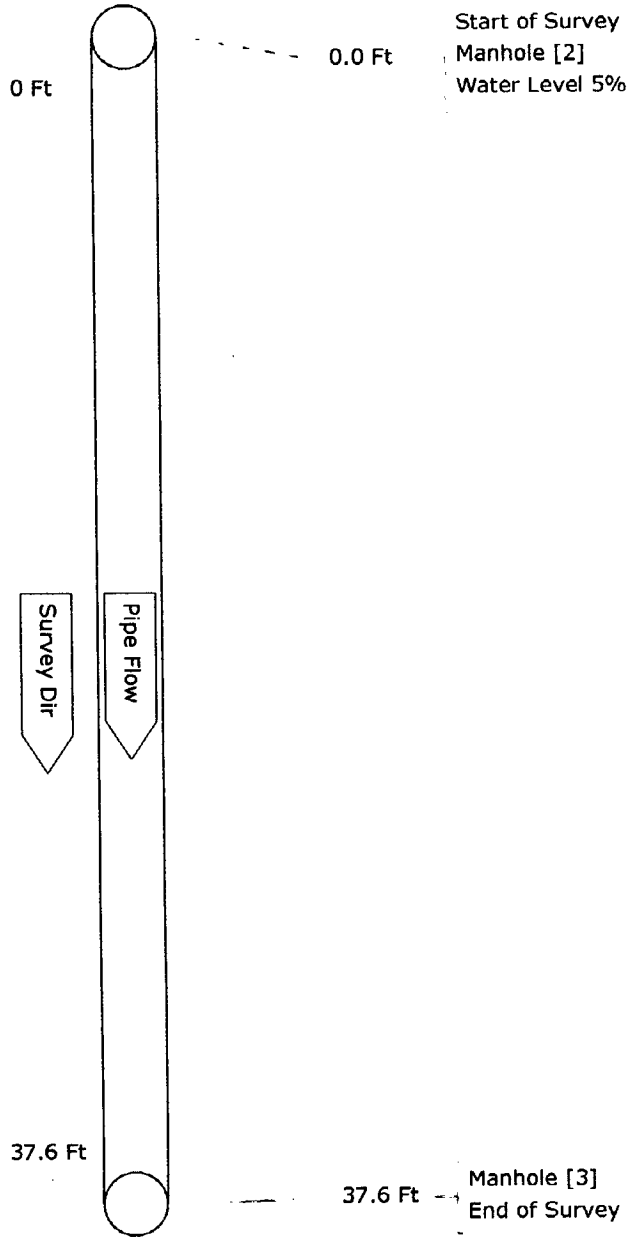
***Notes***

Clock references: Clock references are given clockwise ie from 10 o'clock to 2 o'clock = 1002. The upper part of a pipe is 0903 and the lower half is 0309. See Illustration below



## Pipe Graphic Report of PLR 2 X for SAIC

| | | | | |
|---|---|---|---|---|
| **Sheet** 3 | **Surveyor** Bradley | **Certificate #** U-604-1416 | **System Owner** | |
| **Drainage** | **Survey Customer** | | | |
| **P/O #** | **Date** 2007/05/09 | **Time** 17:03:00 | **Street** McFarland Ave. | |
| **Locality** Inside Fence | **Further location details** | | | |
| **Start** 2 | **Rim to invert** | **Grade to invert** | **Rim to grade** | **Ft** |
| **Finish** 3 | **Rim to invert** | **Grade to invert** | **Rim to grade** | **Ft** |
| **Use** | **Direction** Downstream | **Flow control** | **Tape/Media #** 1 | |
| **Shape** Circular | **Height** 6 **Width** | **ins Preclean** J | **Year Cleaned** | |
| **Material** Polyvinyl Chloride | **Joint length** **Ft** | **Total length** 37.6 **Ft** | **Length Surveyed** 37.60 | |
| **Lining** | **Year laid** | **Year rehabilitated** | **Weather** | |
| **Purpose** | | **Cat** | | |
| **Additional info** | | Structural O&M Constructional | | |
| **Location** | | Miscellaneous Hydraulic | | |



