CITY COUNCIL WORK SESSION AGENDA

August 22, 2011

7:00 P.M. – Call to order in the Multipurpose Room of the Central Services Complex

I. Discussion of the EPA-required draft Management—Operations – Maintenance Programs by Gary M. Cinder, Public Works Director

II. Review of City of Oak Ridge comments on Y-12 draft Request for Proposals (RFP) provisions for new contractor services. (Particular focus to be discussed on community needs aspect of RFP terms.)
- Review of RFP Calendar of Events

III. Discussion and review of the provisions of the DOE/City of Oak Ridge Fire Station contract at ETTP (Station #4) by Acting Fire Chief Darryl Kerley.

IV. Overview and review of Concept Plan for use of portions of Fire Station #4 at ETTP for Historical Interpretive Center of K-25 Complex

V. Review of Financial Summary of Secret City Festival by Janice McGinnis, Finance Director; and Josh Collins, Recreation and Parks Director.

VI. General discussion and review of City ordinances governing vehicle parking. Conduct of discussion on further definition of storage versus parking on City streets.

VII. Update from Recreation and Parks Director on activities and projects of the Recreation and Parks Advisory Board.

VIII. Updates from City Manager
- City Manager Goals
- City Council Retreat Preparation – September 10, 2011

IX. Adjournment

PUBLIC WORKS DEPARTMENT MEMORANDUM
11-21

DATE: August 15, 2011

TO: Mark S. Watson, City Manager

FROM: Gary M. Cinder, P.E., Public Works Director

SUBJECT: **Management – Operations – Maintenance Programs (MOM)**

A requirement of the EPA Administrative Order (AO) received by the City of Oak Ridge in September 2010 requires the development of Management – Operations – Maintenance Programs (MOM) for the wastewater collection and transportation system (WCTS).

During 1991, the City began a sewer rehabilitation program to reduce locations where Inflow and Infiltration (I/I) were entering the WCTS, which reduced the occurrence of sanitary sewer overflows. As of June 30, 2011 approximately $18,000,000 has been expended by the City for the sewer rehabilitation projects, which were all reviewed and approved by the Tennessee Department of Environment and Conservation.

In 2008, the City received a request from the U.S. Environmental Protection Agency (EPA) that required the presentation of the following information for their review:

- Summary of all sanitary sewer overflows for the previous five years
- Wastewater Treatment Plant capacity
- Inventory of sewer lift stations in the WCTS
- Summation of all repairs and rehabilitation in the WCTS to date
- Documentation of the maintenance and operation of the WCTS

In October of 2009, personnel from the EPA conducted a site inspection of the WCTS, resulting with a findings report received by the City in December of 2009 which specified a lack of:

- Formalized written management procedures
- Documented operations and maintenance procedures
- Complete documentation of the previously reported overflows and piped overflows
- Formal mapping/GIS systems with procedures
- A comprehensive Information Management System (IMS)

The City received the AO in September 2010, requiring the correction of these deficiencies and to develop, implement and complete a program to make the necessary repairs to remove all detectable sources of I/I from the WCTS within a five-year period.

The purpose of the MOM is for the City to completely re-evaluate the WCTS, organizational structure and manpower needs. The MOM programs will establish an adequate financial plan to upgrade the system to comply with the requirements of the AO. The MOM programs are a new way of wastewater systems doing business with a new approach to management, operations and maintenance.

The draft copy of the MOM is being provided to City Council to review prior to formal presentation of the final document during the September 12, 2011 meeting, which must be approved by Council prior to submission to the EPA. City Council is responsible for providing an oversight role of the MOM programs, as well as, allocating the necessary funding required for compliance. By approving the final MOM document, City Council will be confirming that the City will implement the MOM programs and commit the necessary resources to operate the WCTS in accordance with the policies and procedures specified.

The development of the MOM document was a team effort by the Public Works Department staff and personnel from Lamar Dunn & Associates, Inc. Roger Flynn, Senior Civil Engineer lead the effort for writing the document and Susan Fallon, Contract/Grants Coordinator provided editing assistance. Staff will be in attendance at the August 22, 2011 work session and will be prepared to present the highlights of the MOM document and answer any questions.

Gary M. Cinder

ks

City of Oak Ridge, Tennessee

Management – Operations – Maintenance Programs (MOM)

Draft

September 2011

TABLE OF CONTENTS

SECTION I 1

GENERAL 1
A. INTRODUCTION 1
B. PURPOSE OF MOM 3
C. GOALS AND MISSION STATEMENT 4

SECTION II 6

MANAGEMENT 6
A. FINANCIAL ADMINISTRATION 6
1. User Rate Charges 7
2. Budget 7
B. PERSONNEL ADMINISTRATION 9
1. Organization 9
2. Training 13
3. Operator Safety Program 15
C. EQUIPMENT AND TOOLS ADMINISTRATION 18
D. LEGAL ADMINISTRATION 20
1. Sewer Use Ordinance 21
E. ENGINEERING ADMINISTRATION 22
1. System Mapping and As-Built Plans 23
2. Design and Capacity Analysis 25
3. Construction 26
F. WATER QUALITY MONITORING 28
G. INFORMATION MANAGEMENT SYSTEM 29
1. Performance Indicators 32
2. Overflow Tracking 33
H. COMPLAINTS 33
1. Public Relations 33
2. Spare Parts Inventory Management 34

SECTION III 35

OPERATIONS 35
A. PRETREATMENT PROGRAM: 35
1. NPDES Permit Requirements 36
2. Inspections and Monitoring 36
3. Flow Monitoring 37
B. CORROSION AND ODOR CONTROL PROGRAM 38
C. FATS, OILS AND GREASE CONTROL PROGRAM 38
D. SERVICE CONNECTION / DISCONNECTION PROGRAM 41
E. PRIVATE HAULER PROGRAM 41
F. LINE LOCATION PROGRAM 41
G. PUMP STATION OPERATION PROGRAM 44

1. Pump Station Description 44
2. Routine Operations 93
3. Emergency Pump Station Program 94
4. Emergency Equipment and Contacts 95
5. Record Keeping 97
6. Force Mains and Air Release/Vacuum Valves 98

SECTION IV **100**

MAINTENANCE **100**
A. INTRODUCTION 100
B. MAINTENANCE SCHEDULING 100
C. SEWER CLEANING 104
1. Cleaning Equipment 104
2. Chemical Cleaning and Root Removal 105
D. CORROSION AND ODORS 108
E. PUMPING STATIONS 109
F. SEWER SYSTEM EVALUATION 119
G. REHABILITATION 119
1. Main Line Repairs 119
a. Point and Replacement Repairs 120
b. Pipe Bursting 122
c. Sewer Lining 122
d. Manhole Repair 124
2. Sewer Laterals 124
H. MAINTENANCE OF WAY 126
1. Rights-Of-Way and Easement Program 126
2. Street Paving Monitoring Program 127

SECTION I

GENERAL

A. INTRODUCTION

The City of Oak Ridge is the result of the Manhattan Project of World War II. The Manhattan Project's primary purpose was to develop the Atomic Bomb. The location was selected for numerous reasons, which included electrical power from the new Tennessee Valley Authority.

In the spring of 1943, the former rural communities within what was to be later known as the Reservation were cleared away, fenced, and controlled by the United States Army Corps of Engineers. The secret activities were referred to as the Clinton Engineering Works. It was not until 1949 that the government town was formally named Oak Ridge.

Between the spring of 1943 and August 1945, a huge industrial complex and City was built. During that two year period, not only were the manufacturing facilities built; but, the bomb as well. Due to the large work force which was required, the Army constructed homes which were intended to be temporary, many of which still exist today and are considered "legacy housing". Municipal services were required, which included drinking water and sewer services.

Two wastewater treatment facilities were constructed. An activated sludge type plant was constructed on Cairo Road, which is in the eastern portion of the City. The plant was known as the East Plant. It may have been the first activated sludge treatment plant in the State of Tennessee.

The residential areas of the eastern area of the new city were served by this plant. The Y-12 atomic facility and western residential areas of the City had wastewater services which were separate from the East Plant area. The western treatment plant was a primary plant, which only provided for solids/liquid separation.

The population of the City swelled to 75,000 persons by 1945. Today, the City has a population of approximately 29,000. In 1947, control of the City shifted from the Army to civilian control as a part of the United States Atomic Energy Commission. Twelve years later (1959), the town was incorporated with a modified City Manager - Council form of government. The newly formed City government continued to operate the wastewater infrastructure constructed by the Army until 1982.

In the early 1980's due to new regulatory standards, the City began the design for new treatment facilities. The old primary treatment plant was no longer an acceptable situation. That program resulted in a new tertiary treatment plant being built adjacent to the old primary plant. The East Plant was abandoned and converted to a pumping station to transfer wastewater to the new tertiary treatment plant on East Fork Poplar Creek.

With time and a maturing of environmental awareness, the regulatory community began looking at wet weather discharges of untreated wastewater. In 1991, the City and State of Tennessee began discussions relative to overflows at the influent pumping station of the treatment plant.

Simultaneously with the study of wet weather flows, a study was being developed relative to radionuclides in the waste stream. The Oak Ridge sludge was known to have a unique mix of constituents. The results of this work were to expand the capacity of the influent pumping station and the treatment plant. That expansion was completed in 1999.

Parallel with the expansion of the treatment facilities, an aggressive program was developed to reduce wet weather flow. Over the period of July 1994 through May 2011 approximately $18,144,033 has been spent by the City on infiltration/inflow (I/I) reduction.

As with a preponderance of wastewater collection systems across the states, overflows still exist. The United States Environmental Protection Agency (EPA) has become proactive toward the elimination of untreated sewage overflows. Over a period of approximately two years, the EPA and City discussed impending regulatory enforcement action. On September 27, 2010, the EPA issued an Administrative Order (A.O.) (No. CWA-04-2010-4772). The A.O. dealt with NPDES permit No. TN0024155. There were several sections to the A.O. Section D of the A.O. requires the City to develop Management, Operations, and Maintenance Programs (MOM).

The MOM program requires a commitment from all groups within a municipal wastewater system. The City Council must be supportive through providing the necessary financial resources and policies to ensure the program succeeds. The City Administration must understand the regulatory requirements and implement procedures to efficiently manage the system with adequate personnel, equipment, training, and guidance. The operating staff must understand the requirements and execute proper maintenance and operational functions.

The management component of the MOM includes several key areas which would include, but necessarily be limited to, the following:

- Financial administration
- Personnel administration
- Equipment and tools administration
- Legal administration
- Engineering administration
- Water quality monitoring
- Management information systems
- Complaint management
- Public relations
- Emergency management and/or contingency plans
- Spare parts inventory management

The operation and maintenance activities of a well operated system are numerous. The system must convey all the wastewater to the treatment plant (without overflows and spillage) where it is properly treated and discharged. Some of the key elements include:

- Maintenance scheduling
- Sewer cleaning
- Root control
- Corrosion control
- Pumping stations
- Continued sewer system evaluation
- Rehabilitation
- Service laterals

The City of Oak Ridge MOM document development was a joint effort of the City staff and consultant, Lamar Dunn & Associates, Inc.

B. PURPOSE OF MOM

The Administrative Order (A.O.) identified nine (9) unpermitted outfalls (constructed overflows). There were also issues with other defects in the City's collection system.

The purpose of the MOM is for the City to completely re-evaluate the wastewater collection and treatment system. That re-evaluation will begin with the review of the organizational structure and manpower needs. The program will establish an adequate financial plan to upgrade the system to bring it into compliance. The City Council is to have an oversight role and provide the necessary funding.

Also, the MOM will review and document various legal aspects relating to the system. They would include:

- City charter for services
- Easement ownership (where and how documents are stored)
- Sewer use ordinance
- Ownership and maintenance policies of private laterals

The MOM program is a new way of wastewater systems doing business. This MOM will develop a new approach to management, operations, and maintenance.

C. GOALS AND MISSION STATEMENT

The City of Oak Ridge (City) mission is: To be a leader and partner in achieving excellence as a community.

The qualities that the City management sees for the organization:

Openness – Committed to the ideals of transparent government and involving our citizens.
Innovation – Committed to creativity and continual improvement in City service and efficiency.
Responsibility – Committed to each action and policy of the City as essential to the future of Oak Ridge.
Decisiveness – Committed to the clear identification of City purpose and the swift process to achieve it.
Communication – Committed to the continuous flow of internal and external communications between individuals, departments and community.

Goals for the MOM Program:

- Comply with each requirement of the U.S. EPA Administrative Order in a timely manner
- Adopt an adequate rate structure to fund the MOM program
- Evaluate the wastewater system's organizational structure to ensure adequate staffing for an efficient and effective operation, including appropriate training and standard operating procedures
- Eliminate preventable dry weather overflows due to grease and root blockage by December 31, 2013
- Reduce wet weather overflows in the Emory Valley Sewershed by July 31, 2012

- Negotiate with the National Nuclear Security Administration (NNSA) to reduce wet weather flow from the Y-12 Federal facility to a manageable level by December 31, 2013
- Reduce wet weather overflows in the East Plant Sewershed by July 31, 2013
- Initiate a program for the rehabilitation of privately-owned service laterals
- Develop a public information program to enhance communication with the community about the importance of a well operated and maintained sewer system, discuss the capital needs to achieve this, and educate the public on various aspects of system operation and maintenance.

SECTION II

MANAGEMENT

A. FINANCIAL ADMINISTRATION

The City of Oak Ridge is governed by a modified City Manager-Council form of government. The governing body of the City is a seven member City Council, electing one of its members as mayor to serve for a two-year period as ceremonial head of the City and presiding officer of the City Council. Policy-making and legislative authority are vested in City Council, including the adoption of the annual budget.

The City Manager, hired by the City Council, is responsible for carrying out the policies and ordinances of the City Council, for overseeing the City's day-to-day operations, and for appointing heads of various departments.

Article 5 of the Charter of the City of Oak Ridge, Tennessee provides guidance for the financial management of the City within the following sections.

- Section 8 – Administration of Finances
  - City Manager or an officer appointed by the manager shall have charge of the administration of the financial affairs of the City.
- Section 9 – Fiscal Year
  - Begin on the first day of July and end on the thirtieth day of June of the succeeding year.

The Public Works Director is responsible for financial administration of the wastewater collection and transportation system (WCTS) with staff support from the Administrative Division Manager and the Administrative Specialist. Public Works Department personnel assist in the preparation of the annual Capital Improvements Program (CIP) and the fiscal year budget. The Department Director will utilize the Administrative Division Manager and Public Works Operations Manager to monitor and advise relative to the financial matters of the WCTS.

Article V, Section 34 of the Charter requires "separate financial and accounting records shall be maintained for each utility in accordance with accepted principles of utility accounting and as may be required by the City Council, without impairing the authority of the city to manage and operate the utilities with the same personnel and equipment".

1. User Rate Charges

For accounting purposes, the operations of the water and wastewater systems are combined into one fund, the Waterworks Fund. Costs for the two systems are tracked separately and user rates are established based on the operations of the individual systems, i.e. the water user rates are based on the operations of the water treatment and distribution system, and the wastewater user rates are based on the operations of the WCTS and treatment.

Biennially, the City reviews the rate structure for water and wastewater services. Capital improvements are the major driver for wastewater user rate increases. Capital improvements impact user rates from increased expenses for depreciation and tax equivalent payments based on higher asset values and the need for sufficient cash levels to fund principal and interest payments on long-term debt issued to finance the projects. The City Council is responsible for adopting the user rate structure to cover the cost of operations of the WCTS.

The current wastewater user rates were effective May 1, 2008. There is a rate study in progress with an expected completion in the fall of 2011. With the expected continuation of the sewer rehabilitation program, the rates will increase due to capital expenditures. The projected new rates will probably be scheduled for incremental increases over the life of the A.O.

The amount of needed capital will not be known until the Remediation Plan is completed and approved by EPA. However, the current activities project $10.0 million capital in the initial rate adjustment. Oak Ridge is unique in that a high percentage of the customers use the minimum monthly amount in the rate bracket, which is 2,000 gallons. The fee for 2,000 gallons or any part thereof is $13.50. The next 8,000 gallons is charged at $5.15 per 1,000 gallons of water consumed. There is a provision in the rate structure for single meter users with an average of 10,000,000 gallons per month usage to pay $120,000 for the base 10.0 million and $6.45 per thousand gallons thereafter.

2. Budget

Article 5 of the Charter of the City of Oak Ridge, Tennessee provides guidance for the budget preparation, adoption, and management of the City within the following sections:

- Section 10 – Manager to Prepare Budget – Contents
  - Detailed estimates of all proposed expenditures for each department
  - Statement of the bonded and other indebtedness of the city
  - Detailed estimates of all anticipated revenues of the city
  - Statement of the estimated balance or deficit at the end of the current fiscal year
  - Other supporting schedules as the council may request or are otherwise required by law
- Section 11 – Capital Budget
  - Statement of pending capital projects and proposed new capital projects
- Section 12 – Public Hearing on Budget – Inspection – Distribution
  - Public hearing on the budget shall be held before final adoption by City Council
  - Notice of public hearing shall be published 10 days in advance of the date
  - Budget and all supporting schedules shall be a public record
- Section 13 – Adoption of Budget – Appropriation Ordinance
  - Prior to the beginning of the fiscal year (July 1), City Council shall adopt an appropriation ordinance
- Section 14 – Amendments to Appropriation Ordinance
  - Amendments may be made to the original appropriation at any time in the current fiscal year after a public hearing before the City Council with 10 days notice and after the City Manager has certified in writing that sufficient amount of unappropriated revenue will be available.
- Section 15 – Unexpended Appropriation to Lapse
  - Any portion of an annual appropriation remaining unexpended and unencumbered at the close of the fiscal year shall lapse
- Section 16 – Budget Control
  - Requires quarterly reports during the fiscal year from the City Manager to City Council
- Section 19 – Annual Audit
  - Each fiscal year an audit shall be made of the accounts and funds of the city, covering the operations of the past fiscal year, by a certified public accountant selected by the City Council

To ensure compliance with the Charter of the City of Oak Ridge, Tennessee, a budget schedule is prepared each year to facilitate the decision-making process by providing overall direction to City departments. Milestones of the budget schedule include the following:

- Late Summer – departments begin preparation of the five-year Capital Improvements Program
- November – departments assess any new resource needs for the next fiscal year and perform a self-evaluation of their objectives and measures of performance for the current year
- February – Finance Department quantifies preliminary budget information for the City Manager's review, which can include departmental budget meetings with the City Manager and finance staff.
- May – proposed budget completed and presented to City Council, public hearing held and approval of the budget prior to May 31
- July – New fiscal year begins on the 1st

B. PERSONNEL ADMINISTRATION

1. Organization

The wastewater collection and treatment facilities owned by the City of Oak Ridge are managed, operated, and maintained by personnel of the Public Works Department. Figure II-1 shows the structure of the department as currently configured. Note the temporary block which is an activity proposed throughout the life of the A.O. That temporary block is further shown in Figure II-2.

The Public Works Director is in responsible charge of all activities of the department including the water and wastewater systems. The current structure is somewhat a result of the A.O.

The Administrative Division Manager will be responsible for implementing the Information Management System (IMS), as required by the A.O. The rehabilitation activities required by the A.O. will result in many consulting engineering assignments and construction contracts. This manager will be responsible for administering all those contracts both from a schedule and financial perspective. When fully implemented, the IMS will be tracking complaints and other activities. The call center will be administered by this manager. The work order system, inventory system, management reports, and other general data collection of operational activities will be the responsibility of the manager.

The City Engineer is responsible for activities generally dealing with construction. The City's mapping program is the responsibility of the City Engineer. Currently, record drawings are maintained in AutoCAD format. As a result of the A.O., the City is developing a Geographical Information System (GIS). The development of the GIS system is being performed by a consultant (See Figure II-2). It is the plan to move the GIS program "in-house" in the future. As development occurs in the City, the City Engineer is responsible for reviewing/approval of plans and specifications and providing construction inspection. The City Engineer is responsible for developing design criteria, managing design consultants, and continually assessing the condition of the wastewater system.

The Operations Manager has far reaching responsibility as can be seen from Figure II-1. As it relates to the wastewater system, that manager is responsible for both the operations and maintenance of the collection and treatment systems. Even though the City Engineer is responsible for assessing the condition of the system from an overall management perspective, the Operations Manager's staff will actually conduct the field activities. All maintenance of pumping stations and treatment plants is administered by the Manager through the maintenance supervisor. Other programs such as the industrial pre-treatment program and root program are the responsibility of the Manager. The fats, oils and grease (FOG) program is administered by the Code Enforcement Division of the Community Development Department with assistance from the Operations Manager.

The City has retained a consulting firm to assist with program management during the life of the A.O. The City has developed a Qualifications Based Selection Process for rehabilitation design consultants. The Program Manager will manage the activities of these firms for an efficient and cost-effective program. That firm will continue to develop the GIS program and work with the Finance and Administration Manager to coordinate all aspects of the rehabilitation program into the IMS.

Figure II-1
City of Oak Ridge Public Works Department
Organizational Structure

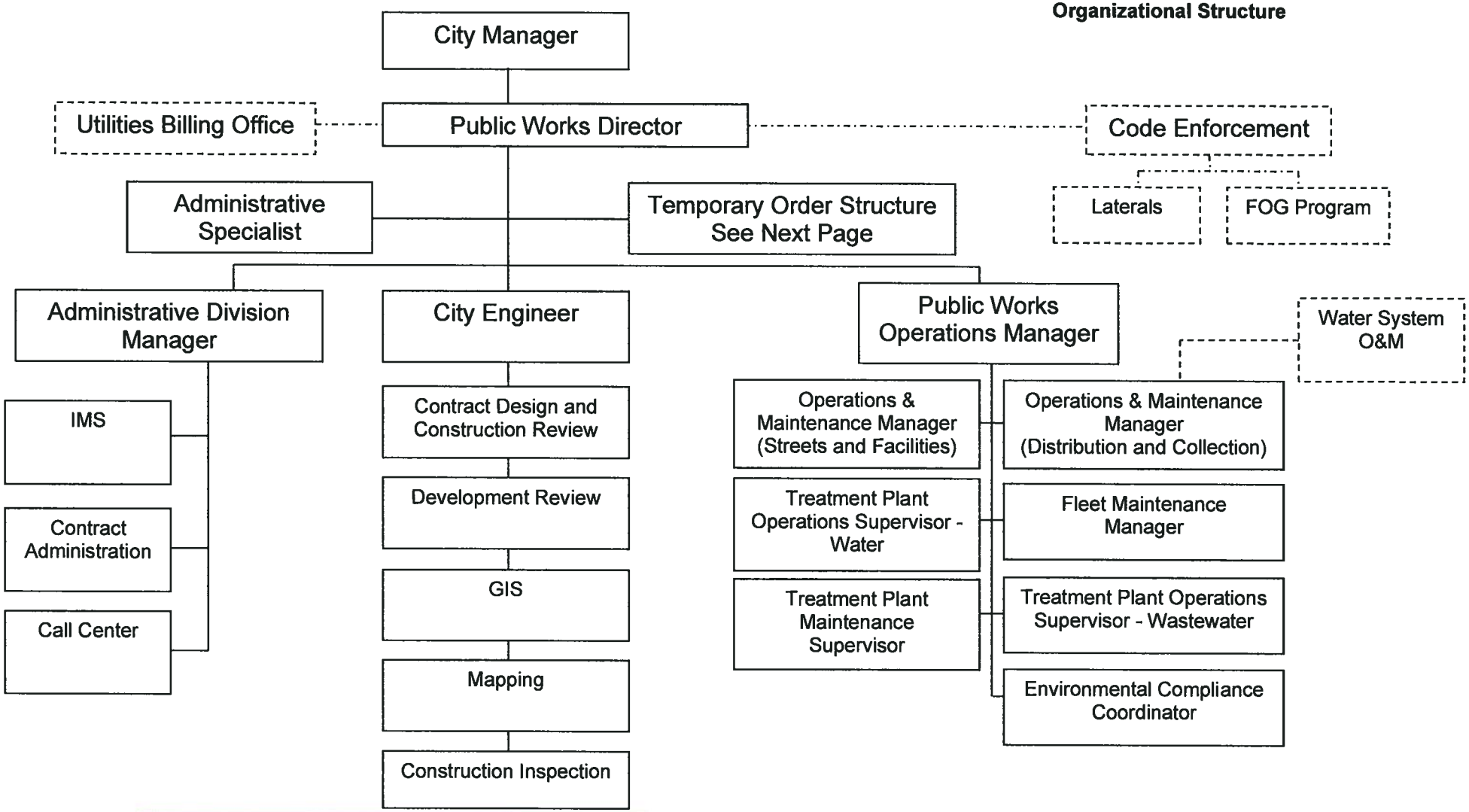
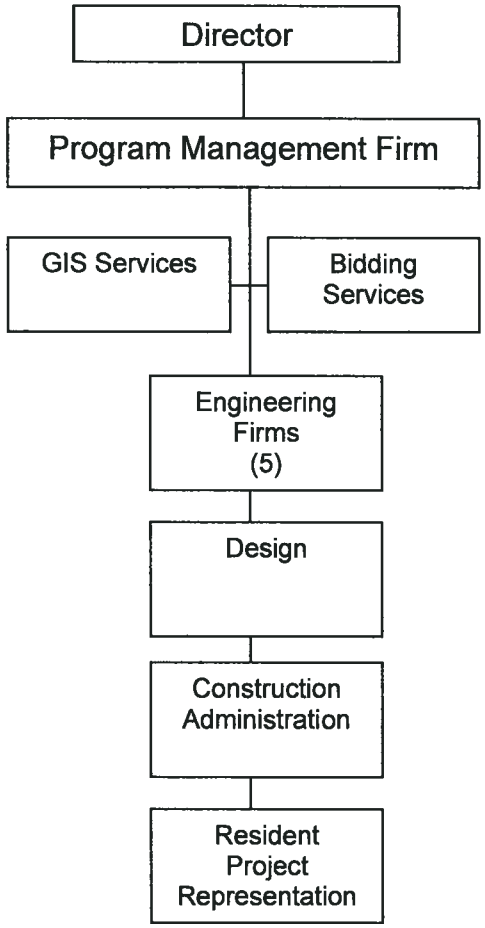


Figure II-2
City of Oak Ridge
Public Works Department
Temporary Assistance Activities



2. Training

The City prefers to promote from within, meaning most employees that are newly hired will enter the City organization as an entry level maintenance worker. Newly hired employees are initially assigned to the crew where the vacancy exists for which they are hired. New employees are subject to a six month probation period. During this period, the employee's supervisor(s) will closely observe the employee's work, the employee's attendance, interaction with other personnel and citizens, and adjustment to being employed by the City, in general, and his/her specific position. During the six month probation period, the employee may be terminated, at will, for unsatisfactory performance.

All training for new employees is initially "on-the-job". The City does not provide specialized training until the employee is no longer on probation, except for safety meetings. New employees are allowed to use common hand tools. All employees are provided and shown how to use appropriate personal protection equipment (PPE) such as gloves, safety glasses, and hard hats. Small power tools may be used after the employee demonstrates that he/she can use them safely and for the intended purpose; and, in the case where the employee has no knowledge of the tools, they are given necessary instruction. New employees may operate passenger vehicles, pickup trucks, and 1-ton dump trucks. New employees may not operate any vehicle requiring a CDL (unless the employee possesses the CDL prior to being hired). They may not operate excavation equipment, unless they have previous experience and can demonstrate competency. New employees are shown how to operate specialized equipment that is used by his/her crew, but may not use that equipment unsupervised.

New employees are required to obtain a CDL within the six month probationary period. The City provides the necessary study material, and other crew personnel help the employee with the "hands on" portion of obtaining the CDL. Employees may use City vehicles to test for the CDL but an employee already licensed to operate the equipment must accompany the CDL candidate to the test site.

After the probation period new employees will begin "on the job" cross training. During this period, the employee rotates through all of the crews which are in his/her career path. The employee spends a minimum of 5 months in each crew learning methods and materials to affect repairs that would most likely be encountered. This training will include sewer maintenance, repair and responding to sewer blockages and SSOs, water leaks and breaks, concrete

repair, storm drainage maintenance, ROW maintenance, and asphalt repair. During the cross training, the employee may begin learning to use specialized equipment, operate excavation equipment, and perform specialized procedures such as installing flow meters. Employees are also trained to perform the duties of the line locator. Maintenance workers may not perform these tasks unsupervised until trained and demonstrate competency to their crew chief.

The City has a formal program whereby all Maintenance Workers are eligible for promotion to Maintenance Mechanic when he/she meets the basic criteria. The employee must have completed at least 3½ years of successful service in their current position, and have completed his/her cross training. This promotion is guaranteed when the criteria is met regardless of whether the position in the crews organization chart is vacant. This ensures that all work pool employees will be able to progress beyond entry level.

During the employee's training, increasing areas of responsibility are assigned after the employee demonstrates competency by completing task specific hands-on skills tests administrated by specialist in the specific area of operation, and witnessed and approved by the supervisor and manager.

In addition to "on-job-training", employees are eligible to participate in classes and seminars that are applicable to their areas of employment. One requirement of the Criteria for Maintenance Worker to Maintenance Mechanic is for the employee to successfully complete a work zone safety seminar from either the State of Tennessee or the Tennessee Municipal League (TML). Many classes are offered by TDEC at the Fleming Training Center in Murfreesboro related to water treatment and distribution and wastewater collection and treatment. Employees are encouraged to attend applicable classes. The City provides tuition and travel expenses.

Any employee that is a candidate for Utility Maintenance Specialist or Utility Line Maintenance Crew Chief must obtain the Grade II system operation certificate in collection or distribution, for sewer or water respectively. Seminars to assist the employee in preparation for testing for these certifications are available from TDEC at the Fleming Training Center. The City provides tuition and travel expenses. Employees having system operator's certificates must maintain those credentials by successfully completing continuing education every 3 years.

Several staff members have various certifications or professional licenses that must be maintained by completing continuing education. The City provides the necessary time, fees, and travel expenses to accomplish this.

3. Operator Safety Program

The City strives to ensure that the employees conduct themselves in a safe manner to eliminate accidents. Some training is provided on a scheduled basis with other training offered on an as needed basis. Training is scheduled or provided based on individual needs depending on the position that a person holds.

The City safety program begins for an employee during the hiring and orientation process. Prior to hiring, employees receive a pre-employee physical to determine if they have any pre-existing medical problem/condition that would prevent them from being able to safely carry out the requirements of the job description for which they are applying. In addition, a pre-employment drug screen must be completed. HAZMATs are provided for positions requiring extensive medical screening and respiratory fit testing. Employees are not required to have had previous safety training; however, during the new employee orientation, a list of applicable training is requested along with a copy of the person's commercial driver's license (CDL).

The City has a drug free work place policy. As part of a person's agreement to accept an employment offer, that person agrees to comply with the random drug testing policy.

New public works work pool employees who will be operating trucks with a capacity larger than one ton are required to secure a CDL during their six-month probationary period. Training is conducted by the employee's foreman or a competent crew member. The City provides a vehicle for training and testing, and pays for all costs associated with testing.

The Public Works Department provides semi-annual training sessions in Cardiopulmonary Resuscitation (CPR) and first aid safety. Classes are offered on a frequent basis. The City has purchased its own training equipment and maintains adequate staff for teaching. The Safety Training Coordinator maintains records when each employee has received certification, and schedules employees for refresher training prior to the date when the employee's certification card will expire.

The Public Works Department provides monthly meetings for its employees on a variety of applicable topics. These meetings are provided on a contract basis. Topics covered during the safety meeting in the past twelve months are:

- OSHA Updates
- Blood Borne Pathogens
- Universal Protective Equipment (PPE)
- Material Safety Data Sheets (MSDS)
- General Safety
- Climbing Safety
- Electric Shock Safety
- Water Safety
- OSHA Four Foot Rule for Confined Space
- Trenching Safety
- Weather Safety
- Driver Safety

The City conducts classes on Work Zone Safety, Trenching/Shoring, and Confined Spaces every three years, or more frequently if needed, for new employees. Fire Extinguisher training is offered every five years, unless it is needed on a more frequent basis.

Radiation worker training is made available by DOE for the small number of crew personnel that may work at locations that were formally nuclear facilities.

Other departments, such as police, fire, and electric, offer specialized training for their personnel. Some of the classes that are thought to be beneficial to multiple departments are offered on a joint basis.

The City has access to driver training for employees who have been in at-fault accidents and/or who have been involved in multiple accidents. In addition, the City requires automatic drug and alcohol testing for persons involved in accidents involving injury or property damage. The City requires the use of seat belts when operating City vehicles, and has a no smoking in City vehicles policy. All City vehicles are equipped with first aid kits and fire extinguishers.

The City provides its personnel appropriate personal protection equipment (PPE) as needed. This equipment includes hard hats, safety vest, safety boots, safety glasses, and hearing protection. Persons working in the WCTS system are provided disposable overalls and rubber gloves. All employees are provided hand sanitizer.

Personnel working in confined spaces or possibly unsafe atmospheres are provided with, and required to use, air monitoring equipment capable of detecting oxygen deficiency or combustible gases. Ventilation equipment is also provided. Personnel working in manholes are required to use tri-pods with rescue winches and safety harnesses.

The City owns a variety of trench boxes and shoring equipment along with ladders that are required when working in open excavations. Employees are trained in proper trenching techniques, and are required to abide by OSHA regulations. In 2000, when the Public Works department adopted the Standard Construction Requirements and Details (SCRD), new requirements were established for gravity sewer main line easement widths. These requirements require wider easements for lines that are greater than five feet in depth. This was done to provide additional easement width for benching trenches, installing trench boxes, and moving spoil piles away from the edge of the excavation. The fire department has personnel trained in trench rescue.

The City maintains a variety of portable warning/message signs, barrels, cones, and type III barricades for personnel to use during times when traffic control is necessary. Crews also have traffic control paddles and portable radios for use during flagging operations.

When new equipment is purchased, the City requires the successful vendor to provide training on that piece of equipment including operation of any safety features. As employees are trained to operate various pieces of equipment, they receive specific training on how to operate safety devices that may be part of the equipment. This training is provided by personnel who have been trained by the manufacture or vendor's representative. Employees are instructed to not by-pass safety controls or remove safety shields that may protect persons from being injured by belts, hoses, hot exhausts, driveshafts, etc.

Supervisors and crew foremen are responsible for ensuring that adequate and appropriate safety equipment is available for their crew members. They are responsible for ensuring training is provided and received. Crew personnel are responsible for familiarizing themselves with the proper use and maintenance of safety equipment, and using that equipment when needed.

Safety is each employee's responsible and all employees are expected to use common sense and exercise good judgment when working to protect themselves, their co-workers, and the general public.

C. EQUIPMENT AND TOOLS ADMINISTRATION

It is the responsibility of the City to provide the necessary tools and equipment to personnel to perform their jobs. The required tools and equipment vary depending on the type of task assigned. The tools and equipment range between small hand tools to specialized heavy equipment.

Below is a typical listing of the vehicles and heavy equipment assigned to the crews responsible for the sewer operation and maintenance within the Oak Ridge Public Works Department.

Sedan	1
Pickup Trucks	7
Utility Vehicles (SUV)	4
Trucks with Utility Beds	4
Van	1
CCTV Equipped Vehicles	2
Trucks with Crane/Boom	2
Dump Trucks	4
Sewer Cleaning Trucks	2
Backhoe	1
Leaf Vacuum	1
Skid Steer Loader	1
Easement Machines	3

All equipment owned is maintained in the City's equipment shop. The equipment shop operates under the supervision of the Public Works department; however, it maintains equipment and vehicles for all City departments including electric, parks & recreation, police, and fire.

The normal staffing level for the equipment shop is eight employees. There is one equipment shop manager. There are five technicians and two service workers. Vehicle service workers do work such as tire replacement, lube, oil & filter, change batteries and wash vehicles.

The equipment shop is capable of most major repairs including major component replacement. The equipment shop does not do body repair work.

The warehouse buys, in bulk, and supplies the equipment shop with common items that are kept in stock. These include tires, batteries, belts, filters, chemicals and additives. The equipment shop operates in an environmentally friendly way by properly

disposing of items that cannot be recycled and recycling items and fluids that are recyclable.

To ensure all equipment is serviced regularly, the City has chosen to use an interval of 90 days or 3,000 miles for passenger vehicles, light and heavy trucks. These service recommendations have been used for many years. A simple software program can provide reminders 90 days from when service is done. The vehicle fueling system requires inputting the current vehicle odometer reading and equipment number prior to activating the fuel pump. The fuel system computer calculates the fuel used for each vehicle and also when 3,000 miles has elapsed.

The IMS will track vehicle use and maintenance. It should also be noted that operation of certain pieces of specialized equipment such as the Vac-Con, jet-rodder, CCTV truck and some excavators is limited to persons trained on that equipment and sometimes operations is even restricted to a few individuals. These vehicles generally have different service intervals for various parts of the machine and those persons that operate these vehicles are responsible for ensuring they are serviced and recording that service on log sheets contained in the vehicle.

Equipment, such as backhoes or machines, used off-road is usually serviced every 100 hours.

In addition to equipment and vehicles each crew is supplied with small items they may need. Some examples are:

Equipment

- Air compressor, hoses, jack hammers and air tools
- Power Wet/Dry Vacuum
- Portable Pumps
- Portable Generators
- Chain Saws
- Concrete/Asphalt/ Pipe Saws
- Emergency Lighting

Specialized Equipment

- Gas Meters
- Debris Baskets
- Pole Hoes
- Pipe Cutters

Safety Equipment

- Confined Entry Tripod, Harnesses and Tether
- Cones, Barrels and Barricades

Each crew also has supplies, maps, hand tools and personnel protection equipment as needed.

D. LEGAL ADMINISTRATION

The City of Oak Ridge was incorporated on June 16, 1959 and is considered a "home rule" community under Tennessee state law. "Home rule cities" were organized under charters approved by referendum of the citizens, with charters authorized by Article XI, Section 9, of the Tennessee State Constitution, as amended in 1953.

Tennessee Code Annotated (TCA) §7-35-401 provides that "Every incorporated city and town in this state is authorized and empowered to own, acquire, construct, extend, equip, operate and maintain within or without the corporate limits of such city or town a waterworks system or a sewerage system, to provide water or sewerage service and to charge for such service."

Article II, Section 11 of the Charter of the City of Oak Ridge, Tennessee (Charter), requires that "any action of council having a regulatory or penal effect, relating to revenue or the expenditure of money, or required to be done by ordinance under this Charter, shall be done only by ordinance. Each ordinance shall relate to a single subject, which shall be expressed in a title that contains a summary of its contents. Each ordinance shall be approved as to form and legality by the city attorney, and upon adoption shall be further identified by number." The Charter requires that all ordinances be read at least at two public City Council meetings and takes effect ten (10) days after adoption.

The City of Oak Ridge Sewer Use Ordinance (SUO) is included as Chapter 3 in Title 18 of the Code of Ordinances for the City of Oak Ridge. The SUO includes the following sections:

18-301	Title
18-302	Administration
18-303	Abbreviations
18-304	Definitions
18-305	Use of Public Sewers Required
18-306	Private Sewage Disposal
18-307	Building Sewers and Connections

18-308	Prohibitions and Limitations on Wastewater Discharge
18-309	Control of Prohibited Wastes
18-310	Wastewater Discharge Permits, Generally
18-311	Wastewater Discharge Permit Revocation
18-312	Reporting Requirements
18-313	Wastewater Sampling and Analysis
18-314	Compliance Monitoring
18-315	Confidential Information
18-316	Publication of Users in Significant Noncompliance
18-317	Enforcement Procedures
18-318	Industrial Waste Surcharge
18-319	Validity

1. Sewer Use Ordinance

The current revision of the SUO incorporated the State's definition of interference. Discharges that exceed the design capacity of the treatment works or the collection system are considered interference and are thus prohibited by any and all users of the sanitary sewer system. Slug control requirements including discharge evaluation to protect the POTW from excessive flow rates and /or concentrations that could be detrimental to the sewer conveyance or to the treatment facility. Significant Industrial Users are required to immediately notify the POTW of changes affecting the potential to slug the system. Overall, the pretreatment program's legal basis is strengthened by the inclusion of an updated "Authorized Representative of Industrial User" definition and IU certification statement requirements. This ordinance has the usual prohibitions on wastewater discharges to the collection system dealing with: animal or vegetable oils and grease, explosive mixtures, noxious materials, improperly shredded garbage, radioactive wastes, solids or viscous wastes, excessive discharge rate, toxic substances, unpolluted waters, discolored materials, corrosive wastes, thermal discharge, human hazard, excess foaming agents, and petroleum or mineral oil.

E. ENGINEERING ADMINISTRATION

The City Public Works Department, Engineering Division (Engineering Division) oversees the design and construction of various municipal infrastructure and utility improvements within the City. These include construction of new capital improvement projects initiated by the City along with portions of projects built by private developers but intended for dedication to the City for ownership and maintenance.

The Engineering Division provides three major services which include:

- Design of projects when the requirements for surveying and/or drawing services do not exceed 'in-house" capability.
- Review of preliminary and final subdivision plats and reviewing construction plans for commercial/industrial projects. These reviews are to ensure compliance with city storm water, water, sewer, roadway and erosions control regulations and good engineering practices.
- Conducts traffic counts and analyzes traffic circulation, traffic impact studies and improvements to traffic signals and streets.

In addition to plan review discussed above for compliance with city standards and specifications, the Senior Civil Engineer has designated authority to review and approve water and wastewater plans on behalf of the Tennessee Department of Environment and Conservation (TDEC). This review is limited to projects submitted for construction and designed by engineering consulting firms and built by developers for dedication to the City. Review authority is limited to construction of items for which the City has standard specifications and for projects that have not been designed by the City for construction by Public Works or a contractor hired by the department. This service is beneficial to TDEC reducing their work load, to the developer reducing the turnaround for plan review and also to the City because staff has a second opportunity to review plans prior to construction approval. The Engineering Division charges a fee for its review service that is the same as that charged by TDEC.

Responsibility for maintaining the City's water and sewer record drawings resides within the Engineering Division. The Division maintains a full time Computer Aided Drawing & Drafting (CADD) technician who also keeps storm drainage and subdivision drawings current.

The City's construction inspectors perform site inspections to verify that utilities and roadways proposed for dedication to the City are properly installed or constructed to city specifications.

Due to the combination of workload and limited number of employees, engineering projects often exceed the capability of "in-house" resources available in the Engineering Division. When this occurs, staff will frequently do conceptual design and then procure the services of a local engineering consulting firm to produce detailed drawings and specifications. Depending on the magnitude of the project the consultant's scope of services may be extended to include services during bidding, contract administrative services for the project and resident project inspection. Any time services of this type are provided, they are monitored by city personnel.

The adopted classification plan of the City, as of August 2011, includes the following filled positions within the Engineering Division.

- City Engineer
- Senior Civil Engineer
- Senior Civil Project Specialist
- Civil Project Specialist

All employees of the Engineering Division regularly attend classes or seminars and/or participate in continuing education that is relevant to their job performance or necessary to maintain licenses or certifications.

The preparation of the MOM document along with other requirements of the A.O. requires engineering services that exceed the "in-house" capability of the Engineering Division. During the October 11, 2010 Oak Ridge City Council meeting, Public Works Memorandum No.10-27 was presented granting a contact to Lamar Dunn & Associates, Inc. (LD&A) for professional engineering services for Wastewater Improvements.

On February 4, 2011 the Engineering Division issued a Request for Qualifications (RFQ) for engineering services from local consulting firms with expertise and experience in WCTS rehabilitation and pumping station replacement, to augment the services of LD&A. Five such firms have been selected. LD&A's role has been expanded to include program management. As Program Manager, LD&A will manage the activities of the other consultants.

1. System Mapping and As-Built Plans

The actual record drawings are on the Oak Ridge Administrative grid. This is a coordinate system that was assigned to Oak Ridge by the Army during the Manhattan project to disguise Oak Ridge's location. The Oak Ridge grid is rotated, clockwise or easterly, from true north. Overlaying the as-built drawing on a drawing based on state plane coordinates requires the use of a TORC (Transform Oak Ridge Coordinates) program.

The as-built drawings are stored in AutoCad format. Locating a specific asset of interest is done by choosing the appropriate as-built drawing grid from a composite or "Master Map" showing the entire citywide sewer system. Some of the information depicted on the as-built drawing sheets relative to the gravity collection system are sewer lines showing length, material type and slope, lateral locations (when available) manholes with top and invert elevations (when available), abandoned laterals and lines and lines that have been renewed during rehabilitation projects. In addition, pumping stations along with the associated sewer force main lines are shown. All infrastructure is located with respect to ground features such as roadway, structures and property lines.

There are a total of 398 individual as-built sheets. The city's mapping technician continuously updates the drawing when revisions are received. When large amounts of new changes are required, such as at the conclusion of a sanitary sewer rehabilitation project or construction of a new neighborhood, it may be necessary to contract for additional services to provide updating in a timely manner.

Section 9.00 of the Standard Construction Requirements and Details (SCRD) require all entities that construct infrastructure for dedication to the City for ownership shall submit as-built drawings. The requirement for these drawings in not limited to WCTS but also includes streets, storm drainage and water system components.

City work crews are provided full size as-built drawing books for office use and reduced size books for field use. Full size books are available for residents at the Community Development Department located in the municipal building. The City strives to update its AutoCAD drawings on a timely basis when revisions are received; however replacing every page in every drawing book each time a revision is made would require a unreasonable number of man hours and pages of paper. The city's mapping technician updates these books on an annual basis.

Section IV of the A.O. entitled "Order" Subsection D ii, Engineering Programs, states in subsection a, that within twelve (12) months of the effective date of the Order the City shall develop and submit for EPA's review, comment and approval the described Engineering Programs. The first of those programs, described in subsection b, is the Sewer Mapping Program. The description states" it "shall include, but not be limited to, a description of the City's mapping procedures (CCTV requirements, etc.): requirements for recording changes and

updates to the sewer maps; utility specific map inclusions and labeling requirements to include manholes, pump stations, force mains, air release valves and other applicable appurtenances that may affect the performance of the WCTS or WWTP' and applicable annual review procedures". The A.O. does not specifically require a GIS mapping system and with the exception of an annual review procedure the City's paper-mapping system actually meets the stated requirements.

For several years the City has had access to the Anderson County Geographic Information System (GIS). The actual use of it was limited to the city's mapping technician due to the complexity of using it and also due to the requirement for using the TORC program to use the GIS for actual information purposes or to produce a drawing.

Staff believes the benefit gained from a GIS mapping system exceeds the cost. A GIS, when combined with an Information Management System (IMS), will provide access to more information quicker both in the office and in the field. In 2010 LD&A was tasked with developing and making operational the GIS. Initial development of the GIS will be limited to the sanitary sewer collection system however once functioning additional data layers will be added. Once complete the GIS information will available to any department, on a read only basis, that can benefit from its use.

When the GIS is complete and linked to the IMS personnel will be able to locate via computer screen any asset of interest and by clicking on that item, whether it be a sewer main or a pump station, determine the past history of the item and the future maintenance schedule. In addition section IV, B, I of the A.O. requires the City to submit, within 6 months a Capacity Assessment Plan and subsection II requires a Capacity Assessment Report. The finding of that study will be linked to each individual asset in the GIS so that personnel can click on an item and determine its capacity.

2. Design and Capacity Analysis

The City did not have formal construction standards prior to the year 2000. The SCRD states that all sanitary sewer construction shall be in accordance with TDEC regulations unless the City specifications differ and are more stringent. Section 2.2.2.1 of the TDEC Design Criteria for Sewage Works says that sewer mains should be able to contain 250%, when running at full capacity, of the average design flow. City staff is in the process of revising the now 10-year-old SCRD.

Volume II, Section 7 of the City of Oak Ridge Water and Wastewater Master Plan (Master Plan) prepared by LD&A (May 1993) contains capacity calculations for each of the City's 81 mini-systems. It also contains area-loading projections for each mini-system based on a total of the flows from dwelling units in the mini-system and flow from commercial customers. These projections are based on Appendix 2 of the TDEC Design Criteria for Sewage Works and use flows which are assumed to cover normal I/I and are then multiplied by a peaking factor to allow for periods of unusually high flows. This section also contains projected future flows from areas where master plans for developments have been submitted or it is considered probable the area may be developed.

Analysis to determine if adequate system capacity exists to accommodate future expansion is to be determined by the capacity study as outlined in the A.O.

3. Construction

The City Standard Construction Requirements and Details (SCRD) for construction of sanitary sewer infrastructure contains, but is not limited to, requirements for location, sizing, slope, cover, bedding, materials and installation methods. In addition, pump station and force main construction is included. Section 2.07 of the SCRD prohibits covering work prior to inspection. Requirements for testing and inspection are included in Section 7.06. The SCRD is made available to any engineer or contractor requesting the document. The SCRD is also available on-line on the Public Works department page or directly at: http://www.cortn.org/PW-html/SCRDwithTableFrame.htm.

Plans submitted to the City for construction of infrastructure for dedication to the City must be stamped by a P.E. licensed in the state of Tennessee as stated in Section 2.01 of the SCRD.

The Public Works Department employs two full time Civil Project Specialists who are responsible for construction inspection. Projects are assigned based on geographic location and/or the number of projects each individual has assigned to him. Both of the Civil Projects Specialists have received formal training and/or attended classes in public works inspection.

Projects will be assigned to an inspector immediately after construction approval so that the inspector may review plans and familiarize himself with the project, participate in any pre-construction meetings, receive material submittals

after review by engineering but prior to the material arriving on-site and inspect any erosion control required prior to commencement of actual construction. The inspector will review any material delivered to the site to ensure it complies with the specifications and approved material submittals.

During construction the inspector will monitor all phases of the installation of materials to ensure compliance with plans and specifications. The inspector will keep a daily log of activities. On projects where quantities of material installed must be certified, the inspector will keep daily totals normally by beginning and ending station numbers. The inspector will mark on his construction plans any deviation from the original plans so that accurate record drawings can be prepared.

Section 7.06 of the SCRD specifies low-pressure air testing "shall be performed in accordance with ASTM C 828" after construction of sanitary sewer main and lateral connection has been completed. The testing is performed at a pressure of four psi and no less than three and one half psi must be maintained for a period of no less than two minutes. Standard Detail 7.09 of the SCRD depicts the Standard Air Test Table. All new or rehabilitated manholes shall be vacuum tested. Testing procedures will in accordance with Appendix 2C of the TDEC Design Criteria expect that testing will take place after completion of final grade work.

The Public Works Department staff frequently visits project sites to ensure adequate progress on projects. Additional inspection may be necessary or desirable when "specialty" items are involved. An example of this would be electric control panels for pump stations will be inspected by the City WWTP Maintenance Supervisor, electric transformers and disconnects panels will be inspected by representatives from the City Electric Department and the City Electrical Inspector and projects that are paid for by funding using state or federal loans or grants will be inspected by representatives from the funding agency.

After completion of the City's GIS the hydraulic model will be linked to it such that the capacity at the outfall from each mini-system can be shown. This will provide the Public Works Department Engineering personnel reviewing proposed projects instant information on whether needed wastewater treatment capacity exists.

F. WATER QUALITY MONITORING

The receiving stream for the City of Oak Ridge wastewater treatment plant (WWTP) effluent is East Fork Poplar Creek (EFPC), which begins on site at the Y-12 National Nuclear Security Administration (NNSA) Complex as part of their storm water collection system. According to Part VI iii D of the USDOE Y-12 NPDES permit TN0002968 there are 60 outfalls in the central drain line before it ever surfaces and then flows 6,300 feet prior to exiting federal property. The creek is posted for a Fish Consumption Advisory to alert the public that fish should not be eaten and water contact should be avoided. EFPC is listed as needing additional controls in the State of Tennessee 2010 303(d) list due to the DOE Oak Ridge facilities. At present Y-12 is required to augment the natural flow of the creek where it exits federal property by pumping raw water from the Clinch River to maintain a minimum flow.

EFPC flows for a distance of 15 miles where it discharges into Poplar Creek near the East TN Technology Park. The WWTP effluent is located at mile 8.3. The City operates the WWTP under NPDES permit TN0024155.

Monitoring data is recorded and submitted monthly to the TDEC Division of Water Pollution Control, as required by the permit.

In addition to the sampling required for the NPDES permit, the City also samples EFPC above and below the WWTP discharge on a weekly basis. The upstream sample is taken approximately 200 yards from the discharge on site at the WWTP. The downstream sample is taken at the Gum Hollow Road Bridge at approximately mile 9.1 of EFPC. These samples are tested for BOD, bacteria, pH, dissolved oxygen, temperature, suspended solids and settable solids. These samples are to monitor any impact the WWTP discharge may have on the receiving stream and are reported to TDEC. Sampling is done by a trained person in sampling procedures.

Monitoring for Nitrogen and Phosphorous is done on a quarterly basis, cyanide on a semiannual basis and metals on an annual basis. Testing of these samples is done under a contract with Environmental Science Corporation (ECS) in Mt. Juliet, Tennessee.

The City operates a separate water quality monitoring program for significant industrial users (SIU) located in Oak Ridge where pre-treatment is required prior to discharge to the WCTS.

G. INFORMATION MANAGEMENT SYSTEM

Section IV, Item D of the EPA Administrative Order (Order), dated September 28, 2010, requires the City of Oak Ridge to include as a component of this Management, Operations and Maintenance document (MOM) an Information Management Systems (IMS) Program.

In general, an IMS involves the collection, identification, analysis, storage, presentation and distribution of information. The Public Works Department began the process of learning about IMS prior to receiving the EPA Order, as a possible method to increase efficiencies and track assets, such as pumps and motors installed at the pump stations. Currently, the Public Works Department utilizes several software systems for these functions, including but not limited to JDEdwards, Access, Excel and AS400 programs created prior to 1985. Gathering needed information from these various sources is very time consuming and inefficient to compile the associated data.

Once the Order was received, the Public Works Department led the City staff effort in researching possible IMS providers. A work team was developed including staff from the City departments of Computer Services, Public Works and Finance along with the City's consultant Lamar Dunn & Associates (LD&A). The work team reviewed several IMS providers via the Internet and decided to invite three providers for onsite presentations. The work team developed a list of requirements for the IMS, such as ability to incorporate the current JDEdwards work orders, GIS and utility customer information. A Request for Proposal was issued to the three companies that had provided an onsite presentation.

The selection process included the work team reviewing the three proposals received, without the pricing information, which allowed for a true technical review of the proposals and allowed the work team to focus on the requirements of the EPA Order and how the IMS complied with them. The work team discussed each proposal with all being most supportive of the one received from Infor Global Solutions (Michigan), Inc. (Infor). The work team agreed that the Infor IMS allowed for the most flexibility based on the following:

- non-module based system, which allows for the flexibility to include work activities without purchasing a module for each activity
- allows for an unlimited number of users without charging a licensing fee per user
- includes energy consumption tracking and asset sustainability management

The work team felt strongly that the Infor IMS will allow for ownership of the system, instead of it being implemented for the staff by the vendor and then leaving the City with it. This philosophy was demonstrated in the Infor RFP by the following statement.

> *"Throughout the implementation there is a gradual transfer of knowledge and ownership from Infor consultants to your project team until the members of the project team become the drivers and champions of the new system and business processes."*

The Infor philosophy was apparent in a three hour meeting on March 29, 2011 with the Infor representatives and City staff from several departments. Several subjects were discussed thoroughly with enough information exchange for the Infor representatives to reevaluate the original pricing and provide revised pricing for implementation and training. The revised pricing includes the integration of GIS (Geographic Information System), sewer CCTV (Closed Circuit Television), JDEdwards and SCADA (Supervisory Control and Data Acquisition), thus including integration of all the needed systems to the IMS.

The Infor Enterprise Asset Management (EAM) software allows for customization of data fields by the user. To simplify the training of City field employees, it was imperative that the chosen IMS would allow for the currently utilized five (5) digit work order numbers to be incorporated into the IMS. These work orders will be "data dumped" from JDEdwards into the Infor system and become known as "task numbers".

To comply with the EPA Order, City staff plans for pump station maintenance to be the first work group for implementation of the IMS, by December 28, 2011. It is believed that this work group will provide City staff with the appropriate learning curve, prior to implementing the IMS to a larger, more diverse work group. Once the pump station maintenance work group is implemented, City staff plans to continue to move work groups to the IMS, with each MOM program developed integrated to the IMS.

Individual work orders will be assigned by the Infor IMS that will include such data as:

- date
- origin of complaint
- time assigned
- employee assigned
- location
- description of work needed
- task number (5 digit former "work order")

The City currently tracks this information utilizing two systems, Access and JDEdwards.

The work order will be sent to the appropriate supervisor (electronically) and initially will be sent to the appropriate Foreman (paper copy). The supervisor will review the requested work and advise the Foreman accordingly. After the Foreman and crew perform work, the time, material and equipment will be input into the IMS and will include such data as:

- date
- time work began
- time work ends
- employee numbers of workers
- equipment numbers used
- warehouse inventory stock numbers and quantity used
- description of work completed

The City currently tracks this information in JDEdwards, AS400 payroll and Access systems.

In conclusion, the Infor IMS will assist the City with streamlining data and the provision of the following:

- detailed work activities conducted
- work time and cost for specific tasks
- data for supervisors and managers to adequately evaluate operations, maintenance, customer service and system rehabilitation activities
- guidelines to track scheduled maintenance activities and to enhance maintenance performance
- complaint tracking system

As the IMS is implemented, the system will collect the data into one system, allowing for the data to:

- be easily reviewed by location, work order, work task or work crew
- include time, material, equipment information and cost
- preserve historical information on each identified asset, such as individual manholes, pumps, motors
- replace numerous paper forms

1. Performance Indicators

The establishment of performance indicators is essential to the operation and maintenance of the WCTS. The Infor IMS will allow for the development of user defined performance indicators based on but not limited to asset, time and/or collection data.

The City plans to establish performance indicators by identified asset as listed below.

Wastewater Treatment

- Effluent BOD
- Effluent TSS
- Effluent Ammonia
- Effluent Flow
- Influent Flow

Collection System

- Flow/Capita (total)
- East Plant Flow
- Emory Valley Flow
- Y-12 Flow
- SSO Dry Weather (date, location)
- SSO I/I (date, location)

Sewer Pump Stations

- Each Station
  - Power Consumption Kw/hr*
  - Power Cost
  - Parts and Supplies Cost
  - Labor Cost
  - Number of Alarms*
  - Run Time*
  - Draw Down Test (each pump)

Employees with access to the Infor IMS will have a customized "dashboard" for their use. This allows for the employee to have a snapshot picture of projects and the status of those projects. Indicators transmitted from the SCADA system (*) to the Infor IMS will alert employees of pending work orders.

2. Overflow Tracking

Currently, overflows are tracked using an "Access" database. When the IMS is fully implemented, all overflow tracking will be done with the IMS. The GIS continually updates the history of overflow locations.

H. COMPLAINTS

The implementation of the Infor IMS will enhance the current call center operation by providing additional information and combining information from various software programs into a centralized system.

It is planned that information from the utility customer accounts to be electronically "data dumped" into the Infor IMS. Once this is completed, when a complaint is phoned or emailed into the call center, the customer information will be readily available. During the Design and Build phase of the Infor IMS implementation, special attention will be given to the design of the complaint tracking screen, so that a natural flow of information can occur between the call center and the complainant and to provide ease in inputting as much information from the complaint as quickly and efficiently as possible. It is planned for social media to be utilized as a tool for customer service and complaint tracking.

Reports will be available based on type of complaint, customer initiating the complaint, location of complaint and any field included in the work order. Employees with access to the Infor IMS will have a customized "dashboard" for their use. This allows for the employee to have a snapshot picture of projects and the status of those projects, pertaining to their responsibilities. The work order system data will be stored and maintained by the Infor IMS.

1. Public Relations

The City of Oak Ridge will utilize the tools available from the Infor IMS to provide information to the public. The utility customer information will eventually be included in the database of the Infor IMS that will include basic information such as name, address, phone number and account number. The Public Works Department personnel will expand this data by requesting and then inputting into the Infor IMS email addresses. Once complete, email blast notifications can be generated to residents for scheduled and/or emergency sewer work near their home.

The City of Oak Ridge utilizes widely accepted social media to notify residents of news and updates of events. The City of Oak Ridge, Public Works Department maintains pages within the city's website which includes information and reports concerning the EPA Administrative Order.

2. Spare Parts Inventory Management

The Infor IMS will be able to store and track parts and supplies utilized from satellite warehouses, such as the one located at Turtle Park Wastewater Treatment Plant as well as the main warehouse for the City of Oak Ridge located at the Central Services Complex.

Data regarding spare parts will be uploaded to the Infor IMS as part of the initial implementation and the ongoing implementation of specific work groups, as required. Once the data of the spare parts is uploaded, the Infor IMS will indicate when replacement parts should be ordered (reorder point) and this information will be available to employees with the appropriate access level.

SECTION III

OPERATIONS

A. PRETREATMENT PROGRAM:

In 1984, the City developed a comprehensive pretreatment program for the City of Oak Ridge following the outline presented in the Tennessee Division of Water Quality Control's Procedures Manual for Preparing a Public Owned Treatment Works (POTW) Pretreatment Submission. Full approval was given to the pretreatment program in January 1985, after the accomplishment of all thirteen activities outlined in the State preparation manual. The City began identifying, permitting, inspecting, and monitoring industrial users (IU) in the late 1980s. These IUs were located primarily in industrial-zoned areas such as Warehouse Road; Fordham, Flint and Franklin Roads; Midway Lane and Mitchell Road; Union Valley Road; and Scarboro Road. All commercial and industrial facilities contributing to the WCTS have been surveyed on a five year cycle since 1990 to identify them as actual or potential dischargers that need inclusion into the pretreatment program.

The City implements and enforces the Industrial Pretreatment Program in accordance with Section 403(b)(8) of the Clean Water Act, the Federal Pretreatment Regulations 40 CFR 403, and the Tennessee Water Quality Control Act Part 63-3-123 through 63-3-128. The legal basis for the pretreatment program is derived from the Sewer Use Ordinance (SUO), originally adopted in March 1991. Due to the Federal Pretreatment Streamlining Rule of 2005, the SUO was extensively revised and adopted in March 2009 after a review and approval by TDEC. At this same time, the Enforcement Response Guide was updated and approved.

The pretreatment program has continued since inception to identify, permit, and monitor all significant industrial users (SIU) in the City. Twelve industries are currently permitted: three are categorical industries and four are significant but non-categorical. The largest SIU is the Y-12 National Security Complex which contributes on an average about 600,000 gallons per day to the Oak Ridge sewer system. The next largest wastewater contributor is Ametek at about 5,000 gpd.

1. NPDES Permit Requirements

In the State-issued NPDES permit, the City of Oak Ridge has been delegated the primary responsibility as the "control authority" for enforcing the 40 CFR 403 General Pretreatment Regulations. The NPDES permit specifically enumerates the following control authority responsibilities:

- Carry out inspection, surveillance, and monitoring procedures which will determine IU compliance with pretreatment standards;
- Development of compliance schedules for IU needing installation of control technologies to meet applicable pretreatment standards;
- Require all IU to comply with all applicable monitoring and reporting requirements as outlined in the SUO and the IU permit;
- Maintain and update records characterizing the IU discharges;
- Obtain appropriate remedies for all IU noncompliance with any pretreatment requirement;
- Maintain adequate revenue structure for continued pretreatment program operation;
- Update the Industrial Waste Survey at least once every five years.