**Tabular Report of PSR 3** X **for SAIC**

| | | | | |
|---|---|---|---|---|
| ***Sheet*** 4 | ***Surveyor*** Bradley | ***Certificate #*** U-604-1416 | ***System Owner*** | |
| ***Drainage*** | ***Survey Customer*** | | | |
| ***P/O #*** | ***Date*** 05/09/2007 | ***Time*** 17:07:00 | ***Street*** McFarland Ave. | |
| ***Locality*** Inside Fence | ***Further location details*** | | | |
| ***Start*** 3 | ***Rim to invert*** | ***Grade to invert*** | ***Rim to grade*** | ***Ft*** |
| ***Finish*** OWS | ***Rim to invert*** | ***Grade to invert*** | ***Rim to grade*** | ***Ft*** |
| ***Use*** | ***Direction*** Down | ***Flow control*** | ***Tape/Media #*** 1 | |
| ***Shape*** Circular | ***Height*** 6 ***Width*** | ***ins*** ***Preclean*** J | ***Year Cleaned*** | |
| ***Material*** Polyvinyl Chloride | ***Joint length*** | ***Ft*** ***Total length*** | ***Ft*** ***Length Surveyed*** 33.7 | |
| ***Lining*** | ***Year laid*** | ***Year rehabilitated*** | ***Weather*** | |
| ***Purpose*** | | ***Cat*** | | |
| ***Additional Info*** | | Structural O&M Constructional | | |
| ***Location*** | | Miscellaneous Hydraulic | | |

| Count | Video | CD | Code | | In1 | In2 | % | Jnt | Fr | To | ImRef | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.0 | 00000 | | ST | Start of Survey | | | | | | | | |
| 0.0 | 00000 | | AMH | Manhole | | | | | | | | 3 |
| 0.0 | 00000 | | MWL | Water Level | | | 5 | | | | | |
| 26.0 | | | DSC | Deposits Settled Compacted | | | 10 | | 04 | 06 | | |
| 33.2 | | | TFA | Tap Factory Active | 06 | | | | 12 | | | |
| 33.6 | | | FL | Fracture Longitudinal | | | | | 12 | | | |
| 33.7 | | | MSA | Abandoned Survey | | | | | | | | CAMERA WILL NOT PASS TAP WITH |

33.7 ***Ft*** ***Total Length Surveyed***

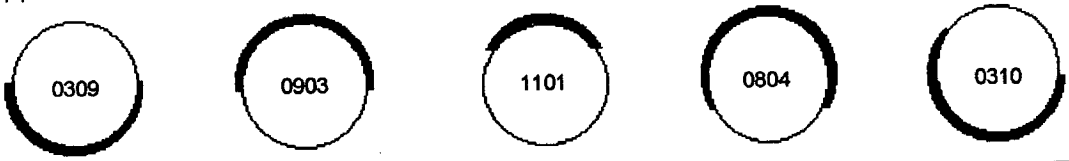
***Scores***

| | | | | |
|---|---|---|---|---|
| ***Structural:*** | ***Total*** 3 | ***Mean Defect*** 3 | ***Peak*** 3 | ***Mean Pipe*** 0.1 |
| ***Service:*** | ***Total*** 6 | ***Mean Defect*** 1 | ***Peak*** 4 | ***Mean Pipe*** 0.2 |

***Notes***

THERE IS NO PIPE GRAPHIC AS SURVEY WAS ABANDONED

Clock references: Clock references are given clockwise ie from 10 o'clock to 2 o'clock = 1002. The upper part of a pipe is 0903 and the lower half is 0309. See Illustration below



DVD of video inspection was inserted in sleeve holder in hard copies.