Other conditions of the NPDES permit deal with notifications, reporting including the Semi-Annual Report (SAR) and monitoring of the influent and effluent at the treatment works by the control authority to assure that the protection criteria and the pass-through limits are met. Also, the "prohibited discharges" requirement in 40 CFR 403.5 (also included in the Sewer Use Ordinance) is an enforcement requirement under the NPDES permit.

2. Inspections and Monitoring

All significant Industrial users are inspected with a scheduled onsite visit at least twice annually. Additional unannounced inspections will be made should there arise any of a number of problems including permit monitoring violations, upsets with the industries' pretreatment processes, break-down in the IU's equipment, long disruptions of utilities, and complaints by the public.

Inspections usually consist of a walk-through of the production areas, of chemical storage areas, of effluent treatment equipment, of sample monitoring locations, and of other locations where discharges to the sanitary sewer can be made. During the walk-through, actual or potential problems are looked for that

could result in slug discharges, in chemical spills that could end up in the sewer, in effluent treatment equipment malfunctioning, in inappropriate chemicals use, and in other IU discharge permit violations.

Monitoring of the effluent discharges (and in some cases the in-plant wastewater streams) of significant industrial users is done on both a scheduled and on an unscheduled basis. The City of Oak Ridge contracts most of this effluent sampling and analysis to a private laboratory. The scheduled monitoring usually coincides with the semi-annual or annual monitoring of the Oak Ridge Wastewater Treatment Plant in order to better identify the source of any high incoming contaminant levels. Tests are made on a semi basis for the following 10 metals: Cadmium, Total Chromium, Chromium III, Chromium VI, Mercury, Copper, Nickel, Lead, Zinc and Silver. Also, tests are performed on an annual basis for the previous ten metals plus an additional five which are: Antimony, Arsenic, Beryllium, Selenium and Thallium. It is believed that in the last decade that no Industrial User discharge has resulted in a NPDES permit violation by the POTW.

3. Flow Monitoring

Permitted Industrial Users are required to monitor their effluent flows to the sanitary sewer and are given daily and occasionally weekly limits in their IU discharge permits. Three of the Significant IU in Oak Ridge can categorize their flow monitoring as continuous, utilizing a flume or weir, a flow sensor, and a recorder. Most of the SIUs in Oak Ridge conduct batch treatment and batch discharges; as such, they conduct "Event" monitoring with equipment that is automatically activated when the flow is detected. The two SIUs with the largest flow utilize continuous monitoring equipment. Flow data for each SIU is reported on their quarterly report to the City of Oak Ridge.

The Y-12 Complex has reported several permit flow limit exceedances since 2005. The City is working with Y-12 in an effort to reduce the amount of extraneous water being discharged into the City WCTS however the City does not have any effective means of enforcement on a Federal facility.

No other significant industrial user (or non-significant industrial user) in Oak Ridge is suspected of sending extraneous waters to the Oak Ridge sewer system. However, in the normal activities of the pretreatment program, flow problems are scrutinized during inspections of permitted industries and during review of the quarterly reports that are issued to the Environmental and

Regulatory Compliance Coordinator of the City. If flow problems become evident, the City will attempt to see that the industry makes reasonable corrective measures to eliminate the flow exceedances or irregularities.

B. CORROSION AND ODOR CONTROL PROGRAM

Section 7.08F of the Standard Construction Requirements and Details (SCRD) requires consideration be given to the presence of hydrogen sulfide, other corrosive gases and grease and oil when specifying material for pumping stations. Station components must be non-corroding aluminum, stainless steel or fiberglass. Only the pump bodies may be iron and they must be epoxy coated.

Section 7.08G of the SCRD requires all concrete wet well components be coated with a specified coating and sealing material.

Section 7.03C 6 of the SCRD requires that all receiving manholes receive an interior coating of Koppers "Super Service Black" or approved equal to prevent corrosion in the concrete. This item is no longer available and is being replaced with Sherman-Williams Hi-Mil Sher-Tar Epoxy coating which can be field applied or a bituminous coating installed by the manhole manufacturer prior to shipment.

At present the City has installed drum scrubbers on four pump stations that are in close proximity to residences and at locations where odor complaints have been received. This solution has been successful and the City is now requiring the installation of Purafil ESD Drum Scrubber 100 on all new pump stations that are or may be near structures.

C. FATS, OILS AND GREASE CONTROL PROGRAM

Any sewer collection infrastructure used to transport waste between a structure and the tap located on the sewer main is considered by the City to be privately-owned; therefore, is defined as plumbing as opposed to part of the Wastewater Collection and Transportation System (WCTS). Generally this means the sewer lateral; however, in the case of food service establishments (FSE) it also includes the grease collection trap. Maintenance of publicly-owned WCTS infrastructure is the responsibility of Public Works Department; however, property owners are responsible for plumbing maintenance. Inspection and enforcement of applicable codes is the responsibility of the Community Development Department, Code Enforcement Division.

Code Enforcement Division has contracted with Monitoring & Management Services (MMS), LLC. to provide fats, oils and grease (FOG) inspection and monitoring services. MMS is providing the City with three primary types of services.

The first service is a review of the current City Sewer Use Ordinance relative to FSE's discharge of FOG. MMS will suggest revisions to the City ordinance as necessary to provide the City legal authority for its FOG program. MMS will also provide the City with a FOG Management Policy and Food Service Establishment Enforcement Response Guide that provides details of grease control equipment sizing, installation and maintenance requirements and enforcement action to be taken when deficiencies are found.

Also MMS will provide the City with the following materials:

- FSE FOG Management Policy for Oak Ridge, TN
- FSE Enforcement Response Guide for Oak Ridge, TN
- FSE Grease Interceptor Maintenance Handout
- FSE Grease Trap Maintenance Handout
- New FSE's and upgrades to existing FSE's requirements brochure
- Noncompliance Notification: 3 part
- FSE Inspection Form: 2 part
- FSE Stormwater Pollution Prevention hand-out
- Residential FOG notification mail-out
- FSE Grease Interceptor & Trap Maintenance Record form
- Grease Interceptor Certification form
- Grease Trap Certification form

The second primary service MMS will provide is FSE FOG Inspections and Data tracking. MMS will provide annual inspection services to approximately 90 FSE's located in the City.

The inspection will include:

- Review of grease control equipment
- Documentation of type of equipment
- Documentation of any maintenance activities or records available
- Provide and distribute educational materials
- Provide grease trap certification form and cleaning logs to FSE management
- Digital photos for documentation

MMS will provide letters of noncompliance to any FSE found to be in violation of the City Sewer Use Ordinance. The City will have the option to do follow-ups at locations where violations have been discovered or having MMS do so.

MMS anticipates a 60-day period to complete inspections. MMS will provide the City with the results of all inspections in the MMS Sewer Maintenance Overflow FOG Tracking (SOFT) database which will become property of the City.

The third service MMS will provide to the City is Grease Control Equipment Certification for Grease Waste Haulers & Plumbers and compile an Approved Grease Waste Hauler List. This will actually be the first step in the City's effort to establish an active and beneficial FOG program. Once established, the approved Grease Waste Hauler List will be provided to all FSE's during the compliance inspection.

While the City is beginning an aggressive FOG prevention program, grease can be deposited into the City WCTS either from FSE's where grease collections systems have failed or from private non-regulated locations. The most likely source for grease from non-regulated locations is high population density such as apartment complexes. When FOG deposits are detected the City Public Works maintenance personnel are dispatched to clean the line(s). Most frequently a Warthog pressure nozzle is used as an attachment to the sewer line cleaning truck. A degreasing chemical such as ZEP may also be introduced into the line segment to aid in grease removal.

When FOG buildups are observed during visual pump station inspections by Treatment Plant Maintenance personnel, Public Works maintenance personnel will be requested to completely clean-out the pump station's receiving manhole and wetwell. This procedure is done using a grease nozzle on the City's Vactor truck cleaning hose. The specific nozzle used is RDS Type A. This is a rotational nozzle that cleans the inside of a vessel with spinning jets. The grease nozzle will be used to break up the grease layer. Once loose, the grease layer along with any other debris and any wastewater in the wetwell will be removed using the vacuum capability of the Vactor truck. After cleaning the wetwell, ZEP is added to degrease the wetwell walls. ZEP raises the wastewater temperature dissolving FOGS. The retention time of ZEP is normally three pumping cycles.

D. SERVICE CONNECTION / DISCONNECTION PROGRAM

Section 18-307 titled Building Sewers and Connections, of the Sewer Use Ordinance of the City of Oak Ridge provides guidance for service connections. Section 7 of the Public Works Department Standard Construction Requirements and Details provides guidance for the construction of sewer mains and connections.

The City of Oak Ridge Utility Business Office (UBO), a division of the Electric Department, administers the application for individual service connections for all City provided utilities, which includes electric, water and sewer. The USC also administers the disconnection process of these utilities.

E. PRIVATE HAULER PROGRAM

The City currently does not have a private hauler program. Section 18-305 of the Sewer Use Ordinance (SUO) provides guidance for the disposal of private waste by truck and holding tanks. This section of the SUO would set the guidelines for a private hauler program if the City chose to establish a program. Currently, there are no plans to establish a private hauler program by the City of Oak Ridge.

F. LINE LOCATION PROGRAM

The City of Oak Ridge (City) participates in the Tennessee One Call system as a utility owner and as an operator of excavation equipment. Section §65-31-101 of Tennessee Code Annotated (TCA) is titled "Underground Utility Damage Prevention Act," and requires anyone who engages in or is responsible for the planning or performance of any type of excavation to provide at least three days advance notice to underground facility owners who may be affected by the excavation. Exceptions to the three day notice are stated for emergencies and pending emergencies.

City personnel are required to place a request for a Tennessee One Call utility locate at least 72 hours before any planned excavation. Utility locate requests may be placed by calling 811 or 1-800-351-1111 and/or on-line by creating an "E-Ticket" through the Tennessee One Call system website www.tnonecall.org.

The three types of calls handled by the Tennessee One Call are:

- Excavation or demolition
- Emergency
- Impending Emergency

When a line location request is received for pending excavation or demolition, Tennessee One Call will notify the member utility (s) of the proposed work. The utility's locator will then have 72 hours, excluding holidays and weekends, to locate and mark the requested underground lines. The following area utility companies are notified when a Tennessee One Call is placed within the City limits of Oak Ridge:

- ATT/Knoxville
- ATT/Chattanooga
- Oak Ridge Utility District
- Comcast (Oak Ridge)
- Oak Ridge Electric
- Oak Ridge Water and Sewer
- Verizon Federal Network

An emergency line locate ticket is defined as a request where excavation must begin prior to the standard 72 hour waiting period. The excavation must meet certain criteria such as being necessary to restore utility service or to protect health and property. Utility companies are required to locate their lines within two hours after receiving an emergency ticket.

An impending emergency line locate ticket is defined as a request where excavation must begin prior to the standard 72 hour waiting period, but not within the two hours required by an emergency line locate. An impending emergency line locate request will normally state an anticipated time when a work crew will be on-site or when work will begin.

A line locate ticket is considered valid for a period of 15 calendar days. If work is still taking place after that period that may require excavation, a new line locate request must be placed or the existing line locate ticket must be renewed.

The City has two full time employees dedicated responding to tasks produced by the Tennessee One Call system, with one employed by the Electric Department and one by the Public Works Department. The Public Works Department line locator is assigned to the water maintenance crew and marks both water and the Wastewater Collection and Transportation System (WCTS) lines.

The Public Works Department line locator receives his/her line locate tickets via the Tennessee One Call on-line system. The line locate ticket is transmitted to the Public Works Administrative Assistant and also to a dedicated printer in the Public Works Department foreman's office. At present the line locator's vehicle is equipped with complete map books for both water infrastructure and the WCTS along with equipment for locating utility lines and supplies to mark the lines.

The line locator is required to complete any line locate ticket within the prescribed amount of time allowed for each type requested. If an emergency line locate ticket is requested during business hours, the line locater will be contacted via radio or by phone and will respond within the allotted time. When the regular full-time person assigned as the line locator is not available, a substitute member of the water crew will be assigned to perform this work.

Communications to the Public Works Department after hours and on weekends is forwarded to the Police dispatch center. As discussed in Section II G 3, the Public Works Department maintains a "call-out list." The list is published monthly and is a rotating schedule of personnel available during non-business hours. The "on-call crew" may be made up of persons from sewer, water, asphalt, concrete or general maintenance crews, but that have been cross trained as described in Section II G 2. When an emergency line locate ticket is received at the dispatch center, the on-call crew foreman is contacted and must respond within the allotted time.

At locations where work will be performed in the street, the line locator is required to use appropriate safety precautions. Due to the short duration of time on-site, it most often will take longer to establish and remove temporary traffic control than to perform the work. In these instances Section 6 G.02 of the Manual on Uniform Traffic Control recommends and the line locator is required to use procedures for mobile work zone operations such as strobe light equipped vehicles and high visibility clothing.

When the mobile GIS/IMS application is available, line locate ticket requests may be transmitted to the line locator's vehicle wirelessly. The line locator will utilize GIS to determine the exact location of requested work. The GIS will replace the current map books and the line locator will be able to complete his/her work order electronically via the mobile IMS application.

G. PUMP STATION OPERATION PROGRAM

In order to properly operate any asset, the characteristics of the asset must be known. Therefore, immediately following the A.O., a review of all pumping facilities were reviewed by visiting, reviewing file information, and securing missing pump curves. The following is a description of the stations:

1. Pump Station Description

Castlewood Pump Station

The Castlewood Pump Station is located behind a condominium building in the Castlewood Condominium complex. The condominium complex is accessed from Arcadia Lane, while the pump station is accessed from the Oak Ridge Turnpike through a City owned ball field. The pumps are housed in a fiberglass enclosure mounted on a concrete pad. The pad is poured around a 5' diameter precast concrete wet well. The discharge check valves, plug valves, air release valve and other mechanical appurtenances are located inside the enclosure. The electrical and instrumentation components are housed inside a panel which is mounted to a metal frame at one end of the enclosure.

The station presently contains 2 suction lift pumps, which are mounted inside the enclosure directly over the wet well. The pumps take suction through vertical piping extending into the wet well. The existing pumps are Hydromatic pumps driven by 5 horsepower, 1155 RPM, General Electric motors. Each pump is rated at 200 GPM. No information concerning the rated pump head is available.

The station pumps through a 6" diameter PVC force main which extends 150 feet along the rear boundary of the condominium complex and connects to a 6" cast iron force main that then extends 350 feet to the discharge manhole (on easement) north of the Oak Ridge Turnpike. The 6" PVC force main was apparently installed as a part of a relocation project which included abandoning a gravity sewer and portion of the cast iron force main to facilitate construction of additional condominium units. The discharge is at approximate elevation 831 feet MSL.

The pump station site is accessed by a paved access road extending from the Oak Ridge Turnpike. The access road extends from the Turnpike across City owned property (portions of which are utilized as athletic fields) and crosses a stream to the site. The site is not fenced.

The pump station power supply is 120/240V, 3-phase from a pad mounted transformer located adjacent to the pump station. Power enters the station underground from the transformer connecting directly to the control panel. There is no electrical disconnect. Each pump has a 20A breaker to shut power off to the pump.

Control of the pumps is initiated through 4 floats, mounted in the wet well, which initiate the on/off sequence for the pumps through rising and falling water levels in the wet well. No redundant level control system is available at the station. The station has no elapsed time meters to monitor pump run times. The station has an alarm light which flashes to notify of alarm conditions but, has no telemetry to transmit alarm or status conditions to the WWTP.

The 5' diameter wet well has a maximum of 5.25 feet available for storage which equates to 771 gallons. In order to provide a 10 minute cycle time (6 starts per hour), 350 gallons is required at peak dry weather flow. The wet well therefore has excess capacity available.

Mechanically, the station is rated "Replace" and it is also rated "Replace" from an electrical standpoint. The specifications and design for the replacement of this station were completed in June 2011. The replacement of this station requires an easement, which is currently being negotiated. The replacement project for this station should be scheduled for bid by September 2011, with construction complete by June 2012.

Centennial Bluff Pump Station

The Centennial Bluff Pump Station is located at 300A Centennial Bluff Boulevard. At the time of the site visit, the station had not been accepted by the City and little information was available with respect to the pump design conditions, force main sizing and routing and, other information.

Mechanically, the station is rated "Fair" and it is rated "Good" from an electrical standpoint. Items that are identified as potential maintenance concerns are as follows:

- The station has no remote telemetry to transmit alarm or other station conditions.
- The valve vault was flooded.

East Plant Pump Station

The East Plant Pump Station is located at 151 Cairo Road at the dead-end of the road. The station was installed to eliminate a WWTP that was originally constructed by the U.S.D.O.E. The station includes a cast in place concrete structure that encompasses the wet well, dry well, influent channel with solids grinder, and pad for an emergency generator. The electrical and instrumentation components are housed inside a concrete block building.

The station presently contains 2 vertical mounted centrifugal pumps with water seals, which take suction from the cast-in-place concrete wet well. The pump motors are mounted on the main floor of the station which also houses the electrical and instrumentation control components. The pumps are driven through extended vertical shafts which extend from the motors on the operation floor down to the pumps. The existing pumps are Fairbanks Morse driven by 200 horsepower, 1,785 RPM, Reliance motors. Each pump is rated at 2,800 GPM at 195 FT total dynamic head. A connection for a future pump is available in the pump room.

The station pumps through a 16" diameter ductile iron force main which extends 10,560 feet and connects to an 18" pipe which extends an additional 3,700 feet to the discharge manhole near the intersection of Emory Valley and Fordham Roads. The 18" force main also carries flow from the Emory Valley Pump Station. The discharge is at approximate elevation 916 feet MSL. A connection to the force main for a bypass pump hose is located just outside the station building.

The pump station site includes a gravel parking/storage area with a paved access off of Cairo Road. The site is also utilized for pole storage by the Electric Department.

The pump station power supply is 460V, 3-phase from pad mounted transformers on-site. No information for the transformers was available as they are not labeled. Power enters the station underground to an 800A main circuit breaker mounted in a MCC. Emergency power is supplied by a Cummins diesel generator which is rated at 260 kW.

Control of the pumps is initiated through a submersible pressure transducer, mounted in the wet well, which transmits the wet well water level to a controller which initiates the on/off sequence for the pumps. No redundant level control system is available at the station. The station is monitored by telemetry which

transmits alarms to the WWTP. Flow from the station is measured through a magnetic flow meter, which is mounted in the discharge pipe inside the building. The station does not have elapsed time meters to record pump run times.

Prior to entering the wet well, flow travels through a hydraulic grinder unit which grinds large solids to smaller particles to prevent damage to the pumps. A bar screen, which is utilized to capture large solids when the solids grinder is out of service, is mounted in a bypass channel.

Mechanically, the station is rated "Good" and it is also rated "Good" from an electrical standpoint. Items that are identified as potential maintenance concerns are as follows:

- The extended shafts from the motors to the pumps are a source of maintenance problems.
- No redundant system for pump control is available.
- Corrosion is evident on metal components inside the pump room (lower level of structure).
- Corrosion is evident on metal components near the influent flow channel. The corrosion is severe in places, including sections of the metal grating over the channel.
- Pump removal is difficult due to the lack of a bridge crane or trolley in the pump room.
- Emergency generator and automatic transfer are very old and parts are obsolete. Units do not provide much reliability.

The station presently receives flow from approximately 3,200 single-family residential and 65 commercial customers which are served by the collection lines in the basin draining to the station, as well as from the following pump stations:

- Emory Heights
- Fairbanks
- Warehouse Road
- Castlewood
- Eastburn
- Palisades #4
- Gregory's
- Rivers Way

- Animal Shelter

Emory Heights Pump Station

The Emory Heights Pump Station is located off of Culver Road in Emory Heights Subdivision. The station is directly behind the home at 100 Coe Road. The pumps are mounted in a 6' diameter precast concrete wet well and, the discharge check valves, plug valves, air/vacuum valves and, other station piping are housed in a 6'X6' precast concrete vault. The electrical and instrumentation components are housed in a stainless steel cabinet mounted on a uni-strut frame adjacent to the station.

The station presently contains 2 submersible pumps, which are mounted on stainless steel guide rails and connected to the 4" discharge piping through a discharge elbow mounted to the bottom of the wet well. The existing pumps are KSB pumps driven by 4.5 horsepower, 1,750 RPM motors. Each pump is rated at 180 GPM at 32 FT total dynamic head.

The station pumps through a 6" diameter transite force main which extends 583 feet north, crossing railroad tracks, Warehouse Road, a railroad spur, and Coal Mine Road and discharges to a gravity interceptor pipe at a tee in the pipe. The discharge is at approximate elevation 830 feet MSL.

The pump station is accessed along a gravity sewer easement from Culver Road. The access drive is gravel.

The pump station power is 208V, 3-phase from a 15 kVA pole mounted transformers located on-site. Power enters the station underground from the transformers to a 100A fused disconnect mounted adjacent to the control panel.

Control of the pumps is initiated through a submersible pressure transducer, mounted in the wet well, which transmits the wet well water level to a controller mounted in the control panel which initiates the on/off sequence for the pumps. A 4-float redundant level control system provides back-up control of the pumps should the pressure transducer fail. The station has a dedicated elapsed time meter for each pump. The control panel has a flashing light to signify alarm conditions.

Mechanically, the station is rated "Fair" and it is also rated "Good" from an electrical standpoint. Items that are identified as potential maintenance concerns are as follows:

- No bypass pump connection to the force main is available.
- No connection for a portable generator or, emergency generator is available at the site.
- The station has no remote telemetry to transmit alarm or other station conditions.
- No yard hydrant is available for pump and wet well wash down.
- Grease and hair buildup on the pumps was noted during the inspection.
- The wet well showed evidence of surcharge conditions but, there was no evidence of an overflow.
- Influent flow into the station at the time of the inspection was clear, estimated at 25-30 GPM, which indicates potential I/I within the collection system draining to this station.
- Emergency generator is very old and parts are obsolete. The generator does not provide much reliability.
- The automatic transfer switch has been replaced and is of a current model in great working condition.

The station presently receives flow from approximately 185 single-family residential customers which are served by the collection lines in the basin draining to the station.

The 6' diameter wet well has a maximum of 5.8 feet available for storage which equates to 1,227 gallons. In order to provide a 10 minute cycle time (6 starts per hour), 640 gallons is required at peak dry weather flow. The wet well has excess capacity available, based on the dry weather flow. Since the wet well exhibits signs of surcharge conditions, wet weather peak flow appears to be considerably higher than dry weather flow.

Emory Valley Pump Station

The Emory Valley Pump Station is located on Emory Valley Road at its intersection with Baylor Drive. The station includes a cast in place concrete structure that encompasses the wet well, dry well, and influent channel with solids grinder, and pad for an emergency generator. The electrical and instrumentation components are housed inside a concrete block building.

The station presently contains 2 dry pit mounted submersible pumps, which take suction from the cast-in-place concrete wet well. The pumps are mounted on the

lower floor of the station. The main floor of the station houses the electrical and instrumentation control components. The existing pumps are Flygt pumps driven by 70 horsepower, 1,775 RPM motors. Each pump is rated at 1,150 GPM at 160 FT total dynamic head. A connection for a future pump is available in the pump room.

The station pumps through parallel 10" diameter ductile iron force mains which extend 7,570 feet and connect to a common 14" pipe which extends an additional 4,300 feet where it connects to an 18" pipe near the Emory Valley Road railroad crossing. The 18" force main is connected to the 16" force main from the East Plant Pump Station. The 18" force main discharges to a manhole near the intersection of Emory Valley and Fordham Roads. The discharge is at approximate elevation 916 feet MSL. A connection to the force main for a bypass pump hose is located just outside the station building.
The pump station site includes a gravel parking area with a paved access off of Emory Valley Road.

The pump station power supply is 480V, 3-phase from pole mounted transformers located approximately 190 feet west of the site. Power enters the station underground to a 400A main circuit breaker mounted in an MCC. Emergency power is supplied by a Kohler diesel generator which is rated at 125 kW.

Control of the pumps is initiated through a submersible pressure transducer, mounted in the wet well, which transmits the wet well water level to a controller which initiates the on/off sequence for the pumps. No redundant level control system is available at the station. The station is monitored by telemetry which transmits alarms to the WWTP. Flow from the station is measured through magnetic flow meters (1 per force main), which are mounted in the discharge pipes inside the building. The station does not have elapsed time meters to record pump run times.

Prior to entering the wet well, flow travels through a hydraulic grinder unit which grinds large solids to smaller particles to prevent damage to the pumps. A bar screen, which is utilized to capture large solids when the solids grinder is out of service, is mounted in a bypass channel. A blower is located outside the building which is utilized to keep solids entering the wet well suspended, preventing settlement and build-up in the wet well.

Mechanically, the station is rated "Excellent" and it is also rated "Excellent" from an electrical standpoint. Items that are identified as potential maintenance concerns are as follows:

- The slide gates which are utilized to divert influent sewage from the grinder channel to the bypass channel are very difficult to move. Operations personnel must lift the gates out by hand and relocate them to the grinder channel prior to performing maintenance or repairs to the grinder unit. No trolley or other hoist is available in the room to assist in lifting the gates, which are very difficult to unseat.
- No redundant system for pump control is available.
- Corrosion is evident on metal components near the influent flow channel.
- Pump removal is difficult due to the lack of a bridge crane or trolley in the pump room.
- A water mark approximately 6 feet above the lower floor, inside the influent channel room, indicates that the flow to the station has exceeded the pump capacity at some point.

The station presently receives flow from 11 apartment complexes, approximately 1,500 single-family residential and, 12 commercial customers which are served by the collection lines in the basin draining to the station, as well as from the following pump stations:

- Marina
- Rivers Run

Fairbanks Pump Station

The Fairbanks Pump Station is located at 545 Oak Ridge Turnpike within the R&R Properties commercial development. The pumps are mounted in a 4' X 4' concrete wet well and, the discharge check valves, plug valves, and, other station piping are housed in a 2'-9" X 2'-9" concrete vault. The electrical and instrumentation components are housed in a stainless steel cabinet mounted on a uni-strut frame adjacent to the station.

The station presently contains 2 submersible pumps, which are mounted on stainless steel guide rails and connected to the 4" discharge piping through a discharge elbow mounted to the bottom of the wet well. The existing pumps are

Flygt pumps driven by 2.2 horsepower, 1670 RPM motors. Each pump is rated at 175 GPM at 10 FT total dynamic head.

The station pumps through a 6" diameter ductile iron force main which extends 86 feet and discharges to a manhole north of the station within the commercial development. The discharge is at approximate elevation 837 feet MSL.

The pump station is accessed from the parking lot of the commercial development. The site is not fenced. A yard hydrant is available for wash down of the pumps and wet well.

The pump station power is 208V, 3-phase originating from an unknown location. Power enters the station underground through 60A fused disconnect mounted adjacent to the control panel.

Control of the pumps is initiated through a submersible pressure transducer, mounted in the wet well, which transmits the wet well water level to a controller mounted in the control panel which initiates the on/off sequence for the pumps. A 2-float redundant level control system provides back-up control of the pumps should the pressure transducer fail. The station has a dedicated elapsed time meter for each pump. The control panel has a flashing light to signify alarm conditions.

Mechanically, the station is rated "Fair" and it is rated "Good" from an electrical standpoint. Items that are identified as potential maintenance concerns are as follows:

- No bypass pump connection to the force main is available.
- No connection for a portable generator or, emergency generator is available at the site.
- The station has no remote telemetry to transmit alarm or other station conditions.

Graceland Pump Station

The Graceland Pump Station is located at 113 Graceland Road. The pumps are mounted in an 8' diameter precast concrete wet well and, the discharge check valves, plug valves, air/vacuum valves and, other station piping are housed in a 6'X 6' precast concrete vault. The electrical and instrumentation components are housed in a stainless steel cabinet mounted on a uni-strut frame adjacent to the station.

The station presently contains 2 submersible pumps, which are mounted on stainless steel guide rails and connected to the 4" discharge piping through a discharge elbow mounted to the bottom of the wet well. Each pump is rated at 200 GPM at 100 FT total dynamic head.

The station pumps through a 6" diameter force main which extends 2,059 feet along Graceland Road and Gum Hollow Road and discharges to a manhole on the south side of Gum Hollow Road. The discharge is at approximate elevation 895 feet MSL.

The pump station does not have off-street parking. A Pur-A-Fil drum air scrubber at the site controls odors from the wet well. A diaphragm type pressure sensor, with gauge, is located in the valve vault. A yard hydrant is available for pump and wet well cleaning.

The pump station power is 460V, 3-phase from 25 kVA pole mounted transformers located at the street. Power enters the station underground from the transformers to a 200A main with a 150A fused disconnect mounted adjacent to the control panel.

Control of the pumps is initiated through a level probe, mounted in the wet well, which transmits the wet well water level to a controller mounted in the control panel which initiates the on/off sequence for the pumps. A 5-float redundant level control system provides back-up control of the pumps should the level probe fail. The station has a dedicated elapsed time meter for each pump. The control panel has a flashing light to signify alarm conditions.

Mechanically, the station is rated "Excellent" and it is also rated "Excellent" from an electrical standpoint. Items that are identified as potential maintenance concerns are as follows:

- No bypass pump connection to the force main is available.
- No connection for a portable generator or, emergency generator is available at the site.
- The station has no remote telemetry to transmit alarm or other station conditions.
- No vehicular access to the wet well is available.

The station presently receives flow from approximately 30 single-family residential customers which are served by the collection lines in the basin draining to the station.

The 6' diameter wet well has a maximum of 4.9 feet available for storage which equates to 1,036 gallons. In order to provide a 10 minute cycle time (6 starts per hour), 100 gallons is required at peak dry weather flow. The wet well has excess capacity available.

Gregory's Pump Station

The Gregory's Pump Station is located on Tax Parcel 94D-E-24, which is in the River View Subdivision adjacent to Melton Lake Drive, directly adjacent to the Melton Hill Lake Peninsula. The pumps are housed in a fiberglass enclosure mounted on a concrete pad. The pad is poured around a 5' diameter precast concrete wet well. The discharge check valves, plug valves, air release valve and other mechanical appurtenances are located inside the enclosure. The electrical and instrumentation components are housed inside a panel which is mounted to a metal frame which is at one end of the enclosure.

The station presently contains 2 suction lift pumps, which are mounted inside the enclosure directly over the wet well. The pumps take suction through vertical piping extending into the wet well. The existing pumps are Hydromatic pumps driven by 15 horsepower, 1,735 RPM, General Electric motors. Each pump is rated at 230 GPM. No information concerning the rated pump head is available.

The station pumps through a 6" diameter PVC force main which extends 860 feet to the intersection of Melton Lake /Drive and Meco Lane, where it connects to an 8" PVC force main that extends 800 feet to the discharge manhole (on easement) north of Meco Lane. The 8" PVC force main also transports the flow from the Rivers Way Pump Station. The discharge is at approximate elevation 832 feet MSL.

The pump station site does not have direct vehicular access. Maintenance personnel must park on the adjacent property and access the site by foot. There is a railroad tie retaining wall on the south and west sides of the site, which is in a low area. The site is not fenced.

The pump station power supply is 120/240V, 3-phase from a pad mounted transformer located adjacent to the pump station. Power enters the station underground from the transformer connecting directly to the control panel. There is no electrical disconnect.

Control of the pumps is initiated through 4 floats, mounted in the wet well, which initiate the on/off sequence for the pumps through rising and falling water levels

in the wet well. No redundant level control system is available at the station. The station has no elapsed time meters to monitor pump run times.

The station presently receives flow from approximately 60 single-family residential customers and the adjacent restaurant which are served by the collection lines in the basin draining to the station.

Mechanically, the station is rated "Replace" and it is also rated "Replace" from an electrical standpoint. The specifications and design for the replacement of this station were completed in June 2011. The replacement of this station requires an easement, which is currently being negotiated. The replacement project for this station should be scheduled for bid by September 2011, with construction complete by June 2012.

Gum Hollow Pump Station

The Gum Hollow Pump Station is located at 197 Gum Hollow Road. The station is directly adjacent to the road. The pumps are mounted in an 8' diameter precast concrete wet well and, the discharge check valves, plug valves, air/vacuum valves and, other station piping are housed in a 6'X6' precast concrete vault. The electrical and instrumentation components are housed in a stainless steel cabinet mounted on a uni-strut frame adjacent to the station.

The station presently contains 2 submersible pumps, which are mounted on stainless steel guide rails and connected to the 4" discharge piping through a discharge elbow mounted to the bottom of the wet well. The existing pumps are KSB pumps driven by 36 horsepower, 1,750 RPM motors. Each pump is rated at 300 GPM at 135 FT total dynamic head.

The station pumps through a 6" diameter force main which extends 4,323 feet along Gum Hollow Road, crossing Oak Ridge Turnpike, and discharges to a manhole on the north side of the Turnpike approximately 100 feet west of the Gum Hollow Road/ Oak Ridge Turnpike intersection. The discharge is at approximate elevation 797 feet MSL.

The pump station does not have off-street parking. A Pur-A-Fil drum air scrubber at the site controls odors from the wet well. A diaphragm type pressure sensor, with gauge, is located in the valve vault.

Control of the pumps is initiated through a submersible pressure transducer, mounted in the wet well, which transmits the wet well water level to a controller mounted in the control panel which initiates the on/off sequence for the pumps.

A 5-float redundant level control system provides back-up control of the pumps should the pressure transducer fail. The station has a dedicated elapsed time meter for each pump. The control panel has a flashing light to signify alarm conditions.

Mechanically, the station is rated "Excellent" and it is also rated "Excellent" from an electrical standpoint. Items that are identified as potential maintenance concerns are as follows:

- No bypass pump connection to the force main is available.
- No connection for a portable generator or, emergency generator is available at the site.
- The station has no remote telemetry to transmit alarm or other station conditions.
- The wet well exhibits signs of surcharge, but no evidence of overflow was evident.
- A steady stream of clear water was flowing into the station at the time of the inspection, which may indicate I/I in the collection system upstream of the station.

The station presently receives flow from approximately 170 single-family residential customers which are served by the collection lines in the basin draining to the station and, the Graceland Pump Station.

The 8' diameter wet well has a maximum of 7.3 feet available for storage which equates to 2,745 gallons. In order to provide a 10 minute cycle time (6 starts per hour), 2,590 gallons is required at peak dry weather flow. The wet well has minimal excess capacity available.

Home Depot Pump Station

The Home Depot Pump Station is located directly adjacent to Laboratory Drive at the Home Depot entrance road. The pumps are mounted in a 6' diameter precast concrete wet well and, the discharge check valves, plug valves, air/vacuum valves and, other station piping are housed in a 6'X8' precast concrete vault. The electrical and instrumentation components are housed in a stainless steel cabinet mounted on a uni-strut frame adjacent to the station.

The station presently contains 2 submersible pumps, which are mounted on stainless steel guide rails and connected to the 4" discharge piping through a

discharge elbow mounted to the bottom of the wet well. The existing pumps are Flygt pumps driven by 3 horsepower, 1700 RPM motors.

The station pumps through a 4" diameter PVC force main which extends 478 feet along Laboratory Road and discharges to a manhole on the east side of Laboratory Road in front of 801 Laboratory Road. The discharge is at approximate elevation 858 feet MSL.

The pump station is accessed by a gravel drive from the Home Depot entrance road. A yard hydrant is available for wash down of the pumps and wet well. A bypass pump connection is piped to the discharge piping in the valve vault.

The pump station power is 120/240V, 3-phase from 15 kVA pole mounted transformers located on-site. Power enters the station underground from the transformers to a 35A fused disconnect mounted adjacent to the control panel.

Control of the pumps is initiated through a submersible level probe, mounted in the wet well, which transmits the wet well water level to a controller mounted in the control panel which initiates the on/off sequence for the pumps. A 5-float redundant level control system provides back-up control of the pumps should the pressure transducer fail. The station has a dedicated elapsed time meter for each pump. The control panel has a horn and flashing light to signify alarm conditions.

Mechanically, the station is rated "Good" and it is also rated "Good" from an electrical standpoint. Items that are identified as potential maintenance concerns are as follows:

- No connection for a portable generator or, emergency generator is available at the site.
- The station has no remote telemetry to transmit alarm or other station conditions.
- The valve vault had 6" of standing water in the bottom.
- The pressure gauge in the valve vault was inoperable.
- The wet well had a thick layer of a hardened substance in it that has adheres to the pumps, floats, cables, etc. and rendered the redundant float system inoperable.

Marina Pump Station

The Marina Pump Station is located at 695 Melton Lake Drive, directly adjacent to the Rowing Club building. The pumps are mounted in a 6' diameter precast concrete wet well and, the discharge check valves, plug valves, air release valves and, a diaphragm type pressure sensor are housed in a 6'X6' precast concrete vault. The electrical and instrumentation components are housed in a stainless steel cabinet mounted on a uni-strut frame adjacent to the station.

The station presently contains 2 submersible pumps, which are mounted on stainless steel guide rails and connected to the 4" discharge piping through a discharge elbow mounted to the bottom of the wet well. The existing pumps are Flygt pumps driven by 10 horsepower, 1,735 RPM motors.

The station pumps through a 4" diameter cast iron force main which extends 2,125 feet and discharges to a manhole at the end of Brockton Lane. The discharge is at approximate elevation 832 feet MSL.

The pump station site includes a paved parking/turn around area with a paved access from Melton Lake Drive and the parking area for the Marina, Rowing Club, restaurant, and adjacent park. The site is not fenced.

The pump station power supply is 120/240V, 3-phase from pole mounted transformers located on the opposite side of Melton Lake Drive from the station. The power meter for the station is also located on the pole. Power enters the station underground (crossing Melton Lake Drive) to a 100A fused disconnect mounted adjacent to the control panel.

Control of the pumps is initiated through a submersible pressure transducer, mounted in the wet well, which transmits the wet well water level to a controller mounted in the control panel which initiates the on/off sequence for the pumps. No redundant level control system is available at the station. The station has a dedicated elapsed time meter for each pump. The control panel has an audible horn and flashing light to signify alarm conditions.

Mechanically, the station is rated "Good" and it is rated "Excellent" from an electrical standpoint. Items that are identified as potential maintenance concerns are as follows:

- No bypass pump connection to the force main is available.
- No connection for a portable generator or, emergency generator is available at the site.

- The station has no remote telemetry to transmit alarm or other station conditions.
- No redundant system for pump control is available.
- No yard hydrant for water to wash down the pumps or wet well is available.
- Debris was noted in the wet well.
- Influent flow from a collection line entering the station from the north was very clear, indicating a potential I/I problem in the collection system draining to the station.

The station presently receives flow from approximately 140 single-family residential customers, a restaurant, and the Marina facilities which are served by the collection lines in the basin draining to the station.

Oak Hills Pump Station

The Oak Hills Pump Station is located on the north side of Oak Ridge Turnpike approximately 1,000 feet west of Oklahoma Avenue. The station perimeter fence is approximately 25 feet from the edge of pavement. The pumps are housed in a fiberglass enclosure mounted on a concrete pad. The pad is poured around a 9' diameter precast concrete wet well. The discharge check valves, plug valves, air release valves and other mechanical appurtenances are located inside the enclosure. The electrical and instrumentation components are housed in panels inside the enclosure. Suction and discharge pressure gauges for each pump are mounted near the pumps.

The station presently contains 2 suction lift pumps, which are mounted inside the enclosure directly over the wet well. The pumps take suction through vertical piping extending into the wet well. The existing pumps are Gorman Rupp pumps driven by 25 horsepower, variable RPM motors. Each pump is rated at 350 GPM at 70 feet of head.

The station pumps through a 6" diameter cast iron force main which extends 3,933 feet east along the Turnpike to the discharge manhole which is located approximately 180 feet ease of Nebraska Avenue. The discharge is at approximate elevation 817 feet MSL.

The pump station site is accessed by a paved drive from Oak Ridge Turnpike. The site is fenced and a yard hydrant is available for wash down of the wet well.

The pump station power supply is 120/240V, 3- phase from the Turnpike. 37.5 kvA and 25kVA pole mounted transformers provide power to the station. Power enters the station overhead from the transformers to a drop pole and down the pole to a 200A fused disconnect.

Control of the pumps is initiated through a submersible pressure transducer, mounted in the wet well, which transmits the wet well level to a controller mounted inside the enclosure. The controller initiates the on/off sequence for the pumps through rising and falling water levels in the wet well. A 3-float redundant level control system controls pump operation if the submersible transducer system fails. The station has a dedicated elapsed time meter for each pump to monitor pump run times and, an alarm light to notify of alarm conditions but, has no telemetry to transmit alarm or status conditions to the WWTP.

Mechanically, the station is rated "Good" and it is rated "Fair" from an electrical standpoint. Items that are identified as potential maintenance concerns are as follows:

- No bypass pump connection to the force main is available.
- The station has no remote telemetry to transmit alarm or other station conditions.
- The discharge pressure gauge on one of the pumps is inoperable.
- The wet well exhibits signs of surcharge but, no signs of overflows were evident.

The station presently receives flow from 254 single-family residential customers and which are served by the collection lines in the basin draining to the station and, the following pump stations:

- Southwood- rated at 180 GPM
- Gum Hollow- rated at 200 GPM

The estimated peak dry weather flow entering the station is approximately 350 GPM. With a capacity of 350 GPM per pump, the station capacity is equivalent to the estimated peak dry weather flow. The two additional stations pumping to the gravity lines draining to the station have a combined capacity greater than Oak Hills. Since these stations pump to gravity lines, the impact of their contributions is buffered. However, since the wet well exhibits signs of surcharging, the station has marginal capacity to handle the estimated dry weather peak flows.

The 9' diameter wet well has approximately 5.7 feet available for storage which equates to 2,712 gallons. In order to provide a 10 minute cycle time (6 starts per hour), 3,500 gallons is required at peak dry weather flow. The calculated cycle time is 7.7 minutes, which is acceptable. The wet well does not have excess capacity available for increased flow to the station.

Palisades #1 Pump Station

The Palisades #1 Pump Station is located at 10 Palisades Parkway at the back of the lot, behind and between 2 homes. The pumps are housed in a fiberglass enclosure mounted on a concrete pad. The pad is poured around a 5' diameter precast concrete wet well. The discharge check valves, plug valves, air release valve and other mechanical appurtenances are located inside the enclosure. The electrical and instrumentation components are housed inside a panel which is mounted to a metal frame at one end of the enclosure.

The station presently contains 2 suction lift pumps, which are mounted inside the enclosure directly over the wet well. The pumps take suction through vertical piping extending into the wet well. The existing pumps are Hydromatic pumps driven by 3 horsepower, 1,150 RPM, U.S. motors. Each pump is rated at 80 GPM. No information concerning the rated pump head is available.

The station pumps through a 4" diameter PVC force main which extends 488 feet along the rear boundary of the subdivision and discharges to the Palisades #2 Pump Station. The discharge is at approximate elevation 797 feet MSL.

The pump station site is accessed by the paved driveway between 10 and 12 Palisades Parkway. The site is not fenced. A yard hydrant is available for wash down of the wet well.

The pump station power supply is 120/240V, single phase from Palisades Parkway. The location of the transformer feeding the station is unknown. Power enters the station underground from the street to a 50A fused disconnect.

Control of the pumps is initiated through 4 floats, mounted in the wet well, which initiate the on/off sequence for the pumps through rising and falling water levels in the wet well. No redundant level control system is available at the station. The station has a dedicated elapsed time meter for each pump to monitor pump run times. The station has an alarm light which flashes to notify of alarm conditions but, has no telemetry to transmit alarm or status conditions to the WWTP.

Mechanically, the station is rated "Poor" and it is rated "Fair" from an electrical standpoint. Items that are identified as potential maintenance concerns are as follows:

- No bypass pump connection to the force main is available.
- No connection for a portable generator or, emergency generator is available at the site.
- The station has no remote telemetry to transmit alarm or other station conditions.
- No redundant system for pump control is available.
- Voids are present under three sides of the concrete slab supporting the station components.
- One of the pumps was inoperable at the time of the inspection.
- The floats were hanging from a wire at the time of the inspection.
- An exposed conduit/wire of unknown use was visible at the station.

The 5' diameter wet well has a maximum of 3.3 feet available for storage which equates to 485 gallons. In order to provide a 10 minute cycle time (6 starts per hour), 40 gallons is required at peak dry weather flow. The wet well therefore has excess capacity available.

Palisades #2 Pump Station

The Palisades #2 Pump Station is located at 18 Palisades Parkway at the back of the lot, behind and between 2 homes. The pumps are housed in a fiberglass enclosure mounted on a concrete pad. The pad is poured around a 5' diameter precast concrete wet well. The discharge check valves, plug valves, air release valve and other mechanical appurtenances are located inside the enclosure. The electrical and instrumentation components are housed inside a panel which is mounted to a metal frame at one end of the enclosure.

The station presently contains 2 suction lift pumps, which are mounted inside the enclosure directly over the wet well. The pumps take suction through vertical piping extending into the wet well. The existing pumps are Hydromatic pumps driven by 3 horsepower, 1,150 RPM, U.S. motors. Each pump is rated at 80 GPM. No information concerning the rated pump head is available.

The station pumps through a 4" diameter PVC force main which extends 528 feet along the rear boundary of the subdivision and discharges to a manhole behind

26 Palisades Parkway, which is just upstream of the Palisades #3 Pump Station. The discharge is at approximate elevation 813 feet MSL.

The pump station site is accessed by the paved driveway between 16 and 18 Palisades Parkway. The site is not fenced. A stone retaining wall on one side of the station prevents the fiberglass cover from being completely removed from the pumps. A yard hydrant is available for wash down of the wet well.

The pump station power supply is 120/240V, single phase from Palisades Parkway. The location of the transformer feeding the station is unknown. Power enters the station underground from the street to a 50A fused disconnect.

Control of the pumps is initiated through 4 floats, mounted in the wet well, which initiate the on/off sequence for the pumps through rising and falling water levels in the wet well. No redundant level control system is available at the station. The station has a dedicated elapsed time meter for each pump to monitor pump run times. The station has an alarm light which flashes to notify of alarm conditions but, has no telemetry to transmit alarm or status conditions to the WWTP.

Mechanically, the station is rated "Fair" and it is rated "Good" from an electrical standpoint. Items that are identified as potential maintenance concerns are as follows:

- No bypass pump connection to the force main is available.
- No connection for a portable generator or, emergency generator is available at the site.
- The station has no remote telemetry to transmit alarm or other station conditions.
- No redundant system for pump control is available.
- The aluminum hatch over the wet well needs to be replaced.
- The retaining wall makes it difficult to access the station equipment for removal and maintenance.

The station presently receives flow from 10 single-family residential customers which are served by the collection lines in the basin draining to the station and, the Palisades #1 Pump Station.

The 5' diameter wet well has a maximum of 4.5 feet available for storage which equates to 661 gallons. In order to provide a 10 minute cycle time (6 starts per hour), 840 gallons is required at peak dry weather flow. The calculated cycle

time at peak flow is 7.8 minutes, utilizing the maximum available storage, which is acceptable.

Palisades #3 Pump Station

The Palisades #3 Pump Station is located at 28 Palisades Parkway at the back of the lot, behind and between 2 homes. The pumps are housed in a fiberglass enclosure mounted on a concrete pad. The pad is poured around a 6' diameter precast concrete wet well. The discharge check valves, plug valves, air release valve and other mechanical appurtenances are located inside the enclosure. The electrical and instrumentation components are housed inside a panel which is mounted to a metal frame at one end of the enclosure.

The station presently contains 2 suction lift pumps, which are mounted inside the enclosure directly over the wet well. The pumps take suction through vertical piping extending into the wet well. The existing pumps are Hydromatic pumps driven by 7.5 horsepower, 1,740 RPM, U.S. motors. Each pump is rated at 115 GPM. No information concerning the rated pump head is available.

The station pumps through a 4" diameter PVC force main which extends 780 feet along the rear boundary of the subdivision and discharges to the Palisades #3 Pump Station. The discharge is at approximate elevation 801 feet MSL.

The pump station site is accessed by a gravel drive between 28 and 30 Palisades Parkway. The site is not fenced. A yard hydrant is available for wash down of the wet well.

The pump station power supply is 120/240V, 3-phase from 2-15kvA transformers on Palisades Parkway. Power enters the station underground from the transformers to a 70A fused disconnect mounted adjacent to the control panel.

Control of the pumps is initiated through 4 floats, mounted in the wet well, which initiate the on/off sequence for the pumps through rising and falling water levels in the wet well. No redundant level control system is available at the station. The station has a dedicated elapsed time meter for each pump to monitor pump run times. The station has an alarm light which flashes to notify of alarm conditions but, has no telemetry to transmit alarm or status conditions to the WWTP.

Mechanically, the station is rated "Fair" and it is rated "Good" from an electrical standpoint. Items that are identified as potential maintenance concerns are as follows:

- No bypass pump connection to the force main is available.
- No connection for a portable generator or, emergency generator is available at the site.
- The station has no remote telemetry to transmit alarm or other station conditions.
- No redundant system for pump control is available.
- Mice were noted underneath the station cover.

The station presently receives flow from 16 single-family residential customers which are served by the collection lines in the basin draining to the station and, the Palisades #2 Pump Station.

The 6' diameter wet well has a maximum of 3.8 feet available for storage which equates to 803 gallons. In order to provide a 10 minute cycle time (6 starts per hour), 860 gallons is required at peak dry weather flow. The calculated cycle time at peak flow is 9 minutes, utilizing the maximum available storage, which is acceptable.

Palisades #4 Pump Station

The Palisades #4 Pump Station is located at 40 Palisades Parkway at the back of the lot. The pumps are housed in a fiberglass enclosure mounted on a concrete pad. The pad is poured around a 5' diameter precast concrete wet well. The discharge check valves, plug valves, air release valve and other mechanical appurtenances are located inside the enclosure. The electrical and instrumentation components are housed inside a panel which is mounted to a metal frame at one end of the enclosure.

The station presently contains 2 suction lift pumps, which are mounted inside the enclosure directly over the wet well. The pumps take suction through vertical piping extending into the wet well. The existing pumps are Hydromatic pumps driven by 3 horsepower, 1,150 RPM, U.S. motors. Each pump is rated at 80 GPM. No information concerning the rated pump head is available.

The station pumps through a 4" diameter PVC force main which extends 962 feet along the rear boundary of the subdivision and adjacent Tennessee Valley Authority property and discharges to a manhole west of the end of Cairo Lane (on easement). The discharge manhole is just upstream of the East Plant Pump Station. The discharge is at approximate elevation 812 feet MSL.

The pump station site is accessed by a paved drive adjacent to 42 Palisades Parkway. The site is not fenced. A yard hydrant is available for wash down of the wet well.

The pump station power supply is 120/240V, single phase from Palisades Parkway. The location of the transformer feeding the station is unknown. Power enters the station underground from the street to a 30A fused main mounted adjacent to the control panel.

Control of the pumps is initiated through 4 floats, mounted in the wet well, which initiate the on/off sequence for the pumps through rising and falling water levels in the wet well. No redundant level control system is available at the station. The station has a dedicated elapsed time meter for each pump to monitor pump run times. The station has an alarm light which flashes to notify of alarm conditions but, has no telemetry to transmit alarm or status conditions to the WWTP.

Mechanically, the station is rated "Fair" and it is rated "Poor" from an electrical standpoint. Items that are identified as potential maintenance concerns are as follows:

- No bypass pump connection to the force main is available.
- No connection for a portable generator or, emergency generator is available at the site.
- The station has no remote telemetry to transmit alarm or other station conditions.
- No redundant system for pump control is available.
- Mice were noted underneath the station cover.
- The revenue meter is utilized as the electrical disconnect.

The station presently receives flow from 16 single-family residential customers which are served by the collection lines in the basin draining to the station and, the Palisades #3 Pump Station.

The 5' diameter wet well has a maximum of 6 feet available for storage which equates to 881 gallons. In order to provide a 10 minute cycle time (6 starts per hour), 1,210 gallons is required at peak dry weather flow. The calculated cycle time at peak flow is 7 minutes, utilizing the maximum available storage, which is acceptable.

The four Palisades stations have varying mechanical and electrical issues associated with them. The stations have been in service in excess of 15 years and are approaching the end of their useful lives. It is recommended that these stations be considered for replacement.

Park Meade Pump Station

The Park Meade Pump Station is located at 1402 Edgemoor Road. The pumps are housed in a fiberglass enclosure mounted on a concrete pad. The pad is poured around a 6' diameter precast concrete wet well. The discharge check valves, plug valves, air release valve and other mechanical appurtenances are located inside the enclosure. The electrical and instrumentation components are housed in panels mounted to the enclosure. Suction and discharge pressure gauges for each pump are mounted near the pumps.

The station presently contains 2 suction lift pumps, which are mounted inside the enclosure directly over the wet well. The pumps take suction through vertical piping extending into the wet well. The existing pumps are Gorman Rupp pumps driven by 50 horsepower, 1,765 RPM motors. Each pump is rated at 500 GPM at 80 feet of head.

The station pumps through a 10" diameter force main which extends 10,278 feet along Edgemoor Road to Bethel Valley Road, crossing South Illinois Avenue to the discharge manhole which is located between Bethel Valley Road and a ramp to South Illinois Avenue. The discharge is at approximate elevation 812 feet MSL.

The pump station site is accessed by a gravel drive from Edgemoor Road. The site is fenced and a yard hydrant is available for wash down of the wet well. The site also has an area light mounted on a pole for use in after-hours maintenance and repairs.

The pump station power supply is 460V, 3- phase from Edgemoor Road. A 112.5 kvA pad mounted transformer provides power to the station. Power enters the station underground from the transformer to a 250A circuit breaker. A 50 kW diesel powered Kohler generator provides immediate back up power to the station, through an automatic transfer switch, during power outages.

Control of the pumps is initiated through a submersible pressure transducer, mounted in the wet well, which transmits the wet well level to a controller mounted inside the enclosure. The controller initiates the on/off sequence for the pumps through rising and falling water levels in the wet well. No redundant level

control system is available at the station. The station has a dedicated elapsed time meter for each pump to monitor pump run times. The station has an alarm light which flashes to notify of alarm conditions but, has no telemetry to transmit alarm or status conditions to the WWTP.

Mechanically, the station is rated "Good" and it is also rated "Good" from an electrical standpoint. Items that are identified as potential maintenance concerns are as follows:

- No bypass pump connection to the force main is available.
- The station has no remote telemetry to transmit alarm or other station conditions.
- No redundant system for pump control is available.
- The discharge pressure gauge on pump #2 was missing and, the discharge pressure gauge on pump #1 was at its maximum pressure reading (pegged) while the pump was running.
- The retaining wall makes it difficult to access the station equipment for removal and maintenance.
- Investigate the addition of an equalization basin to increase the size of the wet well. This station has a very small wet well and as the area develops it may not have the required capacity to handle all incoming flow.

Peach Orchard Pump Station

The Peach Orchard Pump Station is located at 105 Wedgewood Road at the rear of the lot. The pumps are mounted in a 6' diameter precast concrete wet well and, the discharge check valves, plug valves, air/vacuum valves and, other station piping are housed in a 6'X 6' precast concrete vault. The electrical and instrumentation components are housed in a stainless steel cabinet mounted on a uni-strut frame adjacent to the station.

The station presently contains 2 submersible pumps, which are mounted on stainless steel guide rails and connected to the 4" discharge piping through a discharge elbow mounted to the bottom of the wet well. The existing pumps are Flygt pumps driven by 10 horsepower, 1,735 RPM motors.

The station pumps through a 4" diameter AC force main which extends 485 feet west and south, crossing Wedgewood Road, and discharges to a manhole on the south side of Wedgewood Road behind 396/398 West Outer Drive. The discharge is at approximate elevation 1,078 feet MSL.

The pump station is accessed by a gravel drive from Wedgewood Road. The site is not fenced but, a gate prevents access to the gravel drive. A diaphragm type pressure sensor with gauge is located in the valve vault.

The pump station power is 120/240V, 3-phase from 30 kVA pole mounted transformers located on-site. Power enters the station overhead from the transformers to a drop pole and down the pole to a 100A fused disconnect. Station controls are housed in a stainless steel control panel mounted on a uni-strut frame.

Control of the pumps is initiated through a submersible level probe, mounted in the wet well, which transmits the wet well water level to a controller mounted in the control panel which initiates the on/off sequence for the pumps. A 5-float redundant level control system provides back-up control of the pumps should the pressure transducer fail. The station has a dedicated elapsed time meter for each pump. The control panel has a flashing light to signify alarm conditions.

Mechanically, the station is rated "Excellent" and it is also rated "Fair" from an electrical standpoint. Items that are identified as potential maintenance concerns are as follows:

- No connection for a portable generator or, emergency generator is available at the site.

- The station has no remote telemetry to transmit alarm or other station conditions.
- No yard hydrant is available for pump and wet cleaning.
- The latch for the disconnect switch is broken.

The station presently receives flow from approximately 40 single family residences which are served by the collection lines in the basin draining to the station.

The 6' diameter wet well has a maximum of 3 feet available for storage which equates to 635 gallons. In order to provide a 10 minute cycle time (6 starts per hour), 140 gallons is required at peak dry weather flow. The wet well has excess capacity available.

Pumphouse Road Pump Station

The Pumphouse Road Pump Station is located adjacent to Pumphouse Road at Melton Hill Lake. The pumps are mounted in a 10' diameter precast concrete wet well and, the discharge check valves, plug valves, air/vacuum valves and, other station piping are housed in a 8' X 10' precast concrete vault. The electrical and instrumentation components are housed in a stainless steel cabinet mounted on a uni-strut frame adjacent to the station.

The station presently contains 2 submersible pumps, which are mounted on stainless steel guide rails and connected to the 4" discharge piping through a discharge elbow mounted to the bottom of the wet well. The existing pumps are Flygt pumps driven by 105 horsepower, 1750 RPM motors. Each pump is rated at 750 GPM at 200 FT total dynamic head. The pumps are controlled by variable frequency drives.

The station pumps through an 8" diameter cast ironforce main which extends 3,038 feet along Pumphouse Road and Scarboro Road and discharges to the Scarboro Road Pump Station wet well.

The pump station is accessed by a gravel drive off of Pumphouse Road. A diaphragm type pressure sensor, with gauge, is located in the valve vault. A yard hydrant is available for pump and wet well cleaning and a yard light is available for night time work at the site.

The pump station power is 460V, 3-phase from 100 kVA pole mounted transformers located at the street. Power enters the station overhead from the

transformers to a drop pole and along the drop pole to a 400A fused disconnect mounted adjacent to the control panel.

Control of the pumps is initiated through a submersible pressure transducer, mounted in the wet well, which transmits the wet well water level to a controller mounted in the control panel which initiates the on/off sequence for the pumps. A 4-float redundant level control system provides back-up control of the pumps should the level probe fail. The station has a dedicated elapsed time meter for each pump. The control panel has a horn and flashing light to signify alarm conditions.

Mechanically, the station is rated "Excellent" and it is also rated "Excellent" from an electrical standpoint. Items that are identified as potential maintenance concerns are as follows:

- No bypass pump connection to the force main is available.
- No connection for a portable generator or, emergency generator is available at the site.
- The station has no remote telemetry to transmit alarm or other station conditions.

The station presently receives flow from approximately 31 commercial customers which are served by the collection lines in the basin draining to the station and, the Park Meade Pump Station.

The 10' diameter wet well has a maximum of 10 feet available for storage which equates to 5,875 gallons. In order to provide a 10 minute cycle time (6 starts per hour), 5,950 gallons is required at peak dry weather flow. The wet well has sufficient capacity available at the present time.

Radisson Cove Pump Station

The Radisson Cove Pump Station is located adjacent to Melton Lake Drive east of the end of Radisson Cove. The pumps are mounted in a 6' diameter precast concrete wet well and, the discharge check valves, plug valves, air/vacuum valves and, other station piping are housed in a 7'X7' precast concrete vault. The electrical and instrumentation components are housed in a stainless steel cabinet mounted on a uni-strut frame adjacent to the station.

The station presently contains 2 submersible pumps, which are mounted on stainless steel guide rails and connected to the 4" discharge piping through a discharge elbow mounted to the bottom of the wet well. The existing pumps are KSB pumps driven by 20 horsepower, 1,765 RPM motors. Each pump is rated at 230 GPM at 110 FT total dynamic head.

The station pumps through an 8" diameter force main which extends 1,160 feet and discharges to a manhole behind 26 Rivers Run Way (on easement). The discharge is at approximate elevation 891 feet MSL.

The pump station site includes a paved parking/turn around area with paved access from Melton Lake Drive. The site is not fenced but, there is a gate at Melton Lake Drive that prevents unauthorized vehicular access. There is an interlocking block retaining wall on the south and east sides of the site.

The pump station power is 120/240V, 3-phase from a pad mounted transformer located on-site. The transformer size is unknown. Power enters the station underground from the transformer to a 300A fused disconnect mounted adjacent to the control panel.

Control of the pumps is initiated through a submersible pressure transducer, mounted in the wet well, which transmits the wet well water level to a controller mounted in the control panel which initiates the on/off sequence for the pumps. A 4-float redundant level control system provides back-up control of the pumps should the pressure transducer fail. The station has a dedicated elapsed time meter for each pump. The control panel has a flashing light to signify alarm conditions.

Mechanically, the station is rated "Good" and it is also rated "Good" from an electrical standpoint. Items that are identified as potential maintenance concerns are as follows:

- No bypass pump connection to the force main is available.
- No connection for a portable generator or, emergency generator is available at the site.
- The station has no remote telemetry to transmit alarm or other station conditions.
- No yard hydrant is available for pump and wet well wash down
- The piping in the valve vault is unsupported.

The station presently receives flow from approximately 55 single-family residential customers which are served by the collection lines in the basin draining to the station.

The 7'X7' wet well has a maximum of 5.4 feet available for storage which equates to 1979 gallons. In order to provide a 10 minute cycle time (6 starts per hour), 190 gallons is required at peak dry weather flow. The wet well therefore has excess capacity available.

Rivers Run Pump Station

The Rivers Run Pump Station is located at 100 Rivers Run Boulevard. The station is directly adjacent to the road and behind the subdivision entrance sign and landscaping shrubs. The pumps are mounted in a 6' diameter precast concrete wet well and, the discharge check valves, plug valves, air/vacuum valves and, other station piping are housed in a 6'X 6' precast concrete vault. The electrical and instrumentation components are housed in a stainless steel cabinet mounted on a uni-strut frame adjacent to the station.

The station presently contains 2 submersible pumps, which are mounted on stainless steel guide rails and connected to the 4" discharge piping through a discharge elbow mounted to the bottom of the wet well. The existing pumps are KSB pumps driven by 36 horsepower, 1,770 RPM motors. Each pump is rated at 250 GPM at 75 FT total dynamic head.

The station pumps through a 6" diameter force main which extends 7,980 feet along Melton Lake Drive and Emory Valley Road and discharges to a manhole just upstream of the Emory Valley Pump Station. The discharge is at approximate elevation 794 feet MSL.

The pump station does not have off-street parking and cannot be directly accessed by service trucks. Pumps must be lifted across the shrubbery between the station and road when removed. A yard hydrant is available for wash down of the pumps and wet well. A Pur-A-Fil drum air scrubber at the site controls odors from the wet well.

The pump station power is 460V, 3-phase from a 45 kVA pad mounted transformer located on-site. Power enters the station underground from the transformer to a 200A fused disconnect mounted adjacent to the control panel.

Control of the pumps is initiated through a submersible pressure transducer, mounted in the wet well, which transmits the wet well water level to a controller

mounted in the control panel which initiates the on/off sequence for the pumps. A 5-float redundant level control system provides back-up control of the pumps should the pressure transducer fail. The station has a dedicated elapsed time meter for each pump. The control panel has a flashing light to signify alarm conditions.

Mechanically, the station is rated "Good" and it is also rated "Good" from an electrical standpoint. Items that are identified as potential maintenance concerns are as follows:

- No bypass pump connection to the force main is available.
- No connection for a portable generator or, emergency generator is available at the site.
- The station has no remote telemetry to transmit alarm or other station conditions.
- Pump #2 could not be removed during the inspection due to the float cables being wrapped around the pump.

The 6' diameter wet well has a maximum of 3.3 feet available for storage which equates to 698 gallons. In order to provide a 10 minute cycle time (6 starts per hour), 2,300 gallons is required at peak dry weather flow. The station basically acts as an intermediate pumping station between Radisson Cove and Emory Valley. Since it has a capacity in excess of Radisson Cove and, a minimal flow contribution from gravity lines draining to the station, the wet well volume is acceptable.

Riversway Pump Station

The Riversway Pump Station is located at 120 Marywater Lane. The pumps are mounted in a 6' diameter precast concrete wet well and, the discharge check valves, plug valves, air/vacuum valves and, other station piping are housed in a 4'X8' precast concrete vault. The electrical and instrumentation components are housed in a stainless steel cabinet mounted on a uni-strut frame adjacent to the station.

The station presently contains 2 submersible pumps, which are mounted on stainless steel guide rails and connected to the 4" discharge piping through a discharge elbow mounted to the bottom of the wet well. The existing pumps are Flygt pumps driven by 10 horsepower, 1,735 RPM motors. Each pump is rated at 465 GPM at 51 FT total dynamic head, according to the curve supplied by the Flygt manufacturer's representative. The actual pump design point is not

available. Drawdown tests for the pumps resulted in flow rates from 250 to 280 GPM, which represent 68 and 65 feet of head (based on the supplied curve), respectively.

The station pumps through a 6" diameter PVC force main which extends approximately 1,400 feet to the intersection of Melton Lake Drive and Meco Lane where it connects to an 8" PVC pipe which extends approximately 800 feet to the discharge manhole adjacent to 104 Meco Lane (on easement). The discharge is at approximate elevation 825 feet MSL. The 8" force main also carries the flow from the Gregory's Pump Station.

The pump station site includes a concrete paved access from Marywater Lane. The site is not fenced. The station includes a yard hydrant that was inoperable at the time of the inspection. There is also a valve on the influent gravity line, presumably to shut the influent flow to the station off.

The pump station power is 120/240V, 3-phase from 2- 25 kVA pad mounted transformers located on-site. Power enters the station underground from the transformers to a 80A fused disconnect mounted adjacent to the control panel.

Control of the pumps is initiated through a submersible pressure transducer, mounted in the wet well, which transmits the wet well water level to a controller mounted in the control panel that initiates the on/off sequence for the pumps. No redundant level control system to provide back-up control of the pumps is available. The station does not have elapsed time meters for the pumps. The control panel has a flashing light to signify alarm conditions.

Mechanically, the station is rated "Excellent" and it is rated "Good" from an electrical standpoint. Items that are identified as potential maintenance concerns are as follows:

- No bypass pump connection to the force main is available.
- No connection for a portable generator or, emergency generator is available at the site.
- The station has no remote telemetry to transmit alarm or other station conditions.
- No redundant system for pump control is available.
- The yard hydrant was inoperable at the time of the site visit.

The station presently receives flow from approximately 34 single-family residential customers which are served by the collection lines in the basin draining to the station.

The 6' diameter wet well has a maximum of 5 feet available for storage which equates to 1,057 gallons. In order to provide a 10 minute cycle time (6 starts per hour), 120 gallons is required at peak dry weather flow. The wet well therefore has excess capacity available.

Rockbridge Greens Pump Station

The Rockbridge Greens Pump Station is located at 117 Rockbridge Greens at the front common line of 115 and 117 Rockbridge Greens. The pumps are mounted in a 5' diameter precast concrete wet well and, the discharge check valves, plug valves, air/vacuum valves and, other station piping are housed in a 4'X9' cast-in-place concrete vault. The electrical and instrumentation components are housed in a stainless steel cabinet mounted on a uni-strut frame adjacent to the station.

The station presently contains 2 submersible pumps, which are mounted on stainless steel guide rails and connected to the 4" discharge piping through a discharge elbow mounted to the bottom of the wet well. The existing pumps are Flygt pumps driven by 23 horsepower, 1,735 RPM motors. The actual pump design point is not available. Drawdown tests for the pumps resulted in flow rates of 208 GPM for each pump.

The station pumps through a 6" diameter PVC force main which extends approximately 1,887 feet to the discharge manhole at the intersection of Rockingham Lane and Rolling Links Boulevard. The discharge is at approximate elevation 975 feet MSL.

The pump station site is directly adjacent to Rockbridge Greens in a heavily landscaped area. The site is not fenced. A yard hydrant is available for wash down of the pumps and wet well.

The pump station power is 120/240V, 3-phase from a 300 kVA pad mounted transformer located on-site. Power enters the station underground from the transformer to a 100A circuit breaker mounted adjacent to the control panel.

Control of the pumps is initiated through a submersible pressure transducer, mounted in the wet well, which transmits the wet well water level to a controller mounted in the control panel. The controller initiates the on/off sequence for the

pumps. No redundant level control system to provide back-up control of the pumps is available. The station has dedicated elapsed time meters for the pumps. The control panel has a flashing light to signify alarm conditions.

Mechanically, the station is rated "Good" and it is rated "Good" from an electrical standpoint. Items that are identified as potential maintenance concerns are as follows:

- No bypass pump connection to the force main is available.
- No connection for a portable generator or, emergency generator is available at the site.
- The station has no remote telemetry to transmit alarm or other station conditions.
- No redundant system for pump control is available.
- The piping and valves inside the valve vault are too close to the vault walls, creating difficulty in accessing the valves for repair or replacement.
- The access hatches were covered with mulch at the time of the site visit. Mulch has been placed around the station at depths which has created a slope toward the openings, creating a safety hazard. The mulch is very slick, especially when wet.
- The discharge pipes from the pumps are installed in a location too close to the guide rails. When removing the pumps, the pump guide brackets wedge against the pipe flanges, making it difficult to pull the pumps.

The station presently receives flow from approximately 257 single-family residential customers which are served by the collection lines in the basin draining to the station.

The 5' diameter wet well has a maximum of 10 feet available for storage which equates to 1,409 gallons. In order to provide a 10 minute cycle time (6 starts per hour), 890 gallons is required at peak dry weather flow. The wet well therefore has excess capacity available.

Rolling Links Pump Station

The Rolling Links Pump Station is located at 51 Rolling Links Boulevard at the back of the lot. The pumps are mounted in a 5' diameter precast concrete wet well and, the discharge check valves, plug valves and, other station piping are housed in a 4'X8' cast-in-place concrete vault. The electrical and instrumentation components are housed in a stainless steel cabinet mounted on a uni-strut frame adjacent to the station.

The station presently contains 2 submersible pumps, which are mounted on stainless steel guide rails and connected to the 4" discharge piping through a discharge elbow mounted to the bottom of the wet well. The existing pumps are Flygt pumps driven by 10 horsepower, 1735 RPM motors. The actual pump design point is not available. Drawdown tests for the pumps resulted in flow rates of 195 GPM for each pump.

The station pumps through a 6" diameter PVC force main which extends approximately 770 feet to the discharge manhole on Riverside Drive approximately 500 feet east of its intersection with Rolling Links Boulevard. The discharge is at approximate elevation 904 feet MSL.

The pump station site is accessed by a gravel drive that extends approximately 120 feet from Rolling Links Boulevard. The site is not fenced. A yard hydrant is available for wash down of the pumps and wet well.

The pump station power is 120/240V, 3-phase from two 25 kVA pad mounted transformers located on-site. Power enters the station underground from the transformer to a 100A circuit breaker mounted adjacent to the control panel.

Control of the pumps is initiated through a submersible pressure transducer, mounted in the wet well, which transmits the wet well water level to a controller mounted in the control panel. The controller initiates the on/off sequence for the pumps. No redundant level control system to provide back-up control of the pumps is available. The station has dedicated elapsed time meters for the pumps. The control panel has a flashing light to signify alarm conditions.

Mechanically, the station is rated "Good" and it is rated "Fair" from an electrical standpoint. Items that are identified as potential maintenance concerns are as follows:

- No bypass pump connection to the force main is available.
- No connection for a portable generator or, emergency generator is available at the site.
- The station has no remote telemetry to transmit alarm or other station conditions.
- No redundant system for pump control is available.
- There are no air valves on the pump discharge pipes.
- The wet well hatch is small for the application. The pumps barely clear the hatch when they are being pulled. Damage to the pumps or hatch could occur if maintenance personnel are not careful when pulling the pumps.
- The access hatch to the valve vault is almost 1' below the surrounding ground. Water stands over the hatch during periods of rainfall. This could be a safety issue during the winter months as ice may form over the hatch, causing maintenance personnel to slip and fall.

Scarboro Pump Station

The Scarboro Pump Station is located on Scarboro Road, approximately 7,500 feet south of its intersection with Chesapeake Drive. The pumps are mounted in a 10' diameter steel "can", manufactured by the Clow Corporation that is accessed through a 3' diameter steel access tube. The station piping, valves, and other mechanical and electrical equipment are also located in the "can". A sump pump, dehumidifier, and exhaust fan are also located in the steel "can".

The station presently contains 2 vertical mounted, solids handling centrifugal pumps, which take suction through dedicated pipes extending into the wet well. The existing pumps are Yeomans pumps driven by 50 horsepower, 1,750 RPM, Marathon motors. Each pump is rated at 650 GPM at 185 FT total dynamic head.

The station pumps through an 8" diameter force main which extends 4,300 feet and discharges to a manhole approximately 200 feet south of the Scarboro Road/ Union Valley Road intersection. The discharge is at approximate elevation 913 feet MSL.

The pump station site includes a grassed parking/turn around area with a gravel access drive from Scarboro Road. The site is fenced. Undergrowth is heavy on three sides of the site, outside the fence.

The pump station power is 460V, 3-phase from pole mounted transformers located adjacent to the site. Power enters the station site overhead from the transformers to a drop pole through 175A fused disconnect mounted on the pole. Power to the station components is underground from the disconnect to the steel "can".

Control of the pumps is initiated through a submersible pressure transducer, mounted in the wet well, which transmits the wet well water level to a controller mounted in the control panel that initiates the on/off sequence for the pumps. A single high level float in the wet well will start a single pump should the pressure transducer fail. The station does not have elapsed time meters for the pumps.

Mechanically, the station is rated "Replace" and it is rated "Poor" from an electrical standpoint. Items that are identified as potential maintenance concerns are as follows:

- No bypass pump connection to the force main is available.
- No connection for a portable generator or, emergency generator is available at the site.
- The piping and valves inside the station are corroded.
- Foam was noted in the wet well.
- The seals on both pumps were leaking.
- Access to the pumps, piping, valves, and electrical equipment is gained by climbing down a ladder, which creates potential safety hazards.
- The underground installation is damp, which is detrimental to the electrical components inside the station.
- There is minimal room for equipment maintenance and removal inside the station.
- At 20+ years old, the station is approaching the end of its useful life.

The station presently receives flow from the Pumphouse Road Pump Station and, commercial customers within the Commerce Park development.

The 8' diameter wet well has a maximum of 6.5 feet available for storage which equates to 2,443 gallons. In order to provide a 10 minute cycle time (6 starts per

hour), 7,500 gallons is required at peak dry weather flow. The calculated cycle time for the pumps is 3 minutes, which is unacceptable. Since the major contributor of flow to the station is the Pumphouse Road station, the station pumps each time the Pumphouse Road station starts. At present, Pumphouse Road does not have excess inflow, which allows it to pump only a short time before shutting off. The wet well at Scarboro is able to dampen the flow sufficiently to prevent overflows. Should the load on Pumphouse Road increase significantly, problems would arise at Scarboro.

The station should be scheduled for replacement before the load on Pumphouse Road increases.

Southwood Pump Station

The Southwood Pump Station is located south of East Southwood Lane at its intersection with Shagbark Lane. The pumps are mounted in a 6' diameter precast concrete wet well and, the discharge check valves, plug valves and, other station piping are housed in a 4'-8" X 5'-10" concrete block vault. The electrical and instrumentation components are housed in a stainless steel cabinet mounted on a uni-strut frame adjacent to the station.

The station presently contains 2 submersible pumps, which are mounted on galvanized steel guide rails and connected to the 4" discharge piping through a discharge elbow mounted to the bottom of the wet well. The existing pumps are Flygt pumps driven by 10 horsepower, 1735 RPM motors. Each pump is rated at 425 GPM at 45 FT total dynamic head.

The station pumps through an 8" diameter PVC force main which extends 2638 feet east along East Southwood Lane, cross country to Sweetgum Lane, and along the south side of Sweetgum Lane to a manhole at the end of the cul-de-sac. The discharge is at approximate elevation 792 feet MSL.

The pump station is at the front common corner of two lots and is accessed directly from the roadway. The site is not fenced. A yard hydrant is available for pump and wet well cleaning.

The pump station power is 460V, 3-phase from 25 kVA pad mounted transformers located on-site. Power enters the station underground from the transformers to a 60A fused disconnect. Station controls are housed in a stainless steel control panel mounted on a uni-strut frame.

Control of the pumps is initiated through a submersible level probe, mounted in the wet well, which transmits the wet well water level to a controller mounted in the control panel which initiates the on/off sequence for the pumps. A pressure transducer level control system provides back-up control of the pumps should the probe fail. The control panel has a flashing light to signify alarm conditions.

Mechanically, the station is rated "Fair" and it is rated "Poor" from an electrical standpoint. Items that are identified as potential maintenance concerns are as follows:

- No connection for a portable generator or, emergency generator is available at the site.
- The station has no remote telemetry to transmit alarm or other station conditions.
- The ground wire to the control panel is disconnected from the ground rod.
- The fused disconnect enclosure is very corroded.
- The galvanized steel guide rails are corroded and in need of replacement.
- Pump #2 was very difficult to remove due to the corroded guide rails.
- The lifting rings on top of the wet well should be removed (tripping hazard).
- Grease buildup was noted in the wet well.

Summit Ridge Pump Station

The Summit Ridge Pump Station is located at 720 South Illinois Avenue in the Summit Ridge development. The pumps are mounted in an 6' diameter precast concrete wet well and, the discharge check valves, plug valves, air/vacuum valves and, other station piping are housed in a 6'X 8' precast concrete vault. Both the wet well and valve vault have the XYPEX additive in the concrete. The electrical and instrumentation components are housed in a stainless steel cabinet mounted on a uni-strut frame adjacent to the station.

The station presently contains 2 submersible pumps, which are mounted on stainless steel guide rails and connected to the 4" discharge piping through a discharge elbow mounted to the bottom of the wet well. The existing pumps are KSB pumps driven by 10 horsepower, 1,745 RPM motors.

The pump station is accessed from South Illinois Avenue along the paved access road to the Summit Ridge development. A diaphragm type pressure sensor, with gauge, is located in the valve vault. The gauge is unreadable. A yard hydrant is available for pump and wet well cleaning. A bypass pump connection is available in the valve vault.

The pump station power is 460V, 3-phase from a 75 kVA pad mounted transformer located on-site. Power enters the station underground from the transformer to a 40A fused disconnect mounted adjacent to the control panel.

Control of the pumps is initiated through a submersible pressure transducer, mounted in the wet well, which transmits the wet well water level to a controller mounted in the control panel which initiates the on/off sequence for the pumps. A 5-float redundant level control system provides back-up control of the pumps should the pressure transducer fail. The station has a dedicated elapsed time meter for each pump. The control panel has a horn and flashing light to signify alarm conditions.

Mechanically, the station is rated "Excellent" and it is also rated "Excellent" from an electrical standpoint. Items that are identified as potential maintenance concerns are as follows:

- No connection for a portable generator or, emergency generator is available at the site.
- The station has no remote telemetry to transmit alarm or other station conditions.
- The conduit seals in the wet well are failing.
- When the pumps were pulled, it appeared that there was mud in the wet well.
- The discharge pipe flanges interfere with pump removal.
- The air valve discharge is not piped out of the valve vault, creating the potential for corrosion of the metals in the vault.

WATO Pump Station

The WATO Pump Station is located at 113 Eastburn Lane, behind an abandoned radio station building. The pumps are mounted in a 4'X4' concrete wet well and, the discharge check valves, plug valves and, other station piping are housed in a 6'X8' precast concrete vault. The electrical and instrumentation components are

housed in a stainless steel cabinet mounted on a uni-strut frame adjacent to the station.

The station presently contains 2 submersible pumps, which are mounted on stainless steel guide rails and connected to the 4" discharge piping through a discharge elbow mounted to the bottom of the wet well. The existing pumps are Flygt pumps driven by 3 horsepower, 1,700 RPM motors. Each pump is rated at 80 GPM at 34 FT total dynamic head.

The station pumps through a 4" diameter cast iron force main which extends 574 feet and discharges to a manhole west of the Eastburn Lane/ East Drive intersection (on easement). The discharge is at approximate elevation 853 feet MSL.

The pump station site includes a gravel parking/turn around area with paved access from Eastburn Lane. The site is not fenced.

The pump station power is 120/240V, 3-phase from pole mounted transformers located on-site. Power enters the station underground from the drop pole, which also supports the revenue meter, to a 100A fused disconnect mounted adjacent to the control panel.

Control of the pumps is initiated through a submersible pressure transducer, mounted in the wet well, which transmits the wet well water level to a controller mounted in the control panel which initiates the on/off sequence for the pumps. A 4-float redundant level control system provides back-up control of the pumps should the pressure transducer fail. The station has a dedicated elapsed time meter for each pump. The control panel has a flashing light to signify alarm conditions.

Mechanically, the station is rated "Excellent" and it is also rated "Excellent" from an electrical standpoint. Items that are identified as potential maintenance concerns are as follows:

- No bypass pump connection to the force main is available.
- No connection for a portable generator or, emergency generator is available at the site.
- The station has no remote telemetry to transmit alarm or other station conditions.
- No yard hydrant for water to wash down the pumps or wet well is available.

The 4'X4' wet well has a maximum of 2.7 feet available for storage which equates to 323 gallons. In order to provide a 10 minute cycle time (6 starts per hour), 50 gallons is required at peak dry weather flow. The wet well therefore has excess capacity available.

Warehouse Road Pump Station

The Warehouse Road Pump Station is located adjacent to Warehouse Road approximately 250 feet east of Dresden Road. The station is surrounded on 3 sides by thick undergrowth. The pumps are mounted in a 4'X4' concrete wet well and, the discharge check valves, plug valves, and, other station piping are housed in a 4'X4' concrete vault. The electrical and instrumentation components are housed in a stainless steel cabinet mounted on a uni-strut frame adjacent to the station.

The station presently contains 2 submersible pumps, which are mounted on stainless steel guide rails and connected to the 4" discharge piping through a discharge elbow mounted to the bottom of the wet well. The existing pumps are Flygt pumps driven by 2.2 horsepower, 1,670 RPM motors. Each pump is rated at 175 GPM at 10 FT total dynamic head.

The station pumps through a 4" diameter cast iron force main which extends 90 feet and discharges to a manhole north of Warehouse Road and east of the station. The discharge is at approximate elevation 829 feet MSL.

The pump station is accessed by a gravel drive from Warehouse Road. The site is fenced. A yard hydrant is available for wash down of the pumps and wet well. The wet well is accessed by a set of concrete steps.

The pump station power is 120/240V, 3-phase from 25 kVA pad mounted transformers located adjacent to the site. Power enters the station overhead from the transformers to a drop pole and through 60A fused disconnect mounted adjacent to the control panel.

Control of the pumps is initiated through a submersible level probe, mounted in the wet well, which transmits the wet well water level to a controller mounted in the control panel which initiates the on/off sequence for the pumps. A 2-float redundant level control system provides back-up control of the pumps should the pressure transducer fail. The station has a dedicated elapsed time meter for each pump. The control panel has a flashing light to signify alarm conditions.

Mechanically, the station is rated "Good" and it is also rated "Good" from an electrical standpoint. Items that are identified as potential maintenance concerns are as follows:

- No bypass pump connection to the force main is available.
- No connection for a portable generator or, emergency generator is available at the site.
- The station has no remote telemetry to transmit alarm or other station conditions.
- The fence surrounding the site is overgrown.
- A tree inside the fence interferes with service truck access to the station.
- A pole guy wire on the site interferes with pump removal operations.
- The lock on the electrical disconnect was "frozen" and could not be opened.

The station presently receives flow from 2 commercial customers which are served by the collection lines in the basin draining to the station.

The 4' X 4' wet well has a maximum of 2.6 feet available for storage which equates to 309 gallons. In order to provide a 10 minute cycle time (6 starts per hour), 50 gallons is required at peak dry weather flow. The wet well has excess capacity available.

West Outer Pump Station

The West Outer Pump Station is located at 1129 West Outer Drive. The station is behind the homes at 1129 and 1127 West Outer Drive. The pumps are mounted in a 5' diameter precast concrete wet well and, the discharge check valves, plug valves, air/vacuum valves and, other station piping are housed in a 6'X 6' precast concrete vault. The electrical and instrumentation components are housed in a stainless steel cabinet mounted on a uni-strut frame adjacent to the station.

The station presently contains 2 submersible pumps, which are mounted on stainless steel guide rails and connected to the 2" discharge piping through a discharge elbow mounted to the bottom of the wet well. The existing pumps are KSB grinder pumps driven by 23 horsepower, 3,500 RPM motors. Each pump is rated at 45 GPM at 224 FT total dynamic head.

The station pumps through a 3" diameter force main which extends 2,644 feet along West Outer Drive, and discharges to a manhole behind 1096/1097 West Outer Drive. The discharge is at approximate elevation 1088 feet MSL.

The pump station is accessed through Oliver Springs from Sugar Road along a gravel access drive. The site is not fenced but, the access drive is gated. A yard hydrant is available for pump and wet well cleaning.

The pump station power is 120/240V, 3-phase from pole mounted transformers located on West Outer Drive. Power enters the station underground from the transformers to a 200A fused disconnect mounted adjacent to the control panel.

Control of the pumps is initiated through a submersible pressure transducer, mounted in the wet well, which transmits the wet well water level to a controller mounted in the control panel which initiates the on/off sequence for the pumps. The station has a dedicated elapsed time meter for each pump. The control panel has a flashing light to signify alarm conditions.

Mechanically, the station is rated "Fair" and it is rated "Poor" from an electrical standpoint. Items that are identified as potential maintenance concerns are as follows:

- No bypass pump connection to the force main is available.
- No connection for a portable generator or, emergency generator is available at the site.
- The station has no remote telemetry to transmit alarm or other station conditions.
- No redundant system for pump control is available.
- Grease buildup is reported to be a problem at the station.
- The discharge from the air release valves is not piped out of the valve vault, creating the potential for excessive corrosion on the metal components in the vault.
- Vehicular access to the station requires personnel to travel outside the service area.

The station presently receives flow from approximately 100 single-family residential customers which are served by the collection lines in the basin draining to the station.

The 5' diameter wet well has a maximum of 4.5 feet available for storage which equates to 660 gallons. In order to provide a 10 minute cycle time (6 starts per hour), 350 gallons is required at peak dry weather flow. The wet well has excess capacity available.

Westview Pump Station

The Westview Pump Station is located at 129 Westview Lane behind the home at 121 Westview Lane. The pumps are housed in a fiberglass enclosure mounted on a concrete pad. The pad is poured around a 7' diameter precast concrete wet well. The discharge check valves, plug valves, air release valve and other mechanical appurtenances are located inside the enclosure. The electrical and instrumentation components are housed inside a panel which is mounted to a metal frame at one end of the enclosure.

The station presently contains a "series" pumping arrangement with a total of 4 pumps. 2 pumps that take suction from the wet well are piped directly to 2 additional identical pumps, creating the series arrangement. In order to generate the head necessary to pump sewage out of the wet well to the discharge manhole, 2 pumps are operated in series, one pumping to another, which generates the required head. All pumps and motors are mounted inside the fiberglass enclosure directly over the wet well. The existing pumps are Hydromatic pumps driven by 40 horsepower, variable RPM, US motors. Each pump is rated at 175 GPM at 93 feet of head. The total dynamic head is therefore 186 feet (2 X 93 feet).

The station pumps through a 6" diameter PVC force main which extends 720 feet along an easement to the discharge manhole (on easement) behind 103 Westview Lane. The discharge is at approximate elevation 1,145 feet MSL.

The pump station site is accessed by a gravel access road extending from the paved street between 127 and 129 Westview Lane. The access road follows a right-of-way between 127 and 129 Westview and then generally follows a gravity sewer line to the station. The site is not fenced.

The pump station power supply is 120/240V, 3-phase from a 50 kvA pad mounted transformer located adjacent to the pump station. Power enters the station underground from the transformer connecting to a revenue meter at the station, which acts as the disconnect. Each pump has a 150A main electrical feed.

Control of the pumps is initiated through 2 floats, mounted in the wet well, which initiate the on/off sequence for the pumps through rising and falling water levels in the wet well. No redundant level control system is available at the station. The station has dedicated elapsed time meters for each pump to monitor run times. The station has an alarm light which flashes to notify of alarm conditions but, has no telemetry to transmit alarm or status conditions to the WWTP.

The station presently receives flow from approximately 40 single-family residential customers which are served by the collection lines in the basin draining to the station.

The pump station was mounted on the 7' diameter wet well at a location which prevented access to the influent pipe, therefore no determination could be made with respect to the available storage. Based on information provided in the 1997 Master Plan, the available storage is approximately 900 gallons. In order to provide a 10 minute cycle time (6 starts per hour), 140 gallons is required at peak dry weather flow. The wet well therefore has excess capacity available.

Mechanically, the station is rated "Replace" and it is also rated "Replace" from an electrical standpoint. The specifications and design for the replacement of this station were completed in June 2011. The replacement of this station requires an easement, which is currently being negotiated. The replacement project for this station should be bid in September 2011 with project completion by June 2012.

Whippoorwill Pump Station

The Whippoorwill Pump Station is located at 104 Whippoorwill Lane. The pumps are mounted in a 6'X7' precast concrete wet well with a 6' diameter precast concrete riser mounted on top and, the discharge check valves, plug valves, air/vacuum valves and, other station piping are housed in a 6'X6' precast concrete vault. The electrical and instrumentation components are housed in a stainless steel cabinet mounted on a uni-strut frame adjacent to the station.

The station presently contains 2 submersible pumps, which are mounted on stainless steel guide cables and connected to the 4" discharge piping through a discharge elbow mounted to the bottom of the wet well. The existing pumps are KSB pumps driven by 20 horsepower, 1,750 RPM motors. Each pump is rated at 300 GPM at 96 FT total dynamic head.

The station pumps through a 6" diameter PVC force main which extends 566 feet and discharges to a manhole behind 1097 West Outer Drive (on easement). The discharge is at approximate elevation 812 feet MSL.

The pump station site includes a parking/turn around area with access from Whippoorwill Lane. The site is not fenced. The station includes a Pur-A-Fil drum air scrubber to control odors at the site.

The pump station power is 460V, 3-phase from a 45 kVA pad mounted transformer located on-site. Power enters the station underground from the transformer to a 200A fused disconnect mounted adjacent to the control panel.

Control of the pumps is initiated through a submersible pressure transducer, mounted in the wet well, which transmits the wet well water level to a controller mounted in the control panel which initiates the on/off sequence for the pumps. A 5-float redundant level control system provides back-up control of the pumps should the pressure transducer fail. The station has a dedicated elapsed time meter for each pump. The control panel has a horn and flashing light to signify alarm conditions.

Mechanically, the station is rated "Good" and it is rated "Excellent" from an electrical standpoint. Items that are identified as potential maintenance concerns are as follows:

- No bypass pump connection to the force main is available.
- No connection for a portable generator or, emergency generator is available at the site.
- The station has no remote telemetry to transmit alarm or other station conditions.
- No yard hydrant is available for pump and wet well wash down
- Debris was noted in the wet well.

The station presently receives flow from approximately 135 single-family residential customers which are served by the collection lines in the basin draining to the station and, the following pump stations:

- William Lane
- Westview

The 6'X7' wet well has a maximum of 7 feet available for storage which equates to 2,200 gallons. In order to provide a 10 minute cycle time (6 starts per hour),

3,420 gallons is required at peak dry weather flow. The calculated cycle time for the pumps at peak dry weather flow is approximately 6 minutes, which is within the acceptable range for the motors. The wet well is borderline with respect to available capacity. Realistically, flow from the two stations pumping to Whippoorwill would not enter the station at the same time. The gravity lines that the force mains discharge to would dampen the flow.

Williams Pump Station

The Williams Pump Station is located at the end of William Lane, east of its intersection with Winchester Circle. The pumps are mounted in a 7' diameter precast concrete wet well and, the discharge check valves, plug valves, air/vacuum valves and, other station piping are housed in a 6'X7' precast concrete vault. The electrical and instrumentation components are housed in a stainless steel cabinet mounted on a uni-strut frame adjacent to the station.

The station presently contains 2 submersible pumps, which are mounted on stainless steel guide cables and connected to the 4" discharge piping through a discharge elbow mounted to the bottom of the wet well. The existing pumps are KSB pumps driven by 49 horsepower, 1,750 RPM motors. Each pump is rated at 120 GPM at 210 FT total dynamic head.

The station pumps through a 4" diameter force main which extends 1,454 feet and discharges to a manhole behind 108 Winchester Circle (on easement). The discharge is at approximate elevation 1,029 feet MSL.

The pump station power is 460V, 3-phase from a pad mounted transformer located on-site. Power enters the station underground from the transformer to a 200A fused disconnect mounted adjacent to the control panel.

Control of the pumps is initiated through a submersible pressure transducer, mounted in the wet well, which transmits the wet well water level to a controller mounted in the control panel which initiates the on/off sequence for the pumps. A 2-float redundant level control system provides back-up control of the pumps should the pressure transducer fail. The station has a dedicated elapsed time meter for each pump. The control panel has a flashing light to signify alarm conditions.

Mechanically, the station is rated "Good" and it is rated "Excellent" from an electrical standpoint. Items that are identified as potential maintenance concerns are as follows:

- No bypass pump connection to the force main is available.
- No connection for a portable generator or, emergency generator is available at the site.
- The station has no remote telemetry to transmit alarm or other station conditions.
- The connection between the guide cables and concrete structure is heavily corroded, which could lead to failure of the connection.
- The pressure gauge connected to the diaphragm pressure sensor is inoperable.

The station presently receives flow from approximately 57 single-family residential customers which are served by the collection lines in the basin draining to the station.

The 7' diameter wet well has a maximum of 6.5 feet available for storage which equates to 1,871 gallons. In order to provide a 10 minute cycle time (6 starts per hour), 200 gallons is required at peak dry weather flow. The wet well therefore has excess capacity available.

Wolf Creek Pump Station

The Wolf Creek Pump Station is located at 108 Pavilion Drive. At the time of the site visit, the station had not been accepted by the City and little information was available with respect to the pump design conditions, force main sizing and routing and, other information.

Mechanically, the station is rated "Poor" and it is rated "Good" from an electrical standpoint. Items that are identified as potential maintenance concerns are as follows:

- The station has no remote telemetry to transmit alarm or other station conditions.
- The check valve on pump #2 was inoperable, which was allowing flow from pump #1 to drain back into the wet well.
- A pipe in the valve vault was broken at the valve due to no pipe supports under the valve.
- No lock was installed on the wet well hatch.

2. Routine Operations

Routine pump station operations mainly consists of preventative maintenance activities which anticipates what is going to go wrong and preventing it from happening. If something does go wrong, the problem is identified and corrected or repaired. Preventative maintenance is the most effective and efficient type of maintenance. It is a systematic approach for conducting maintenance activities prior to any equipment failure for the purpose of extending equipment life, reducing maintenance cost, and increasing reliability.

As most utilities have discovered, as more resources are dedicated to preventative maintenance, less time and money will have to be spent on the emergency maintenance.

The preventative maintenance program will improve equipment and pump station reliability and provide the following benefits:

- Reduce overtime cost
- Reduce materials cost
- Improve morale
- Reduce capital repair/replacement costs
- Improve the use of human resources
- Improve public relations

A key component of a pump station preventive maintenance program should include the implementation of telemetry, also known as a SCADA system, utilizing technology to assist with detection of potential problems. Another component of pump station maintenance is the standardization of equipment installed in each station. In order to standardize the control panels in each pump station, the City of Oak Ridge developed a specification for the required panels. The specified panels utilize the latest in pump control and are equipped for full SCADA implementation.

The IMS/SCADA/GIS will allow both management and operations to institute a true asset management system. A companion document will address pump station operation programs which will be included in the supporting documentation for MOM.

3. Emergency Pump Station Program

Emergencies are incidents that require immediate responses to the potential consequences that can affect public health and safety, property and environmental damage. The collection system is subject to a wide variety of emergency situations. These can range from recurring incidents to much more severe emergencies that are the results of human events or natural disasters. Some of the emergencies that could occur in the collection system are:

- Stoppages and overflows
- Power failure in pump stations
- Major equipment or system failure in pump stations
- Hazardous toxic spills
- Work accidents
- Fires and explosions
- Natural disasters-earthquakes, floods, tornadoes, blizzards
- Collapses or failures of force mains and main gravity lines

Emergencies are classified as normal emergencies and extraordinary emergencies. Normal emergencies, such as line stoppages and overflows, may occur with a regular frequency and are routine events. They are somewhat predictable; we know they will happen, we just don't know when. The maintenance staff must be prepared to respond to normal emergencies, usually with internal staff that include appropriate procedures, spare parts, repair materials, equipment and trained personnel.

Extraordinary emergencies are those not classified as normal or routine events. They occur with less frequency and can have a greater impact on public health and the environment. Emergencies caused by natural events tend to affect wider geographic areas and will affect other utilities and services. Managing such emergencies usually requires resources outside the utility and involves more planning and response coordination than other normal emergencies.

A good preventive maintenance programs will minimize routine emergencies by reducing stoppages and overflows and maintaining system and equipment functionality.

The objectives of our pump station emergency program are:

- Develop an effective response to system failure
- Minimize SSO's
- Comply with regulatory requirements

- Ensure the public health and safety
- Protect the environment

The City of Oak Ridge Sewer Overflow Response Plan (SORP) addresses pump station alarm responses. Also, there is a procedure for responding to Wet-well/Dry-well stations and Submersible type stations.

Emergency procedures pertaining to pump station in the Sewer Overflow Response Plan (SORP) are:

- Sewer Force Main Breaks
- Air Release and Vacuum Valve Failure
- Pump Station Alarm Response Plan
- Response to Wet-well/Dry-well Stations
- Response to Submersible Stations
- Pump Station Failure Due to Secondary Power Failure
- Pump Station Failure Due to Valve Pit, Pump or Valve Failure
- Pump-Out Procedures

4. Emergency Equipment and Contacts

Electrical

The electric system in Oak Ridge is operated by the City of Oak Ridge Electric Department. They are located in the same building with the Public Works Department. Emergency contact with the Electric Department is usually by radio. They can be reached on the same radios that the Wastewater Department utilizes. Their office land line number is 865-425-1803. Response time with the department is excellent.

Three of the larger capacity wastewater pump stations have diesel generators that will activate when the stations loses power. These stations are:

- East Plant
- Emory Valley
- Park Meade

The City of Oak Ridge has arrangements with the following companies for the rental of emergency generators:

- Nixon Power Services Company
  297 Hill Avenue
  Nashville, TN. 37210
  615-244-0650

- Stowers Industrial Power
  6301 Old Rutledge Pike
  Knoxville, TN. 37924
  865-595-1036

The City plans to purchase two portable generators, one large and another medium size, that will run the remaining pump stations in the case of an extended power outage. These generators will be portable and easily transported to different locations.

All new design pump stations will have the required equipment necessary for the connection of a portable generator. All existing pump station swill be retrofitted with either a new control panels with the appropriate equipment or an external transfer switch which will be installed on the existing control panel to allow for fast, easy and proper connection of a portable stand-by generator. In addition the City will maintain contracts with two different vendors as mentioned previously for the rental of generators if required.

All new design pump stations will have by-pass pump connections installed at the time of construction and all existing stations are currently in the process of having by-pass pump connections installed. In addition the City will maintain contracts with two different vendors for the rental of generators if required.

Pumps that are utilized in the pump stations are listed below along with the suppliers:

- Flygt- Nedrow & Associates
  2233 Southpark Drive
  Murfreesboro, TN. 37128
  865-867-7576

- KSB & Hydromatic- Water & Waste Equipment Inc.
  2335 Shady Lane
  Cleveland, TN. 37312
  423-479-2084

- Gorman Rupp- Southern Sales Inc.
  2929 Kraft Drive
  Nashville, TN. 37204
  615-245-0066

Some of the parts needed for repairs are kept in stock but if there is a need to order a part, delivery can be made in a very short time or a trip to the vendor to pick it up.

There are several small pumps that are portable and easy to transport. One of our larger portable pumps is a Gorman Rupp six inch trash pump. It is driven by a four cylinder gas powered Ford motor.

The City of Oak Ridge has arrangements with the following Companies to rent pumps:

- Stone Pump and Trench
  10000 Parkside Drive
  Knoxville, TN. 37922
  865-691-4933

- Heartland Pump Rental & Sales, Inc.
  4001 Murfreesboro Road
  Antioch, TN. 37013
  615-471-4219

5. Record Keeping

The City of Oak Ridge has chosen to replace its old method of record keeping with a new Information Management System (IMS) purchased from Infor Enterprise Assets Management Systems. The new IMS will allow the City to perform Management, Operations, Maintenance, Compliance Tracking and Perform Indicators Computations. Record keeping will be consolidated into one central location that will be accessible to many individuals.

Some of the functions of the IMS are:

- Maintain preventative maintenance and inspection schedules
- Track repair and work orders
- Organize capital replacement plans/projects

- Manage tool and equipment inventory
- Create purchase orders
- Record customer service inquiries, complaints and requests
- Provide measurement of effectiveness of programs of operations and maintenance activities

All aspects of activities being performed within the City of Oak Ridge Wastewater Department will be registered and tracked with the IMS. This would include all treatment, collection, compliance, pump station maintenance, ARV-Air/Vacuum Valves maintenance and customer concerns.

Management and Engineers within the department will be able to access this information and plan future work in a more reliable manner.

6. Force Mains and Air Release/Vacuum Valves

Regular inspection of the routes of force mains to ensure that they are working properly is essential. Most all of the force mains are located on public right of ways and if a break occurs, it will be seen and reported to the City for immediate action. The portion of force mains that are located on easements and in hidden areas are checked on a regular basis.

When a force main does break, an investigation occurs to determine the cause of the break. The cause could occur because of improper installation, human error, water hammer or other unforeseen action. Air release and vacuum valves are installed to prevent force mains failure due to water hammer. These valves must be maintained on a periodic basis. Both of these valves may fail to operate reliably if grease or other foreign material is allowed to accumulate in the valve body or on the operating mechanism.

Air Release- Air /Vacuum Valve Inspection Instruction

Set up the site for the inspection
- Gather required equipment and insure equipment is in operating order
- Develop traffic safety plan if applicable

Prepare for confined space permit entry
- Generate a confined space entry permit

- Conduct a hazard assessment of the premises and job task
- Remove manhole lid
- Conduct atmospheric teat and provide ventilation if necessary
- Determine type of personal protection equipment needed
- Set up retrieval equipment
- Post confined space entry permit

Conduct inspection

- Visually inspect valve for leaks, cracks, or other physical defect prior to entering manhole
- Enter manhole in accordance with procedures for confined space entry
- Perform a thorough inspection of the valve and test valve as directed by manufacturer
- Remove all tools, equipment from manhole
- Exit manhole and replace lid
- Close confined space permit

Air release valve and air/vacuum valve inspection report

All inspection report shall include:

- Valve number
- Date
- Arrival time and departure time
- Inspector(s) name
- Location
- Work performed
- Additional work required
- A copy of the confined space entry permit must be attached

The inspection report will be reviewed by wastewater management and entered into the IMS (Information Management System).

SECTION IV

MAINTENANCE

A. INTRODUCTION

The A.O. addresses maintenance programs in multiple ways. Within twelve (12) months after approval of the Capacity Assessment Plan, the City is to submit a report relative to the condition of the pump stations and force mains. Then, fifteen (15) months after the effective date of the A.O., maintenance programs for both manned and unmanned stations to reduce the need for reactive maintenance. That document will address electrical, mechanical, and physical programs, as well as, a pump station repair program.

This MOM will address the issues in a preliminary fashion with the intent that when the additional information is available, a revision will be prepared.

Gravity line preventative maintenance program is addressed here, as well.

B. MAINTENANCE SCHEDULING

General maintenance of the gravity sewer collection system consists of cleaning and inspection and is necessary to locate defects and deficiencies. Correcting defects discovered during maintenance procedures ranges from minor repairs to major line or manhole rehabilitation.

In response to the Environment Protection Agency (EPA) Administrative Order (A.O.) and in preparation for the Sanitary Sewer Evaluation Study (SSES), the City will smoke test, clean and Close Circuit TV (CCTV) the entire gravity collection system. This work was performed in a very compressed timeframe by City forces supplemented by multiple contractors, representatives from the City's engineering consultant, Lamar Dunn and Associates, Inc., (LD&A) and as many as twenty (20) temporary laborers procured from a local employment agency. The work is being done by regularly working twelve (12) hours per day and frequently seven (7) days per week. This was a one-time effort done at a pace that cannot be maintained on a regular basis. The data gathered from this effort will be used to develop the SSES, design future sewer rehabilitation contracts and will also be entered into the City's Graphical Information System (GIS) as it is developed.

In response to the City's commitment to operate the Wastewater Collection and Transportation System (WCTS) in accordance with the MOM, the City will be required to reorganize the current sewer crews and add a new sewer crew. The addition of a new sewer crew will also require the purchase of equipment required to perform the work tasks.

The current organizational structure and job titles, for the two sewer crews with the responsibility for gravity sewer maintenance is as listed below:

- Operations / Maintenance Manager
  - Sewer Maintenance Crew
    - Utility Crew Chief
    - Utility Maintenance Specialist
    - Maintenance Mechanic (2)
    - Maintenance Worker
  - Sewer Repair Crew
    - Utility Crew Chief
    - Utility Maintenance Specialist
    - Equipment Operations Specialist
    - Maintenance Mechanic
    - Maintenance Worker

With the implementation of the MOM program a new crew will be required to be responsible for the proactive work as specified in the MOM program. This will be accomplished by hiring new employees, relocating existing employees within the Public Works Department and the possible promotion of employees. The addition of a new sewer crew will require the purchase of new equipment as well.

It is anticipated that the reorganized crew structure will include the following three crews and responsibilities:

- Operations / Maintenance Manager
  - Sewer Maintenance Crew
    - Utility Crew Chief
    - Utility Maintenance Specialist
    - Maintenance Mechanic (2)
    - Maintenance Worker

No change to the current positions for this crew. Work responsibilities will be sewer cleaning and reactive to SSO.

Sewer Repair Crew
- Utility Crew Chief
- Utility Maintenance Specialist
- Equipment Operations Specialist
- Maintenance Mechanic
- Maintenance Worker

No change to the current positions for this crew. Work responsibilities will include repair and replace sewer taps, construct point repairs where indicated from data received from the MOM Sewer Crew.

MOM Sewer Crew
- Utility Crew Chief
- Utility Maintenance Specialist
- Maintenance Mechanic
- Maintenance Worker (3)

This crew will comprise of six new positions. Work responsibilities will include all proactive activities required by the implementation of the MOM program such as continuous cleaning and TVing of the WCTS, manhole inspection, smoke testing and flow metering. Flow monitoring will be conducted on a continuing basis with manhole inspections and smoke testing on a seven-year cycle.

With the implementation of the MOM program, personnel will need to be increased. Listed below are the additional personnel positions for the gravity line sewer maintenance activity.

- Utility Crew Chief
- Utility Maintenance Specialist
- Maintenance Mechanic
- Maintenance Worker (3)

With the addition of a new MOM Sewer Crew, existing equipment will be reallocated among the crews based on work tasks, but additional equipment will need to be purchased. The following equipment will need to be purchased to perform the work tasks included with the MOM program implementation.

- Sewer Jet Rodder
- Large Dump Truck
- Small Dump Truck
- Pickup Truck (2)

Upon implementation of the Infor Information Management System (IMS) and when linked to the GIS, the IMS will be used as the main tool for maintenance scheduling. The City intends to completely clean and inspect the entire WCTS every seven years, with portions of the system receiving service more frequently than others.

As part of the data collection effort for the SSES and to provide information for the GIS/IMS, the City is conducting a complete inventory of the WCTS. The actual results of the inventory won't be available before the submission deadline for the MOM. The estimated cleaning schedule will be adjusted based on actual field conditions.

Prior to the Environmental Protection Agency (EPA) A.O., the City has slip-lined or pipe burst approximately 236,000 feet of the WCTS using High Density Polyethylene (HDPE) pipe. This represents approximately 19 percent of the gravity sewer line and the City estimates that another 10 percent is new enough to have been constructed using Polyvinyl Chloride (PVC) pipe and five percent to ten percent concrete pipe leaving approximately 60 percent or 700,000 feet of clay pipe. The amount of clay pipe that will remain in the City gravity collection system after rehabilitation work takes place will be described in the SSES and can only be estimated at this time. It is expected the amount will decrease by at least an additional ten percent.

The City's experience is that clay requires more maintenance than other pipe materials due to being laid in shorter pieces resulting in more joints where roots can penetrate and because it is more brittle resulting in more frequent cracking. The City believes the clay pipe will be cleaned and CCTV on a four-year rotation. The remaining lines of various other materials will be cleaned during the remaining three years of the seven year cycle.

To accomplish the scheduling, staff will use the inventory of sewer main line piping being developed as part of the SSES and for use in the GIS. A query of all locations where clay pipe exists can be performed and the results can be entered into the IMS. The IMS can then be used to create work orders for each clay line segment for cleaning on the desired time basis.

C. SEWER CLEANING

1. Cleaning Equipment

There are several causes for obstructions in gravity sewer main lines. The most common are roots and debris, with the majority of obstructions detected during routine maintenance and can normally be removed before a blockage occurs.

General cleaning of gravity sewer lines will be performed using hydraulically propelled high-velocity jet cleaning equipment. Selection of cleaning tool(s) to be used is based on the condition of the line. Primary consideration is whether cleaning is for the purpose of clearing an existing blockage or routine maintenance. If the later, then whether debris is present that must be removed or whether root removal is necessary. City sewer maintenance personnel have a variety of cleaning tools available for use depending on the application.

City personnel normally clean going from downstream to upstream. When cleaning of an entire section cannot be successfully performed from one manhole the crew will move its equipment to the manhole located at the other end of the line and attempt cleaning the remaining portion.

Sludge, dirt, sand, rocks, grease, roots or any other material that is dislodged from the sewer line during cleaning will be removed at the downstream manhole. Debris may not be pushed from one main line section to the next and may not be washed into pump station wetwells.

At locations where root intrusion exists, the root cutter will be used to remove the roots. The line will then be cleaned using a debris removal tool. A work report showing the presence of roots will trigger the IMS to add the line section to the list of locations for chemical root treatment.

All scheduled cleaning will be performed at times when wastewater flow in main lines is at a minimum. If necessary, the flow should be reduced by manipulation of pump station cycles. Plugging of upstream manholes may be necessary, but in no case may the plug be left in place long enough to create an overflow. Any plugging should be done using an inflatable plug that can be installed, inflated, deflated, and removed from the surface; therefore, not requiring entry into the manhole.

If the cleaning equipment is being followed by a CCTV camera, then the depth of flow in 6" to 10" gravity main lines should not exceed 20% of the pipe diameter and flow in 12" to 24" lines should not exceed 25% of the pipe diameter.

When cleaning gravity sewer main lines, City personnel use baskets located in the downstream manhole to capture any debris including roots larger than ½". In addition, any debris that is washed out of the mainline and into the downstream manhole will be removed and hoisted to the surface in a bucket. If it is necessary for personnel to enter the manhole to install the basket or remove debris, then confined space procedures will be observed and appropriate personal protection equipment (PPE) and fall protection equipment will be deployed. Any material removed during cleaning procedure will be disposed of at the WWTP.

At locations where cleaning is routine maintenance and has been scheduled in advance, affected home owners/residents should be notified in advance of work via door hangers.

At locations where work will be performed in the street, City personnel should set up signs, barricades or barrels for traffic control and public safety, rerouting traffic as necessary and deploying traffic control measures as needed.

At locations where the access manhole is in or near the street and is therefore accessible, the jet rodder or vactor truck will be used to supply water pressure needed to operate the cleaning tool. For locations where the access manhole is behind a house or away from the road or where the hose from a truck will not reach, an easement machine will be transported to the site and the cleaning tool will be attached to the easement machine's hose. The easement machine in turn is attached to the trucks pressure hose.

2. Chemical Cleaning and Root Removal

Intrusion of roots into sewer lines is probably the most destructive problem encountered in the wastewater collection system. Root related sewer problems include:

- Sanitary Sewer Overflows (SSO)
- Structural damage caused by root growth
- Formation of septic pools behind root masses
- Reduction in hydraulic capacity and loss of self-scouting velocity
- Infiltration on areas where pipes are under a water table
- Exfiltration of sewage into soils around cracks or separated joints

In sewer line root control, the City will use the following methods to identify root problems:

- Maintenance histories- maintenance records will show which gravity sewer main lines have experienced stoppages
- Close Circuit TV (CCTV) data – Video from CCTV investigations will provide documentation of the root intrusion and help to assess the extent of root problems
- Visual inspection of gravity sewer main line easements and rights-of-way where gravity sewer main lines are located - walking gravity sewer main line routes, pulling manhole covers and inspecting for root intrusion along with observing tree locations on gravity sewer main line routes
- Commonalties in root prone areas- sewer lines in the same area that were installed at the same time and have similar tree-planting patterns will experience similar root problems

The City maintenance personnel shall use the following methods for root control:

- Non-chemical control
- Physical control
- Mechanical control
- Chemical control

Non-chemical control

Proper planning during sewer line design and construction is a practice that can prevent or minimize tree root invasion problems. Root problems are reduced by carefully installing and inspecting sewer lines during construction to assure joints are properly sealed and controlling the selection of trees species and planting sites near the sewer line. Section 2.09 A of the City Standard Construction Requirements and Details (SCRD) prohibits planting trees in sewer easements or over gravity sewer main lines. The Code Enforcement Division of the Community Development Department is responsible for assuring that building laterals are inspected and the connections to mainline sewers are tight.

Physical control

Physical control of sewer line roots, involve isolating the environment of the sewer line from roots that would cause problems. The City would consider tree removal, sewer pipe replacement, pipe relining and pipe bursting. Administrative and/or engineering staff will review each Water Collection and Transportation System (WCTS) problem on a case-by-case basis and recommend the most cost effective method of repair.

Mechanical controls

Mechanical control is the most common method that the Public Works Department uses to control roots. Mechanical control involves the use of tools and other devices which cuts and removes roots from inside sewers. Hydraulically operated cleaning tools along with jet and flushing equipment will be used by the City for root extraction.

Chemical root control

The City of Oak Ridge WCTS maintenance foreman and operations superintendent requested and received a demonstration of chemical root control from Dukes Root Control. The City is monitoring the locations that were treated to determine the effectiveness. The preliminary results appear to be satisfactory. The City anticipates this being an annual option with an approximate cost of $25,000 which would allow for approximately 13,000 feet of line to be treated.

After implementation of the chemical root control program and the IMS and using the IMS and its record keeping capability, the City anticipates using the following procedure relative to root control:

All responses by the City personnel shall be recorded on work orders. If roots are determined to be the problem, the following actions shall occur:

- For immediate relief the roots must be extracted by mechanical procedures
- A follow up of the affected gravity sewer main line should be chemically treated
- After a period of time, the City shall CCTV the location and review video to determine results

- If pipe joints or cracks are in the pipe allowing for root intrusion, a point repair or replacement should be scheduled
- If the removal of roots and chemical treatment was successful, the area should be placed on a schedule for CCTV review every three years
- If CCTV inspection shows signs of new or returning root intrusion, the locations should be retreated with chemical root control treatment

D. CORROSION AND ODORS

City employees are instructed during routine visual inspection of manholes to look for evidence of corrosion at locations where pump station force main lines discharge. Normally, corrosion occurs when the dissolved oxygen of the wastewater is depleted while being stored in the pump station wetwell and force main.

The City, during the course of routine inspection and maintenance, has previously found locations where hydrogen sulfide gas caused deterioration of the receiving manhole and the downstream collection lines at one of the locations. When this occurs, the receiving manhole and the next two downstream manholes will be rehabilitated using Quadex Aluminaliner. In a case where the manhole(s) is not salvageable, it will be replaced. If the CCTV inspection of the collection lines show deterioration, an appropriate trenchless rehabilitation method is used to renew the pipe.

The City presently has one pump station that, during very warm weather, requires frequent monitoring to ensure offensive odors do not occur. This pump station was constructed with a large wetwell to accommodate a large variance in flow and for future development. Public works personnel have installed an automatic flushing device at this location that can be activated during the summer months, if needed, to flush the station with fresh water causing the pumps to cycle more frequently and reducing holding time.

City personnel have other odor control methods available that are used on an infrequent basis. Twenty (20) pound deodorant blocks containing Para-Di-Cholorobenzene that can be deployed in gravity sewer main line manholes or sewer pump stations for the purpose of masking offensive odors. City personnel will, upon citizen request, seal manhole lids to prevent odor from escaping. To seal manhole lids, a commercially available foam insulation type sealer than can be dispensed from a pressurized can is used.

At present the City has installed drum scrubbers on four pump stations that are in close proximity to residences and at locations where odor complaints have been received. This solution has been successful and the City is now requiring the installation of Purafil ESD Drum Scrubber 100 on all new pump stations that are or may be near structures.

Another aspect of our preventative maintenance program is predictive maintenance. This will involve establishing baselines for equipment and system performance, monitoring performance guidelines over a period of time, and observing changes in performance. With this information City personnel can predict equipment failure and maintenance can be performed on a planned, scheduled basis.

E. PUMPING STATIONS

Critical importance to any maintenance schedule is proper timing. When timing maintenance activities, two important points will be considered: (1) timing the maintenance to take place just before problems or emergencies develop, and (2) timing the frequency of maintenance so that it is efficient economically. The maintenance tasks required for each piece of equipment or system can range from very simple to complex.

Maintenance frequencies will be determined by the conditions that are specific to each pump station. The operation and maintenance manuals that came with the equipment will be referenced to determine most of the maintenance schedules. Other than the operation and maintenance manual, the following will be considered:

- Is the station monitored 24 hours a day using a telemetry system?
- Is the pump station or equipment critical to collection system operations?
- Does the pump station or equipment have a history of frequent failures?
- Is the equipment operating in a harsh environment?

Frequency for pump station maintenance is performed on a weekly, monthly, quarterly, semi-annual or annual schedule. Daily visits are performed if the station is having problems or a repair takes several days to perform.

Maintenance activities are divided into level 1 and level 2 tasks. Level 1 maintenance activities are completed by maintenance personnel who visit the pump station on a periodic basis, daily to weekly, to perform a variety of preventative maintenance tasks. The frequency of the visits depends on the following factors:

- Size of the station

- Type of station
- Extent to which the station is critical to the operation of the collection system
- Reliability of the station
- Remote monitoring or supervisory controls available

Typical level 1 tasks performed by maintenance personnel include observing, recording, and analyzing one or more of the following station operating guidelines:

- Incoming line voltage and current
  1. Utility supplied power problems such as low or high voltage, unbalanced 3 phase power
  2. Pump station changes in load or groundings

- Pump operating levels
  1. Transducer operation is accurate and reading properly
  2. Probe stick is clear of debris and is accurate and reading properly
  3. Changes in the supervisory control system

- Pump operating times
  1. Pump performance problems
  2. Supervisory control problems
  3. Increase or decrease station flow

- Station flow
  1. Identify internal versus external station problems
  2. Isolate external problems

- Pump discharge pressures
  1. Force main problems
  2. Suction condition changes
  3. Pump performance

- Changing pump sequencing (manual alternation)
- Checking for tripped circuit breakers
- Exercising the emergency generator
- Pump station housekeeping
- Exercising the valves
- Lubricating pumps, motors and drives
- Changing the drive belts

- Cleaning the bar screens

The level 1 maintenance activities are performed by maintenance personnel who are responsible for observing and verifying the operation of all systems in the station. They possess a broad background and understanding of various types of equipment and systems installed in pump stations. They may not possess the electrical and mechanical ability that require specialized skill in these areas.

Level 2 maintenance activities are usually performed on a less frequent basis than level 1 maintenance but require specialized skills in specific areas and equipment systems. The level 2 maintenance are usually performed by more experienced electricians and mechanics.

Some of the activities that are performed at level 2 are:

- Voltage control center maintenance
- Supervisory system maintenance
- Instrument and control system maintenance
- Internal control maintenance
- Lighting panel and branch circuit maintenance
- Pump overhaul
- Mechanical seal replacement
- Vibration measurement analysis
- Pneumatic system maintenance
- Valve maintenance and overhaul
- Engine repair and overhaul
- Generator maintenance
- Heating/ventilation/air conditioning maintenance

All maintenance work performed on the pump stations are required to be recorded. The City is currently in the implementation phase of the Infor IMS for pump station maintenance. Upon the completion of the implementation of the Infor IMS, the transfer of the data from pump station maintenance activities will be recorded within the Infor IMS. The estimated completion for the Infor IMS implementation for pump station activities is December 2011.

Pump stations that are involved in the maintenance program according to type are:

Submersible	W-well/D-well	Suction Lift
Centennial Bluff	East Plant	Castlewood
Emory Heights	Emory Valley	Gregory's
Fairbanks	Scarboro	Oak Hills
Graceland		Palisades#1
Gum Hollow		Palisades#2
Home Depot		Pallisades#3
Marina		Palisades#4
Peach Orchard		Park Meade
Pump House Road		Westview
Radisson Cove		
Rivers Run		
Rivers Way		
Rockbridge Greens		
Rolling Links		
Southwood		
Summit Ridge		
Warehouse Road		
WATO		
West Outer		
Whippoorwill		
Williams		
Wolf Creek		

Pump Stations and Maintenance Personnel

The City of Oak Ridge does not have any manned pump stations. All maintenance activities are performed under the direction of the Treatment Plant Maintenance Supervisor. His office is located at the wastewater treatment facility and all maintenance personnel work out of that complex.

The current organizational structure and job titles, for personnel responsible for pump station maintenance is as listed below:

Treatment Plant Maintenance Supervisor
- Treatment Plant Maintenance Crew Chief (1)
- Senior Treatment Plant Maintenance Specialist (1)
- Treatment Plant Maintenance Specialist (1)
- Maintenance Mechanic (1)
- Maintenance Worker (1)

With the implementation of the MOM program personnel and equipment will need to be increased. Listed below is the additional personnel and equipment for the pump station maintenance activity. The additional staffing would be implemented along with the purchase and installation of a SCADA system for the pump stations.

- Treatment Plant Maintenance Specialist (2)
- Maintenance Mechanic (1)
- Boom Truck
- Van Style Truck
- Utility Truck

Typical Frequency for Performing Submersible Pump Station Maintenance Activities
(after installation of SCADA system and upgrade control panels)

SYSTEM OR EQUIPMENT	WEEKLY	MONTHLY	QUARTERLY	SEMI-ANNUALLY	ANNUALLY	Manufacturer Recommend
ELECTRICAL						
Incoming Voltage			1		2	
Circuit Breaker	1				2	
Auto Transfer Switch	1				2	
Motor Control Center	1		2		2	
Branch Circuit Breakers	1				2	
Motor Starters	1		2		2	
Relays	1			2		
Indicating Lights	1				2	
Pump Voltage Read	1		2		2	
Pump Amperage Read	1		2		2	
Infrared Scan				2		
Wiring			2		2	
Pump Sequencing	1					
Pump Operating Levels	1					
Alarms and Levels	1					
Floats	1					
Transducers	2					
Probes	1					
Cooling Fans	1					
Heating System	1					
Lighting Systems		1				
PUMPS						
Bearings						2
Mechanical Seals						2
Mounting						2
Meghommeter						2
Balance						2
Impeller Clearance						2
Capacity						2
Discharge Pressure						2
Run Time	1					
VALVES						
Discharge Valve			1			
Check Valve			1			
Air Valve		1				
Inspect Piping		1				

One (1) - Level one maintenance
Two (2) - Level two maintenance

Typical Frequency for Performing Suction Pump Station Maintenance Activities
(after installation of SCADA system and upgrade control panels)

SYSTEM OR EQUIPMENT	WEEKLY	MONTHLY	QUARTERLY	SEMI-ANNUALLY	ANNUALLY	Manufacturer Recommend
ELECTRICAL						
Incoming Voltage			1		2	
Circuit Breaker	1				2	
Auto Transfer Switch	1				2	
Motor Control Center	1		2		2	
Branch Circuit Breakers	1				2	
Motor Starters	1				2	
Relays	1		2		2	
Indicating Lights	1				2	
Pump Voltage Read	1		2		2	
Pump Amperage Read	1		2		2	
Infrared Scan			2			
Wiring			2		2	
Pump Sequencing	1					
Pump Operating Levels	1					
Alarms and Levels	1					
Floats	1					
Transducers	2					
Probes	1					
Cooling Fans	1					
Heating System	1					
Lighting Systems		1				
PUMPS						
Bearings	1	2			2	
Mechanical Seals	1		2		2	
Mounting	1				2	
Balance						2
Impeller Clearance				2		
Capacity				2		
Discharge Pressure						2
Infrared Scan					2	
Run Time	1					
VALVES						
Discharge Valve			1			
Check Valve			1			
Air Valve			1			
Belts	As Needed					
Inspect Piping				1		
MOTORS						
Bearings	1				2	
Balance	1				2	
Wire Connections			2			
Meghmmeter					2	

SYSTEM OR EQUIPMENT	WEEKLY	MONTHLY	QUARTERLY	SEMI-ANNUALLY	ANNUALLY	Manufacturer Recommend
MOTORS, continued						
Running Temperature			2			
Amperage Draw			2			
Voltage			2			
Coupling			2			
Infrared Scan					2	

One (1) - Level one maintenance
Two (2) - Level two maintenance

Typical Frequency for Performing Dry Pit Pump Station Maintenance Activities
(after installation of SCADA system and upgrade control panels)

SYSTEM OR EQUIPMENT	WEEKLY	MONTHLY	QUARTERLY	SEMI-ANNUALLY	ANNUALLY	Manufacturer Recommend
ELECTRICAL						
Incoming Voltage			1		2	
Circuit Breaker	1				2	
Auto Transfer Switch	1				2	
Motor Control Center	1		2		2	
Branch Circuit Breakers	1				2	
Motor Starters	1				2	
Relays	1		2		2	
Indicating Lights	1				2	
Pump Voltage Read	1		2		2	
Pump Amperage Read	2		2		2	
Infrared Scan			2		2	
Wiring			2		2	
Fuses	1					
Pump Sequencing	1					
Alarms and Levels	1					
Floats	1					
Transducers	2					
Probes	1					
Drive Cooling Fans	1		2		2	
Lighting Systems	1					
PUMPS						
Mechanical Seals	1				2	2
Packing	1		2			2
Bearings	1		2			2
Mounting	1				2	
Balance					2	
Impeller Clearance				2		2
Capacity				2		
Discharge Pressure					2	
Infrared Scan					2	
Run Time	1					
MOTORS						
Bearings	1				2	
Balance	1				2	
Wire Connections			2			
Megohmmeter					2	
Running Temperature			2			
Amperage Draw			2			
Voltage			2			
Coupling			2			
Infrared Scan					2	
Drive Shaft Bearings	1		2		2	

SYSTEM OR EQUIPMENT	WEEKLY	MONTHLY	QUARTERLY	SEMI-ANNUALLY	ANNUALLY	Manufacturer Recommend
VALVES						
Suction Valve			1		1	
Check Valve			1		1	
Surge Valve			2		2	
Inspect Piping		1			2	
AUXILIARY SYSTEMS						
Ventilation Systems	1				2	
Heating Systems	1				2	
Generators	1			2		2
Lighting Systems	1		2			
Protected Water System	1			2		
Bar Screens	1		2			2
Comminutors	1		2			2
Conveyors	1		2			2
Doors and Windows	1				1	
Hatches and Manhole Covers	1					
Locks and Latches	1					
Fences and Gates	1					
Grounds Keeping		1				
Sump Pumps	1					
Water Spickets			1			
Odor Control		1				
Housekeeping			1			
Hazards	1					

One (1) - Level one maintenance
Two (2) - Level two maintenance

Manufacturers' recommendations and running times are other typical factors that we will consider when establishing the maintenance frequencies. A good maintenance schedule should be flexible. Periodically we will review the schedules and made adjustments as needed.

F. SEWER SYSTEM EVALUATION

The City has developed a Sewer System Evaluation Survey (SSES) work plan, which has been submitted and approved by EPA. The routine investigative work to be performed by the City in future years will be consistent with that document.

It is the intent of the City to continue to collect rainfall data and flow data to monitor the condition of the collection system.

G. REHABILITATION

Gravity sewer main lines are rehabilitated for two reasons. The first is to eliminate leaks that allow extraneous water to enter the Wastewater Collection and Transportation System (WCTS) or to prevent wastewater from exiting the WCTS system. The second is to prevent roots, which naturally grow toward sources of moisture, from entering sewer main lines through pipe joints. Both of these conditions can contribute to Sanitary Sewer Overflows (SSO).

Historically most gravity sewer main line repairs have been performed by excavation and replacement. It is still the only way to correct sections of pipes that have become severely misaligned due to differential soil settlement or to repair complete collapses.

In 1994, the City began to use Trenchless pipe rehabilitation technologies. These methods provide the means to install liners inside existing gravity sewer main lines without digging up the entire line section. Some of the methods require excavations for liner insertion and for service reconnections. One method, cured-in-place liners requires no excavation. All of the trenchless technology methods provide liners that do not have joints; thereby, greatly reducing the possibility of water leaking in or out and preventing penetration of tree roots.

1. Main Line Repairs

The need for main line repairs may be obvious and visible such as when a collapse has created a backup that has come to the surface in the form of a Sanitary Sewer Overflow (SSO). A problem of this sort requires an emergency response and must be corrected immediately. In this event procedures specified in the City of Oak Ridge Sanitary Overflow Response Plan (SORP) plan must be followed.

Most defects that require main line repair are not emergencies. The majority of main line defects are found during routine maintenance or during Infiltration and Inflow (I/I) investigation. In most cases, Closed Circuit TV (CCTV) inspection is required to determine the severity of the defect and the urgency of the repair. At locations where flow is still possible but pipe failure is imminent, repairs must be performed quickly; however, at locations where the integrity of the pipe has not been compromised repairs can be scheduled.

The method used for repair of sanitary sewer gravity collection lines will be site specific. The types of repairs are conventional dig and lay point and/or pipe replacement repairs. Trenchless technology repairs include using grout, sewer line pipe bursting, sewer slip lining, or cured-in-place lining. In addition, main line appurtenances including manholes and sewer lateral taps are considered, for purposes of this document, to be part of the main line.

The means and methods for repairs will be chosen by an appropriately qualified crew foreman, personnel from the Public Works engineering staff or by an engineering consultant. City personnel have the ability to perform in-house conventional repairs such as point and pipe replacement and manhole repairs; however, Trenchless Technology repairs must be performed by qualified contractors using specialized equipment.

Means and methods for each type of repair are as follows.

a. Point and Replacement Repairs

Procedure for City personnel:

Dispatch crew(s) to the locations where the problem has been reported and/or discovered. Crews will refer to mapping for location of gravity sewer main lines and also review the adjacent area for obstacles such as structures, fences, landscaping, etc.

When the repair has been scheduled, a TN One Call utility locate will be placed three days prior by calling 811 or 1-800-351-1111. The request may be placed either by phone or on-line. In the event the repair is the result of a collapse or blockage that will require excavation to correct an emergency, an emergency TN One Call locate will be requested.

At locations where repairs have been scheduled in advance, affected home owners/residents will be notified in advance of work via door hangers.

At locations where work will be performed in the street, crews set up signs, barricades or barrels for traffic control and public safety, rerouting traffic as necessary and deploying traffic control measures as needed.

For scheduled repairs, CCTV data should have been previously obtained. The TV log will be reviewed to determine the location of the defect(s) and also the location of any service laterals. For emergency repairs the line must be CCTV inspected prior to digging. This can be done while waiting on a response from the utility line locators.

After CCTV to determine location and type of defect affected, home owners/residents near the location will be notified. Pumping around the line to be repaired may be required. If necessary, set up bypass pumping equipment. If not necessary, prepare for repairs while the line is live.

Excavation will be conducted using all appropriate safety measures including and in accordance with Occupational Safety and Health Administration (OSHA) standards. Shoring shall be used along with ladders and employees will be required to use personal protection equipment. Confined space procedures shall be used along with ventilation and fall protection when personnel entry into manholes is needed.

Repairs shall be executed as specified in section 7.07 Repair of Sanitary Sewer Lines in the Standard Construction Requirements and Details (SCRD). Upon confirmation of integrity of repair, backfill the excavation and restore surface conditions.

The crew leader will fill out a report indicating the time of the call, description of the problem, the repair work done, personnel present and equipment and material used.

If sewage overflowed the Wastewater Collection and Transportation System (WCTS), complete the SSO report as required. Notify the Tennessee Department of Environment and Conservation (TDEC) within the required 24 hours, followed by final report within five days.

b. Pipe Bursting

Pipe Bursting is a process whereby the existing sewer main line is replaced by fragmenting it and installing a replacement polyethylene pipe in its void. There are two common methods for pipe bursting. The most used method is a pneumatic percussive "moling" device suitably sized to break out the old pipe with a flared bursting head. The new polyethylene pipe is attached to the "moling" head and is pulled into place as the bursting head moves along the path of the host pipe. A second less common but acceptable method is inserting a rod into the existing host pipe, attaching a bursting head to the rod and retracting the rod causing the bursting of the host pipe and simultaneously pulling the new polyethylene pipe into place. The installed pipe burst pipe is continuous from manhole to manhole and has no joints thereby eliminating the possibility of I/I and root intrusion.

The City does not have in-house ability to pipe burst sewer main lines. The City must rely on contractor resources to affect this method of repair.

c. Sewer Lining

i. Slip Lining

Slip lining is a process whereby a continuous polyethylene liner is inserted into an existing sewer main line. The outside diameter of the liner is slightly smaller than the inside diameter of the existing sewer main line allowing the liner to slide or be pulled through the existing main line. The installed liner is continuous from manhole to manhole and has no joints: thereby, eliminating the possibility of I/I and root intrusion.

The City does not have in-house ability to slip line sewer main lines. The City must rely on contractor resources to affect this method of repair.

ii. Cured-in-Place

Cured-In-Place Pipe (CIPP) is the insertion of a resin impregnated lining tube which is then cured to form a tight fit against the existing sewer main line pipe. CIPP lining is a non-disruptive trenchless technology whereby the resin impregnated lining tube, which is usually a non-woven polyester felt material, is inverted and then installed in the host pipe using either air or water pressure. Once the liner has passed completely through the pipe including both the up and down stream manholes that were used for access, the resin and liner is heated using water or steam to push the liner tightly against the host pipe and to cure the resin to form a tight fitting pipe within a pipe. Service lateral connections which have been lined over can be re-opened either by using a remote robotic cutting tool or by hand in larger diameter sewer main lines. The CIPP method of repair is advantageous due to the lack of surface disruption.

The size of a completed CIPP lining is basically the same as that of the host pipe. The actually lining process results in a slight reduction in the cross section of the host pipe; however, the difference is negligible. The flow characteristics of new CIPP liner are much better than old vitrified clay meaning there is an increase in capacity. Capacity flow analysis prior to CIPP lining is not necessary unless a known capacity problem exists that may require up sizing of the sewer main line.

The City does not have in-house ability to install CIPP liners in sewer main lines. The City must rely on contractor resources to affect this method of repair. Installing CIPP lining is a process that requires trained personnel and specialized equipment including refrigeration trucks and boiler trucks.

d. Manhole Repair

There are two types of manholes in the City. The older areas of the City have manholes that were constructed by hand from brick using mortar to bind the brick together. When new, the tops of these manholes had a concrete ring and top. The practice of using brick manholes was abandoned in the 1970's due to the time required and high cost of skilled craftsman needed to construct them. In 2000, when the City SCRD was adopted brick manholes were specifically prohibited. Section 7.04, C 1 of the City SCRD specifies installation of precast manholes that meet American Society of Testing and Materials (ASTM) C 748 for design and manufacture.
Problems with precast manholes generally involve cracking and spalling of the concrete. Precast manholes also exhibit leaking around the joints and ring and cover

Settlement has been observed in both types of manholes causing offsets in the influent and effluent piping.

City personnel are capable of making some repairs when they are minor in nature and do not involve structural failure. The City must rely on contractors for major repairs or total rehabilitation.

2. Sewer Laterals

Oak Ridge was incorporated as a city on June 16, 1959. Prior to that date the city was owned by the federal government and managed by Clinton Engineering Works. When the city was incorporated and the assets transferred from the federal government, the transfer of utilities and the associated easements did not include the sanitary sewer laterals. Therefore, the policy was established for the City to not have ownership of the laterals.

The City considers the gravity sewer main line tap to be the point of delineation between public and private ownership with the tap being the responsibility of the City and anything between the tap and the structure to be the responsibility of the property owner. City Code section 18-307.14 provides that ownership and maintenance responsibility for the sanitary sewer lateral rests solely with the owner of the building being served.

Sewer laterals in Oak Ridge are considered private plumbing. Inspection for construction of new laterals and repair of existing laterals is considered as building inspection, with building inspection a service of the City of Oak Ridge, Community Development Department, Code Enforcement Division. Specifically, inspection of the sewer laterals is the responsibility of the plumbing inspector.

The City has three programs in place to assist homeowners with lateral repair or provide financial aid, in limited cases.

- Sewer Lateral Reimbursement Program
  This program provides assistance to homeowners with a reimbursement for a specific amount to replace a sewer lateral that leaves their property and crosses under a City street or crosses an adjoining property. The program will allow for assistance from City personnel if a plumber replacing a sewer lateral does not feel capable of doing the work due to health or safety issues. The Sewer Lateral Reimbursement Program was formally adopted by City Council on February 2, 1999 under resolution 2-12-99.
- Sewer Main Line Tap Program
  This program allows for Public Works Department personnel to replace the gravity sewer main line tap at no expense to the homeowner when the homeowner is having his/her lateral replaced between the tap and the structure. This policy is detailed in Public Works Memorandum 03-47 dated October 8, 2003.
- Common Sewer Lateral Program
  This program is established in the Sewer Use Ordinance (SUO), Section 18-307.14 regarding common sewer laterals. A common sewer lateral exists when the sewer laterals from two or more different parcels are connected together. The length of pipe between the most upstream point of connection and the tap become the common portion of the sewer lateral. The Public Works Department assumes responsibility for maintenance of the common portion of the lateral. Section 18-307.3 of the SUO prohibits construction of common laterals.

There are approximately 12,500 service laterals and an estimated 600,000 ft. of privately owned sewer service line in the City. The amount of I/I entering the WCTS from leaks in private laterals is unknown.

At this time the only authority City personnel can cite regarding I/I from private plumbing is in the Oak Ridge Municipal Code, section 18-307.7 of the SUO which prohibits allowing extraneous water from entering the WCTS however the intent of the ordinance is to prevent roof down spouts, gutter drains or surface area drains from being connected to the WCTS. At present the City has no effective way to require repair of private sewer laterals that allow I/I to enter the WCTS.

The EPA A.O. and local media discussion regarding other communities that are searching for ways to deal with problem has resulted in new local discussion seeking solutions to the problem. The City has entered a contract with a recent graduate of the East Tennessee State University who received a masters degree in Public Administration. At present he has been tasked with researching solutions both technical and financial that have worked for other municipalities and utilities and any applicable Tennessee law. In addition information is being sought from the Tennessee Municipal League and the National League of Cities.

Any program that staff recommends will require the recommendation of the City Manager and approval of City Council. The City will have to develop the legal means to enforce any action it may require. This will require amendments to the Municipal Code and SUO which must be approved by City Council.

It is anticipated a formal program will be developed and presented for City Council consideration within 12 months of the completion of this MOM document. At such time as a program has been adopted, the MOM will be revised to include that program as an operation policy.

H. MAINTENANCE OF WAY

1. Rights-Of-Way and Easement Program

Most of the 1,255,000 feet of gravity sewer main line in the City of Oak Ridge (City) is located either in street rights-of-way or easements located on private property. Of those gravity sewer main lines, the vast majority are in locations that are accessible from the street for maintenance. These areas are usually mowed and maintained by property owners; however, some which are primarily along state road rights-of-way are mowed by the City's mowing contractor. Some lines are located at the rear of properties and require the use of one of the City's three easement machines.

The City lies between natural ridgelines. Some of the City's gravity sewer main lines run through the valleys or hollows formed by these ridgelines. These topographic features make some of these lines difficult to access.

As part of its efforts to improve the way easements are maintained, the City has identified 59,286 feet of gravity sewer main line that is located in areas that is not normally mowed or maintained by property owners and is difficult to access. The City has created a database listing each line segment (asset) using the new naming convention. Using this naming convention will allow these lines to be identified in the Geographical Information System and the Information Management System (GIS/IMS) when implemented.

The City Sewer Line Maintenance Crew Chief is presently working toward inventorying these areas relative to whether they can be maintained using tractors equipped with bush hogs or whether the terrain is so rough that tracked equipment will be required. Public Works personnel are also developing a current map book for these locations. The City believes most of the areas can be accessed by tractor and has discussed the concept of including these areas in the scope of work for mowing when the contract is renewed. Clearing these easements at the end of the regular mowing season would accomplish two things. First, it would create off season work for the mowing contractor and second, it would accomplish the main goal of the easement maintenance program which is to keep the gravity sewer line sections located in these areas accessible. The remaining areas that require clearing using tracked equipment will be maintained in-house by City personnel. The City will use the IMS to produce work orders on an annual basis for these locations.

2. Street Paving Monitoring Program

In 1994, the City of Oak Ridge (City) Public Works Department, Engineering Division began a Roadway Surface Management Program. The program was needed to improve the efficiency of the way decisions regarding roadway resurfacing are made. At the time the first street inventory was prepared, there were 929 sections of street in the City. It was not possible for anyone to sort or rank the streets in terms of which were in worse condition and most in need of resurfacing. Streets were paved based on citizen complaints, but there was no way to justify which street was selected.

The City chose to use The Road Surface Management System (RSMS) to analyze the entire road network. Implementing RSMS required the City to develop an accurate inventory of the roadway network and then to estimate traffic volumes for each street.

The RSMS software calculates a Pavement Condition Index (PCI) for each street section based on the defects recorded. The entire inventory list along with the PCI can then be placed into a standard Microsoft spreadsheet application and sorted in ascending order by PCI resulting in a list of streets ranked from worse to best. Streets that have similar defects will receive a similar or identical PCI. It is common for several streets to receive the same ranking. The RSMS software does not replace engineering judgment, but provides a screening of the roadway network.

Street resurfacing and sewer rehabilitation are normally independent of each other. The City does not resurface streets just because pavement patches may be present from excavation for pipe entry pits or service reconnections. Instructions for evaluating extent and severity of patching/potholes using RSMS state that "Only patches that show deterioration should be evaluated. Good patches should be ignored."

The City does normally do leak detection on water lines located under or near streets that are considered candidates for resurfacing and also does Closed Circuit TV (CCTV) inspection of all Wastewater Collection and Transportation System (WCTS) lines under streets that may be resurfaced. When defects are located they are corrected prior to paving. Water leaks are repaired by City personnel; however, WCTS lines that need rehabilitation using Trenchless Technologies are normally placed in a rehab contract. The time needed to affect the repair may result in rescheduling resurfacing of the street. The City also has the option to use the emergency Point Repair Contract; however, this is avoided if possible due to higher unit costs

The Management, Operations, Maintenance Programs will be implemented during calendar year 2012, as required by the A.O. The programs will be reviewed on an annual basis throughout the A. O. period (2015). After completion of the provisions of the A.O., the programs will be reviewed and updated on five (5) year increments. The Public Works Director shall convene an appropriate team to review and update the programs. The amended programs will be presented to the Oak Ridge City Council upon completion.

Department of Energy
National Nuclear Security Administration
Service Center
P. O. Box 5400
Albuquerque, NM 87185

July 21, 2011

Prospective Offerors:

The Department of Energy, National Nuclear Security Administration (DOE/NNSA) is providing this draft Request for Proposals (RFP) entitled "Management and Operating Contract of the Y-12 National Security Complex (Y-12) and Pantex Plant (Pantex), with an option for Savannah River Tritium Operations (SRTO)" (DE-SOL-0001458) for purposes of obtaining information through communications with industry, thereby assisting DOE/NNSA in improving its RFP as to purpose, content, clarity, correctness, and completeness from the industry perspective.

This solicitation includes two Contract Line Item Numbers (CLINs). CLIN 0001 covers the management and operation of Pantex and Y-12 for the initial five year base with sub-CLINs for three option periods, transition of SRTO, and inclusion of SRTO, respectively. CLIN 0002 covers the project management of the Y-12 Uranium Processing Facility (UPF).

DOE/NNSA will utilize comments to the draft RFP to: (1) determine interest in this solicitation; (2) identify improvements to the RFP; and (3) identify or clarify what may appear to be problems, conflicts, or obstacles for an institution or organization that might otherwise wish to become a potential offeror. Proposals are not requested at this time and will not be considered. The draft RFP includes a Base Term start date of January 1, 2013, for purposes of review. The dates will be adjusted in the final RFP. The comment period for this draft RFP will be from July 21, 2011 through September 19, 2011. The Contractor selected will be a Management and Operating Contractor as defined in Federal Acquisition Regulation Part 17.6 and DOE Acquisition Regulation Part 917.6.

Prospective offerors are requested to examine carefully and provide comment on the entire draft RFP, including:

> The feasibility of accomplishing all Transition Term activities specified within Human Resources (Section J, Appendix A, Chapter III, Human Resources).
>
> Whether the inclusion of the SRTO option is an impediment to bidding on this contract.
>
> The inclusion of Y-12 UPF Project Management as a separate CLIN, with a separate fee structure.
>
> Proposal instructions, evaluation criteria, and maximum number of proposal pages.

How the evaluation criteria impacts competition positively or negatively, as NNSA is seeking robust competition.

How the decision concerning the location(s) of the Contractor's home office should be made.

The fee structure for CLIN 0001, including Fixed Fee, range of Total Available Fee, Cost Savings Incentive Fee, and Options for additional term.

Any Contract requirements that are impediments to effective and efficient operations, including obtaining cost savings.

The information being requested does not constitute a commitment on the part of the Government to award a contract, nor to pay for any costs incurred as a result in replying to this notice. This notice should not be construed as a commitment by the Government for any purpose.

The NNSA has established a website at http://www.doeal.gov/MOContracts/, which will be utilized to disseminate information relating to this acquisition. Responders are encouraged to monitor this website because it will be the principal distribution medium for the draft RFP, notices, changes, questions & answers, reading room material, pre-solicitation conference, and one-on-one meetings as well as any other pertinent information. The entire draft RFP will be made available on the Government Point of Entry (GPE) website at http://www.fedbizopps.gov and the NNSA website. Paper copies will not be available.

Prospective offerors are requested to submit e-mail questions or comments to Daniel J. Saiz, Contracting Officer, at SEB1@doeal.gov concerning the draft RFP on or before 5:00pm MST, September 19, 2011. Written inputs submitted to this address, on or before this date, relative to this draft RFP will be considered and may be posted to the NNSA website established for this solicitation. The Contracting Officer is the sole point of contact during the conduct of this procurement.

Sincerely,

Daniel J. Saiz
Contracting Officer

Enclosure:
RFP No. DE-SOL-0001458

PATH FORWARD

Milestone	Date / Duration
Issue Draft RFP (open 60 days)	July 21, 2011
Presolicitation Conference	August 9, 2011
One-on-One Meetings with Industry	Week of August 29, 2011
Draft RFP Closes	September 19, 2011
Issue Final RFP	30 to 60 Days After Draft Closes
RFP Closes / Proposals Due	60 to 90 Days After Final RFP Issued

CITY OF
OAK RIDGE

Office of the City Manager

POST OFFICE BOX 1 • OAK RIDGE, TENNESSEE 37831-0001

June 22, 2011

Mr. John Eschenberg
Acting Deputy Manager
U.S. Department of Energy
Oak Ridge Office
P.O. Box 2001
Oak Ridge, TN 37831

Option to Support Section 106 Compliance at East Tennessee Technology Park

Dear Mr. Eschenberg:

I am writing in response to your letter dated June 13, 2011 to the Consulting Parties regarding site interpretation at the East Tennessee Technology Park (ETTP). This also follows up our recent conversation about how the City's Fire Station #4 might support the Department of Energy's (DOE) compliance with Section 106 of the National Historic Preservation Act.

I recently toured the Fire Station and believe the use of a portion of the building for site interpretation is a viable option. The building (also known as K-1652) was constructed in 1983 and occupies 23,232 square feet. Together with the adjacent modular change house (Building K-1310-HT), the driveway and parking area, the complex is situated on approximately 2.2 acres. The footprint is located inside the property protection fence in the central portion of ETTP, adjacent to the K-25 structure. However, we understand fencing modifications being considered now will lend to easy public access.

The location of the property lends itself for use as an interpretive center. In particular, the hose tower on the back side of the facility directly faces the south side of the K-25 building site. The tower could be modified to serve as a "South End Tower" viewing platform for visitors, offering an unobstructed view of the u-shaped K-25 perimeter. In addition, a portion of the building could be remodeled to include exhibits on the history of the K-25 facility, as well as artifacts from the building itself. The field in front of the building could potentially be developed for parking; the building is wheelchair accessible. The "checkpoint" at the entrance to K-25 might also be incorporated into this project.

The building presently houses the Oak Ridge Fire Department, a garage for emergency response equipment, and offices for Protective Services and Security personnel. Fire department

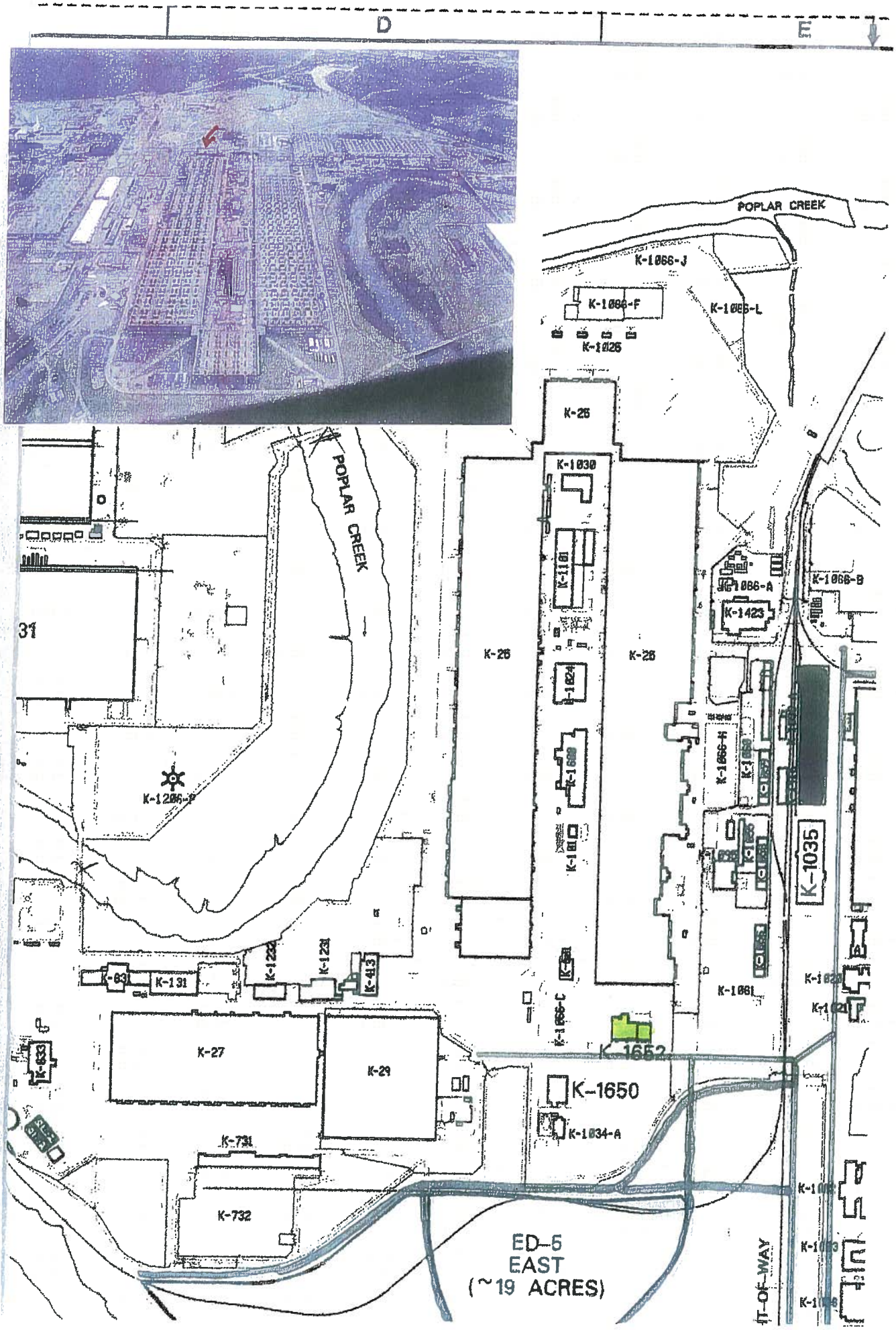
personnel are onsite 27/7, and could potentially assume a role in managing a portion of the facility for interpretive services.

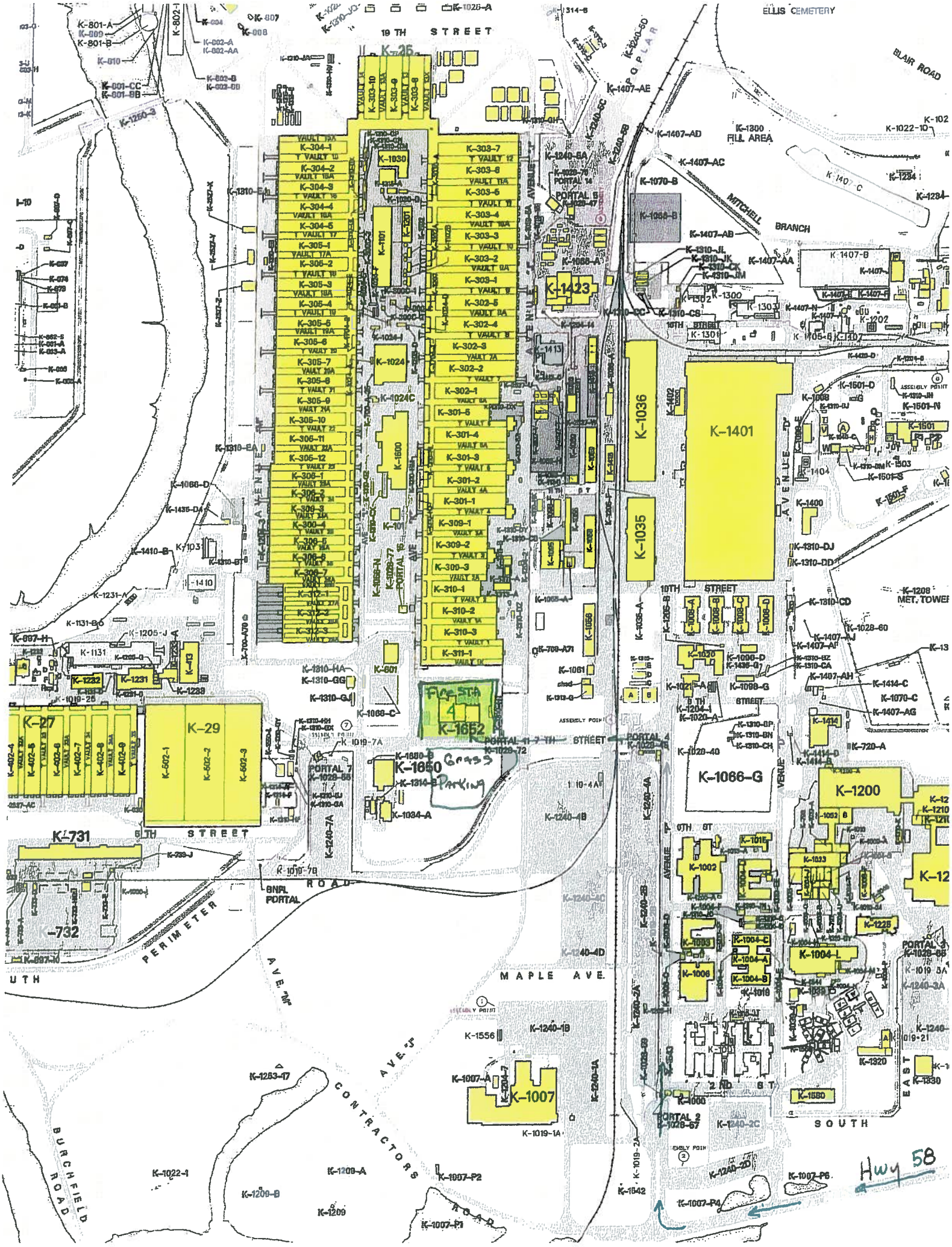
As transitions occur over the next few years, this is an ideal time to consider the facility's "dual purpose" potential. If you concur, the next step would be the development of a conceptual plan that illustrates how the functions could be compatible. I look forward to discussing this matter with you in greater detail. Feel free to call me at 425-3550 should you have any questions.

Sincerely,

Mark S. Watson
City Manager

Attachment


D
E
POPLAR CREEK
K-1066-J
K-1066-F
K-1066-L
K-1026
K-26
K-1030
K-1161
K-1066-A
K-1423
K-1066-B
K-26
K-26
K-1824
K-1066-H
K-1035
K-1206-P
K-1066-C
K-1652
K-1650
K-1034-A
K-1061
K-1820
K-1821
K-1223
K-1231
K-413
K-63
K-131
K-633
K-27
K-29
K-731
K-732
ED-5
EAST
(~19 ACRES)
T-OF-WAY


19 TH STREET
ELLIS CEMETERY
BLAIR ROAD
K-1300 FILL AREA
MITCHELL BRANCH
K-1423
K-1036
K-1035
K-1401
K-1066-G
K-1200
K-1007
K-1652
K-1650
K-27
K-29
K-731
-732
K-1002
K-1004-L
K-1006
K-1225
K-1320
K-1330
K-1580
K-1000
K-1024
K-1024C
K-1600
K-1101
K-1030
K-1410
K-1131
K-1232
K-1231
K-1233
K-1400
K-1414
K-1501
K-1202
K-1302
K-1300
K-1303
K-1301
K-1407-B
K-1407
K-1408
K-1404
K-1503
K-1501-S
K-1501-D
K-1501-N
K-1208 MET. TOWER
K-1070-B
K-1068-B
K-1066-A
K-1407-AD
K-1407-AC
K-1407-AB
K-1407-AA
K-1407-AE
K-1407-AG
K-1407-AH
K-1407-AJ
K-1407-AF
K-1310-JL
K-1310-JK
K-1310-CK
K-1310-JM
K-1310-CC
K-1310-CS
K-1310-DJ
K-1310-DD
K-1310-CD
K-1310-CA
K-1310-HA
K-1310-GG
K-1310-GJ
K-1310-GP
K-1310-GN
K-1310-CH
K-1310-EA
K-1310-EH
K-1310-JH
K-1310-GJ
K-1310-DM
K-1310-DY
K-1310-CD
K-1310-BZ
K-1310-GA
K-1310-GX
K-1310-GU
K-1310-FJ
K-1310-FH
K-1310-FG
K-1310-FF
K-1310-FE
K-1310-FD
K-1310-FC
K-1310-FB
K-1310-FA
K-1310-EY
K-1310-EX
K-1310-EW
K-1310-EV
K-1310-EU
K-1310-ET
K-1310-ES
K-1310-ER
K-1310-EQ
K-1310-EP
K-1310-EN
K-1310-EM
K-1310-EL
K-1310-EK
K-1310-EJ
K-1310-EI
K-1310-EG
K-1310-EF
K-1310-EE
K-1310-ED
K-1310-EC
K-1310-EB
K-1310-DZ
K-1310-DY
K-1310-DX
K-1310-DW
K-1310-DV
K-1310-DU
K-1310-DT
K-1310-DS
K-1310-DR
K-1310-DQ
K-1310-DP
K-1310-DN
K-1310-DM
K-1310-DL
K-1310-DK
K-1310-DJ
K-1310-DH
K-1310-DG
K-1310-DF
K-1310-DE
K-1310-DD
K-1310-DC
K-1310-DB
K-1310-DA
K-1310-CZ
K-1310-CY
K-1310-CX
K-1310-CW
K-1310-CV
K-1310-CU
K-1310-CT
K-1310-CS
K-1310-CR
K-1310-CQ
K-1310-CP
K-1310-CN
K-1310-CM
K-1310-CL
K-1310-CK
K-1310-CJ
K-1310-CH
K-1310-CG
K-1310-CF
K-1310-CE
K-1310-CD
K-1310-CC
K-1310-CB
K-1310-CA
K-1310-BZ
K-1310-BY
K-1310-BX
K-1310-BW
K-1310-BV
K-1310-BU
K-1310-BT
K-1310-BS
K-1310-BR
K-1310-BQ
K-1310-BP
K-1310-BN
K-1310-BM
K-1310-BL
K-1310-BK
K-1310-BJ
K-1310-BH
K-1310-BG
K-1310-BF
K-1310-BE
K-1310-BD
K-1310-BC
K-1310-BB
K-1310-BA
K-1310-AZ
K-1310-AY
K-1310-AX
K-1310-AW
K-1310-AV
K-1310-AU
K-1310-AT
K-1310-AS
K-1310-AR
K-1310-AQ
K-1310-AP
K-1310-AN
K-1310-AM
K-1310-AL
K-1310-AK
K-1310-AJ
K-1310-AH
K-1310-AG
K-1310-AF
K-1310-AE
K-1310-AD
K-1310-AC
K-1310-AB
K-1310-AA
K-1310-JJ
K-1310-JK
K-1310-JL
K-1310-JM
K-1310-JN
K-1310-JP
K-1310-JQ
K-1310-JR
K-1310-JS
K-1310-JT
K-1310-JU
K-1310-JV
K-1310-JW
K-1310-JX
K-1310-JY
K-1310-JZ
K-1310-KA
K-1310-KB
K-1310-KC
K-1310-KD
K-1310-KE
K-1310-KF
K-1310-KG
K-1310-KH
K-1310-KJ
K-1310-KK
K-1310-KL
K-1310-KM
K-1310-KN
K-1310-KP
K-1310-KQ
K-1310-KR
K-1310-KS
K-1310-KT
K-1310-KU
K-1310-KV
K-1310-KW
K-1310-KX
K-1310-KY
K-1310-KZ
K-1310-LA
K-1310-LB
K-1310-LC
K-1310-LD
K-1310-LE
K-1310-LF
K-1310-LG
K-1310-LH
K-1310-LJ
K-1310-LK
K-1310-LL
K-1310-LM
K-1310-LN
K-1310-LP
K-1310-LQ
K-1310-LR
K-1310-LS
K-1310-LT
K-1310-LU
K-1310-LV
K-1310-LW
K-1310-LX
K-1310-LY
K-1310-LZ
K-1310-MA
K-1310-MB
K-1310-MC
K-1310-MD
K-1310-ME
K-1310-MF
K-1310-MG
K-1310-MH
K-1310-MJ
K-1310-MK
K-1310-ML
K-1310-MM
K-1310-MN
K-1310-MP
K-1310-MQ
K-1310-MR
K-1310-MS
K-1310-MT
K-1310-MU
K-1310-MV
K-1310-MW
K-1310-MX
K-1310-MY
K-1310-MZ
K-1310-NA
K-1310-NB
K-1310-NC
K-1310-ND
K-1310-NE
K-1310-NF
K-1310-NG
K-1310-NH
K-1310-NJ
K-1310-NK
K-1310-NL
K-1310-NM
K-1310-NN
K-1310-NP
K-1310-NQ
K-1310-NR
K-1310-NS
K-1310-NT
K-1310-NU
K-1310-NV
K-1310-NW
K-1310-NX
K-1310-NY
K-1310-NZ
K-1310-PA
K-1310-PB
K-1310-PC
K-1310-PD
K-1310-PE
K-1310-PF
K-1310-PG
K-1310-PH
K-1310-PJ
K-1310-PK
K-1310-PL
K-1310-PM
K-1310-PN
K-1310-PP
K-1310-PQ
K-1310-PR
K-1310-PS
K-1310-PT
K-1310-PU
K-1310-PV
K-1310-PW
K-1310-PX
K-1310-PY
K-1310-PZ
K-1310-QA
K-1310-QB
K-1310-QC
K-1310-QD
K-1310-QE
K-1310-QF
K-1310-QG
K-1310-QH
K-1310-QJ
K-1310-QK
K-1310-QL
K-1310-QM
K-1310-QN
K-1310-QP
K-1310-QQ
K-1310-QR
K-1310-QS
K-1310-QT
K-1310-QU
K-1310-QV
K-1310-QW
K-1310-QX
K-1310-QY
K-1310-QZ
K-1310-RA
K-1310-RB
K-1310-RC
K-1310-RD
K-1310-RE
K-1310-RF
K-1310-RG
K-1310-RH
K-1310-RJ
K-1310-RK
K-1310-RL
K-1310-RM
K-1310-RN
K-1310-RP
K-1310-RQ
K-1310-RR
K-1310-RS
K-1310-RT
K-1310-RU
K-1310-RV
K-1310-RW
K-1310-RX
K-1310-RY
K-1310-RZ
K-1310-SA
K-1310-SB
K-1310-SC
K-1310-SD
K-1310-SE
K-1310-SF
K-1310-SG
K-1310-SH
K-1310-SJ
K-1310-SK
K-1310-SL
K-1310-SM
K-1310-SN
K-1310-SP
K-1310-SQ
K-1310-SR
K-1310-SS
K-1310-ST
K-1310-SU
K-1310-SV
K-1310-SW
K-1310-SX
K-1310-SY
K-1310-SZ
K-1310-TA
K-1310-TB
K-1310-TC
K-1310-TD
K-1310-TE
K-1310-TF
K-1310-TG
K-1310-TH
K-1310-TJ
K-1310-TK
K-1310-TL
K-1310-TM
K-1310-TN
K-1310-TP
K-1310-TQ
K-1310-TR
K-1310-TS
K-1310-TT
K-1310-TU
K-1310-TV
K-1310-TW
K-1310-TX
K-1310-TY
K-1310-TZ
K-1310-UA
K-1310-UB
K-1310-UC
K-1310-UD
K-1310-UE
K-1310-UF
K-1310-UG
K-1310-UH
K-1310-UJ
K-1310-UK
K-1310-UL
K-1310-UM
K-1310-UN
K-1310-UP
K-1310-UQ
K-1310-UR
K-1310-US
K-1310-UT
K-1310-UU
K-1310-UV
K-1310-UW
K-1310-UX
K-1310-UY
K-1310-UZ
K-1310-VA
K-1310-VB
K-1310-VC
K-1310-VD
K-1310-VE
K-1310-VF
K-1310-VG
K-1310-VH
K-1310-VJ
K-1310-VK
K-1310-VL
K-1310-VM
K-1310-VN
K-1310-VP
K-1310-VQ
K-1310-VR
K-1310-VS
K-1310-VT
K-1310-VU
K-1310-VV
K-1310-VW
K-1310-VX
K-1310-VY
K-1310-VZ
K-1310-WA
K-1310-WB
K-1310-WC
K-1310-WD
K-1310-WE
K-1310-WF
K-1310-WG
K-1310-WH
K-1310-WJ
K-1310-WK
K-1310-WL
K-1310-WM
K-1310-WN
K-1310-WP
K-1310-WQ
K-1310-WR
K-1310-WS
K-1310-WT
K-1310-WU
K-1310-WV
K-1310-WW
K-1310-WX
K-1310-WY
K-1310-WZ
K-1310-XA
K-1310-XB
K-1310-XC
K-1310-XD
K-1310-XE
K-1310-XF
K-1310-XG
K-1310-XH
K-1310-XJ
K-1310-XK
K-1310-XL
K-1310-XM
K-1310-XN
K-1310-XP
K-1310-XQ
K-1310-XR
K-1310-XS
K-1310-XT
K-1310-XU
K-1310-XV
K-1310-XW
K-1310-XX
K-1310-XY
K-1310-XZ
K-1310-YA
K-1310-YB
K-1310-YC
K-1310-YD
K-1310-YE
K-1310-YF
K-1310-YG
K-1310-YH
K-1310-YJ
K-1310-YK
K-1310-YL
K-1310-YM
K-1310-YN
K-1310-YP
K-1310-YQ
K-1310-YR
K-1310-YS
K-1310-YT
K-1310-YU
K-1310-YV
K-1310-YW
K-1310-YX
K-1310-YY
K-1310-YZ
K-1310-ZA
K-1310-ZB
K-1310-ZC
K-1310-ZD
K-1310-ZE
K-1310-ZF
K-1310-ZG
K-1310-ZH
K-1310-ZJ
K-1310-ZK
K-1310-ZL
K-1310-ZM
K-1310-ZN
K-1310-ZP
K-1310-ZQ
K-1310-ZR
K-1310-ZS
K-1310-ZT
K-1310-ZU
K-1310-ZV
K-1310-ZW
K-1310-ZX
K-1310-ZY
K-1310-ZZ
K-1310-AA
K-1310-AB
K-1310-AC
K-1310-AD
K-1310-AE
K-1310-AF
K-1310-AG
K-1310-AH
K-1310-AJ
K-1310-AK
K-1310-AL
K-1310-AM
K-1310-AN
K-1310-AP
K-1310-AQ
K-1310-AR
K-1310-AS
K-1310-AT
K-1310-AU
K-1310-AV
K-1310-AW
K-1310-AX
K-1310-AY
K-1310-AZ
K-1310-BA
K-1310-BB
K-1310-BC
K-1310-BD
K-1310-BE
K-1310-BF
K-1310-BG
K-1310-BH
K-1310-BJ
K-1310-BK
K-1310-BL
K-1310-BM
K-1310-BN
K-1310-BP
K-1310-BQ
K-1310-BR
K-1310-BS
K-1310-BT
K-1310-BU
K-1310-BV
K-1310-BW
K-1310-BX
K-1310-BY
K-1310-BZ
K-1310-CA
K-1310-CB
K-1310-CC
K-1310-CD
K-1310-CE
K-1310-CF
K-1310-CG
K-1310-CH
K-1310-CJ
K-1310-CK
K-1310-CL
K-1310-CM
K-1310-CN
K-1310-CP
K-1310-CQ
K-1310-CR
K-1310-CS
K-1310-CT
K-1310-CU
K-1310-CV
K-1310-CW
K-1310-CX
K-1310-CY
K-1310-CZ
K-1310-DA
K-1310-DB
K-1310-DC
K-1310-DD
K-1310-DE
K-1310-DF
K-1310-DG
K-1310-DH
K-1310-DJ
K-1310-DK
K-1310-DL
K-1310-DM
K-1310-DN
K-1310-DP
K-1310-DQ
K-1310-DR
K-1310-DS
K-1310-DT
K-1310-DU
K-1310-DV
K-1310-DW
K-1310-DX
K-1310-DY
K-1310-DZ
K-1310-EA
K-1310-EB
K-1310-EC
K-1310-ED
K-1310-EE
K-1310-EF
K-1310-EG
K-1310-EH
K-1310-EJ
K-1310-EK
K-1310-EL
K-1310-EM
K-1310-EN
K-1310-EP
K-1310-EQ
K-1310-ER
K-1310-ES
K-1310-ET
K-1310-EU
K-1310-EV
K-1310-EW
K-1310-EX
K-1310-EY
K-1310-EZ
K-1310-FA
K-1310-FB
K-1310-FC
K-1310-FD
K-1310-FE
K-1310-FF
K-1310-FG
K-1310-FH
K-1310-FJ
K-1310-FK
K-1310-FL
K-1310-FM
K-1310-FN
K-1310-FP
K-1310-FQ
K-1310-FR
K-1310-FS
K-1310-FT
K-1310-FU
K-1310-FV
K-1310-FW
K-1310-FX
K-1310-FY
K-1310-FZ
K-1310-GA
K-1310-GB
K-1310-GC
K-1310-GD
K-1310-GE
K-1310-GF
K-1310-GG
K-1310-GH
K-1310-GJ
K-1310-GK
K-1310-GL
K-1310-GM
K-1310-GN
K-1310-GP
K-1310-GQ
K-1310-GR
K-1310-GS
K-1310-GT
K-1310-GU
K-1310-GV
K-1310-GW
K-1310-GX
K-1310-GY
K-1310-GZ
K-1310-HA
K-1310-HB
K-1310-HC
K-1310-HD
K-1310-HE
K-1310-HF
K-1310-HG
K-1310-HH
K-1310-HJ
K-1310-HK
K-1310-HL
K-1310-HM
K-1310-HN
K-1310-HP
K-1310-HQ
K-1310-HR
K-1310-HS
K-1310-HT
K-1310-HU
K-1310-HV
K-1310-HW
K-1310-HX
K-1310-HY
K-1310-HZ
K-1310-JA
K-1310-JB
K-1310-JC
K-1310-JD
K-1310-JE
K-1310-JF
K-1310-JG
K-1310-JH

CITY OF
OAK RIDGE

FINANCE DEPARTMENT

Secret City Festival Revenues and Expenditures FY11

	Amount
REVENUES:	
Donations and Festival Revenues:	
Sponsors	$90,675.00
Ticket Sales	27,880.00
Vendor Fees	19,968.65
Merchandise	2,269.00
Total Donations and Festival Revenues	**$140,792.65**
City Contribution:	
Economic Diversification Fund - City Sponsorship[1]	$50,000.00
Economic Diversification Fund - Public Works and Electric Crews[2]	31,360.25
General and Other City Funds	96,385.52
Total City Contribution:	**$177,745.77**
TOTAL REVENUES	**$318,538.42**
EXPENDITURES:	
Entertainment	$86,100.00
Site Management	32,205.42
Children Events	29,909.58
Advertising	14,185.89
Supplies	6,159.04
Merchandise/Promo Items	3,848.08
Training/Consulting	1,557.46
Meetings, Etc.	1,133.59
City Electric Department[2]	19,188.10
City Public Works[2]	12,172.15
Other City Employees[3]	62,588.00
Other City Employees - Direct Overhead[4]	25,035.20
Other City Employees - Indirect Overhead[5]	8,762.32
TOTAL EXPENDITURES	**$302,844.83**
REVENUES LESS EXPENDITURES	**$15,693.59**

[1] City Festival Sponsorship primarily provided funding for entertainment deposits and children's events.

[2] Salary, overhead and materials costs for Electric and Public Works employees accounted for under the labor distribution system.

[3] Direct salary costs for employees for work performed for the Festival, excludes Electric and Public Works employees accounted for under the labor distribution system.

[4] Direct Overhead estimated at 40% of direct salaries referenced in 3 above. This includes such items as FICA, Retirement, Long-Term Disability, Medical Insurance, etc.

[5] Indirect Overhead estimated at 10% of direct salaries referenced in 3 above. This includes such items as supervision, accounting, computer services, legal, etc.

CITY COUNCIL MEMORANDUM
11-40

DATE: August 17, 2011

TO: Honorable Mayor and Members of City Council

FROM: Mark S. Watson, City Manager

SUBJECT: PARKING ON CITY STREETS

One of the largest issues that the City is being affected by relative to the "Not in Our Town" campaign is the parking of motorized or nonmotorized vehicles on City streets. The conflict is between storage on public streets or rights-of-way versus parking.

Attached for Council's information is a copy of Chapter 3, titled **Junked Vehicles**, of the City Code; and Legal Department Memorandum 07-09, which explains the State laws pertaining to abandoned, immobile and unattended motor vehicles.

This item is on Monday's work session agenda for discussion.

Mark S. Watson

Mark S. Watson

Attachments

CHAPTER 3

JUNKED VEHICLES[1]

SECTION

13-301. Definitions.
13-302. Declared public nuisance.
13-303. Notice to remove.
13-304. Removal by city.
13-305. Exemptions from chapter.
13-306. Penalty for violation.

13-301. Definitions. For the purposes of this chapter, the following terms, phrases, words and their derivatives shall have the meanings given herein:

(1) "City manager." "City manager" shall mean the city manager or the city manager's duly authorized designee.

(2) "Junked vehicle." Any motorized or non-motorized vehicle, including but not limited to campers, trailers and semi-trailers, the condition of which is one or more of the following: wrecked, abandoned, discarded, in a state of disrepair, lacking vital component parts, or poses a safety hazard.

(3) "State of disrepair." Exhibiting one (1) or more of the following characteristics: inoperable under its own power (if a motor vehicle), without one (1) or more wheels or inflated tires, burned throughout, with more than one (1) broken window, or in a generally unusable condition. (Ord. #16-03, July 2003)

13-302. Declared public nuisance. The location or presence of any junked vehicle on any street, roadway, right-of-way, lot, tract, or parcel of land, or portion thereof, occupied or unoccupied, improved or unimproved, within the city, shall be deemed a public nuisance and it shall be unlawful for any person to cause or maintain such public nuisance on the property of another, or to suffer, permit or allow the same to be placed, located, maintained or to exist upon his or her own real property. (Ord. #16-03, July 2003)

13-303. Notice to remove. Whenever any junked vehicle is found in the city in violation of an ordinance, the city manager shall cause the owner or occupant of the premises on which such vehicle is located, or the owner of said vehicle, to be served with a notice to remove such vehicle within ten (10) days after service of such notice. It shall be unlawful for the owner or occupant of the

---

[1]Municipal code reference
Motor vehicle regulations generally: title 15.

premises, or owner of the vehicle, to fail, neglect or refuse to obey such notice within ten (10) days after service of the same. (Ord. #16-03, July 2003)

13-304. **Removal by city**. If the premises on which a junked vehicle is located contrary to this chapter is unoccupied and the owner or agent thereof cannot be found, or by permission of the owner of the premises, the city manager shall abate such public nuisance by having said vehicle impounded. If any junked vehicle is located on a roadway or public right-of-way and has not been removed within ten (10) days of notice, the city manager shall abate such public nuisance by impounding the vehicle. If any junked vehicle is located on a roadway or public right-of-way causing a safety hazard, the city manager may immediately remove said vehicle for safety purposes. Such impoundment and disposition shall not relieve any person from liability for penalty upon conviction for violating other provisions of this chapter, but is in addition to any other penalty. (Ord. #16-03, July 2003)

13-305. **Exemptions from chapter**. This chapter shall not apply to:

(1) Any vehicle in an enclosed building;

(2) Any vehicle in an appropriate storage place maintained in an officially designated place and manner by the city.

(3) Vehicles retained by the owner for antique collection purposes rather than for salvage or for transportation.

(4) Vehicles stored by a member of the armed forces of the United States who is on active duty assignment and stored with the permission of the property owner. (Ord. #16-03, July 2003)

13-106. **Penalty for violation**. Any person violating this chapter, upon conviction, shall be fined no more than fifty dollars ($50.00). (Ord. #16-03, July 2003)

LEGAL DEPARTMENT MEMORANDUM
07-09

DATE: **February 19, 2007**

TO: **Rick Stone, Patrol Captain**
Alan Massengill, Administrative Captain
David H. Beams, Police Chief

FROM: **Tammy M. Dunn, Senior Staff Attorney**

SUBJECT: **ABANDONED, IMMOBILE AND UNATTENDED MOTOR VEHICLES**

As requested by Patrol Captain Stone, this memorandum explains the State laws pertaining to abandoned, immobile and unattended motor vehicles, specifically Tennessee Code Annotated §§55-16-103–107, §§55-16-111–112, and Tennessee Code Annotated §66-19-103. The procedure for removal of abandoned, immobile and unattended motor vehicles is rather detailed and must be followed.

Authority to Take Abandoned, Immobile and Unattended Motor Vehicles

Pursuant to Tennessee Code Annotated §§55-16-104, a police department may take into custody any motor vehicle found "abandoned," "immobile," or "unattended" on public or private property. This may be done through the police department itself, or this service may be contracted out.

Abandoned Vehicle

To be considered an "abandoned" motor vehicle, the vehicle must meet one of the five requirements set forth in Tennessee Code Annotated §55-16-103(1). Those requirements are:

1. Is over four (4) years old and is left unattended on public property for more than ten (10) days; **or**

2. Is in an "obvious state of disrepair" and is left unattended on public property for more than three (3) days; **or**

3. Has remained illegally on public property for a period of more than forty-eight (48) hours; **or**

4. Has remained on private property without the consent of the owner or person in control of the property for more than forty-eight (48) hours; **or**

5. Has been stored, parked or left in a garage, trailer park, or any type of storage or parking lot for more than thirty (30) consecutive days.

"Obvious state of disrepair" is defined in Tennessee Code Annotated §55-16-103(4) as a vehicle that exhibits one or more of the following characteristics:

1. Inoperable under its own power, **or**

2. Without one (1) or more wheels or inflated tires, **or**

3. Burned throughout, **or**

4. With more than one (1) broken window

If a motor vehicle meets the definition of an abandoned vehicle under Tennessee Code Annotated §55-16-103(1), the vehicle may be taken into custody by the Police Department.

Immobile Vehicle

To be considered an "immobile" motor vehicle, the vehicle must the requirements set forth in Tennessee Code Annotated §55-16-103(3). Those requirements are:

Any motor vehicle, trailer, semitrailer, or combination or part of a motor vehicle, trailer, or semitrailer that is immobilized and incapable of moving under its own power due to:

1. An accident, **or**
2. Mechanical breakdown, **or**
3. Weather conditions, **or**
4. Other emergency situation.

If a motor vehicle meets the definition of an immobile vehicle under Tennessee Code Annotated §55-16-103(3), the vehicle may be taken into custody by the Police Department.

Unattended Vehicle

To be considered an "unattended" motor vehicle, the vehicle must the requirements set forth in Tennessee Code Annotated §55-16-103(7). Those requirements are:

Any motor vehicle, semitrailer, or combination or part of a motor vehicle, trailer, or semitrailer, that is on public or private property, **and**

1. Is unattended by the owner or authorized driver, and interferes with or impedes the orderly flow of traffic, **or**
2. A motor vehicle that is unattended by reason of the arrest of the driver of such motor vehicle.

If a motor vehicle meets the definition of an unattended vehicle under Tennessee Code Annotated §55-16-103(7), the vehicle may be taken into custody by the Police Department.

Notification to Owners/Lienholders When Taken

If the Police Department takes an abandoned, immobile or unattended motor vehicle into custody pursuant to Tennessee Code Annotated §55-16-104, the Police Department is required to give notification to the owner of the vehicle and all lienholders.

Tennessee Code Annotated §55-16-105(a) requires notice by registered mail, return receipt requested, within fifteen (15) days. This notice must be sent to the last known address of the registered owner of the motor vehicle. Notice must also be given to all lienholders of record, by the same method and within the same timeframe. The notice must state the following information:

1. Describe the year, make, model and serial number of the vehicle,
2. The location of the facility where the vehicle is being stored,

3. The owners' and lienholders' rights to reclaim the vehicle within ten (10) days after the date of the notice, upon payment of all towing, preservation and storage charges resulting from having the vehicle in custody, **and**

4. A statement that failure to exercise the right to reclaim the vehicle within the ten-day timeframe shall be deemed a waiver of all right, title and interest in the vehicle and shall be deemed to be consent to the sale of the vehicle at public auction.

Notification by Publication

If there is no response to the notice sent by mail, notice must be given by publication. Notice by publication consists of running a small display ad in a newspaper of general circulation in the area where the vehicle was left abandoned, immobile or unattended. The notice is required to be published one time. The notice may contain multiple listings; therefore, individual notices for each person or each vehicle is not required. However, the required information for notices must be set forth in the advertisement.

Pre-Seizure Notice

The notice set forth in Tennessee Code Annotated §55-16-105(a) is not required when the Police Department has given *pre-seizure* notice to the owner and lienholders. Pre-seizure notice must comply with the requirements set forth in Tennessee Code Annotated §55-16-105(b), which is similar to the notice requirements set forth above. Notice must be in writing, written in plain language, sent by registered mail or certified mail, return receipt requested, to the last known address of the owner of record and to all lienholders of record, and must contain the following information:

1. The year, make, model and vehicle identification number;

2. The location of the vehicle;

3. A statement advising the owner that the owner has ten (10) days to either (i) appeal the determination by the police department that the vehicle is abandoned, immobile, or unattended, or (ii) to remove the vehicle; or the police department will take the vehicle into custody;

4. A statement of the owners' and the lienholders' right to reclaim the vehicle after it has been taken into custody, but before it is sold or demolished, upon payment of all towing, preservation, storage or any other charges resulting from having the vehicle in custody; **and**

5. A statement that failure to exercise the right to reclaim the vehicle shall be deemed a waiver of all right, title and interest in the vehicle and shall be deemed to be consent to the sale of the vehicle at public auction.

If the owner/lienholder cannot be located through due diligence, pre-seizure notice may be given by publication. The requirements of notice by publication are set forth above. The required items for pre-seizure notice must be contained within the advertisement

If the owner or lienholder fails to appeals the determination of the motor vehicle as abandoned, immobile, or unattended, or fails to remove the vehicle within the timeframe for appeal, the police department may take the vehicle into custody. Failure to make an appeal within the timeframe is, without exception, a waiver of the right to appeal. If an appeal is made within the timeframe, the vehicle may not be taken into custody while the appeal is pending.

Verification of Ownership

When the Police Department, or the towing company under contract with the Police Department, takes possession of an abandoned, immobile or unattended motor vehicle, Tennessee Code Annotated §55-16-105(e) requires ownership of the vehicle to be verified through the Tennessee Information Enforcement System (TIES). The information received from the TIES search must be placed on the towing form, and the information shall be provided to the towing company with whom the Police Department has a contract.

If the response from the TIES search is "not on file," the Police Department is required to contact the Department of Revenue, Title and Registration Division, which division shall search their records for ownership information. The ownership information received from this division is required to be placed on the towing form, and the information shall be provided to the towing company with whom the Police Department has a contract.

Notice Required by Garage-Keepers (Towing Companies)

When the abandoned, immobile or unattended motor vehicle comes into the possession of the towing company, the towing company must also provide notice to the last known registered owner and all lienholders of record. Pursuant to Tennessee Code Annotated §55-16-105(f), the towing company must give this notice within fifteen (15) days of taking possession of the vehicle. The notice requirements are the same as set forth above for the Police Department, meaning the notice must be sent by registered mail, return receipt requested, and shall contain the following information:

1. Describe the year, make, model and serial number of the vehicle,

2. The location of the facility where the vehicle is being stored,

3. The owners' and lienholders' rights to reclaim the vehicle within ten (10) days after the date of the notice, upon payment of all towing, preservation and storage charges resulting from having the vehicle in custody, and

4. A statement that failure to exercise the right to reclaim the vehicle within the ten-day timeframe shall be deemed a waiver of <u>all</u> right, title and interest in the vehicle <u>and</u> shall be deemed to be consent to the sale of the vehicle at public auction.

If no response if received to the notice sent by mail, the towing company shall then give notice by publication in a newspaper of general circulation in the area where the vehicle was found. The requirements for notice by publication are the same for the towing company as they are for the Police Department.

Disposition of Vehicles in the Custody of the Police Department

After the required notices, if an abandoned, immobile or unattended motor vehicle has not been reclaimed after it has been taken into custody by the Police Department, Tennessee Code Annotated §55-16-106(a) gives the Police Department the authority to sell the vehicle at public auction. The purchaser shall take title free and clear of all liens and ownership claims. Upon sale at public auction, the Police Department shall issue a sales receipt which shall serve as the purchaser's documentation to receive a certification of title from the Department of Safety.

As required by Tennessee Code Annotated §55-16-106(d), the proceeds of such sale shall be used for payment of the expense of all notice and publication requirements, towing/storage/preservation expenses, and auction expenses for the vehicle. The remainder of the proceeds, if any, shall be held for the owner or lienholder to claim within forty-five (45) days. Failure to claim these funds shall result in the

money being held in a special fund for payment of expenses associated with other abandoned, immobile or unattended motor vehicles.

Waiver of Right to Sell Vehicle

The Police Department may waive its right to sell at auction any abandoned, immobile or unattended motor vehicle taken into custody. Pursuant to Tennessee Code Annotated §55-16-107, such a waiver may only be issued by the Chief of Police and may only be given in favor of the towing company to whom the Police Department authorized the tow.

Towing Company Right to Sell, Enforce Lien

In the event of a waiver, the towing company shall have the right to sell the vehicle at public auction after thirty (30) days from the date of the waiver, and to keep the proceeds of the sale. Such sale must be made in a commercially reasonable manner and failure to do so may subject the towing company to a lawsuit by the true owner or lienholder for monetary damages.

If repairs to the vehicle have been made by the towing company, the towing company may proceed to enforce the lien pursuant to Tennessee Code Annotated §66-19-103.

Timeframe for Removal of Vehicles

Pursuant to Tennessee Code Annotated §55-16-111, notwithstanding any other law to the contrary, a vehicle cannot be towed within twelve (12) hours from the time the vehicle was first found to be immobile or abandoned unless authorization is given by the owner. This, however, is not applicable to immobile or unattended vehicles creating a hazard, such as blocking access to public or private property, or immobile or unattended vehicles illegally parked. In such event, those vehicles may be towed upon direction of a law enforcement officer without waiting twelve (12) hours from the time the vehicle was first found to be immobile or abandoned.

The notice requirements to the registered owner and all lienholders must still be met.

Further Responsibilities of Towing Company

Pursuant to Tennessee Code Annotated §55-16-112, a towing company may not tow or store a vehicle without the express written consent of the owner of the vehicle, the owner of private property upon which the vehicle is located, or a law enforcement officer. This statute requires written authorization for each vehicle towed/stored. The authorization to tow and/or store a vehicle cannot be given by anyone other than persons in those three positions (i.e. a lessee cannot give authorization to tow a vehicle from their rental property; nor may an owner of private property give authorization to tow any vehicle on their property, but must given authorization for each vehicle to be towed).

If you have any questions regarding this information, please contact the Legal Department.

Tammy M. Dunn