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Risk and Vulnerability Assessment

Austin Water Utility EPA Compliance

December 2004

Office of the City Auditor
Austin, Texas

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City of Austin



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Date: December 15, 2004

To: Mayor and Council

Subject: Austin Water Utility EPA Compliance Risk Assessment

Attached is our report on the results of our work regarding Austin Water Utility's EPA compliance efforts. Our objectives were to provide Council with information about the Utility's efforts toward eliminating wastewater overflows, to identify high-risk areas within these efforts, and to assess the controls in place to address identified high-risk areas.

We found that the Austin Water Utility, through the Austin Clean Water Program (ACWP), is proactively identifying and addressing many risks that could impact the successful completion of the program and compliance with an EPA Administrative Order.

Specifically, we identified ten issue areas that had medium to high inherent risks and found that controls reduced seven of these to medium or low vulnerability. Although no issue area received the highest risk rating, there were three issue areas where efforts being made by the Utility to address risks related to the program may not be sufficient. These remaining risks are that:

- Delays related to real estate acquisition, project bidding, or construction conditions could impact the December 2007 deadline.
- A shortage of contractors bidding on ACWP projects could drive up project costs, increase the potential for collusive fraud by bidders, and impact project schedules.
- A number of factors could increase planned expenditures on ACWP projects.

We have communicated the results of our work to management, including risks that are not addressed in our current list of proposed audits and will continue these discussions with the Utility as we develop our 2005 service plan. We appreciate the cooperation we have received from City management, the Austin Water Utility, and Austin Clean Water Program team members.

Stephen L. Morgan
City Auditor

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BACKGROUND

Sanitary sewer overflows can endanger public health and cause damage to the environment and personal property.

Sanitary sewer overflows involve un-permitted discharges of wastewater. These overflows can seriously impact citizen health, the environment, and property.

A sanitary sewer overflow (SSO) is an illegal, un-permitted discharge of untreated or under-treated wastewater from a wastewater collection system. Sanitary sewer overflows are a violation of the federal Clean Water Act and National Pollutant Discharge Elimination System (NPDES) permits. The NPDES, under the authority of the Clean Water Act, issues permits to regulate location points where authorized wastewater discharges may be made. Austin holds an NPDES permit for each wastewater treatment plant (WWTP) the City owns:

- Govalle WWTP,
- Walnut Creek WWTP, and
- South Austin Regional WWTP.

Any other discharge from the City's wastewater collection system is a sanitary sewer overflow.

The public can be exposed to untreated wastewater from a sanitary sewer overflow by drinking contaminated water or from direct contact with areas contaminated by raw sewage. Untreated wastewater contains organisms that can cause health impacts ranging from mild gastroenteritis to life-threatening ailments such as cholera, dysentery, infections, hepatitis, and severe gastroenteritis. The Environmental Protection Agency (EPA) estimates that as many as 1.8 to 3.5 million people contract some form of illness each year from swimming in waters contaminated by sanitary sewer overflows.

Sanitary sewer overflows that enter streams, rivers, or lakes can affect water quality and contaminate wildlife habitats. Untreated wastewater contains pathogens, organic materials, and other contaminants that deplete dissolved oxygen in natural waterways. This environmental contamination can degrade habitats and threaten wildlife species. In addition, the public is impacted when waterways cannot be used for drinking water or recreational activities.

Sanitary sewer overflows on private property (sewer backups) are a health risk to residents and can cause property damage. A sewer backup on private property can occur because of defects or obstructions in the sewer line. When a sewer backup occurs in a private residence, the affected area must be thoroughly cleaned and disinfected to reduce the risk of exposure to the residents. Cleaning these affected areas can be expensive for homeowners and generally will involve replacing carpets, curtains, flooring, wall panels, and upholstered furniture. The EPA estimates that cleaning costs can range from \$700 to \$4,000. In addition, homeowners living on or near overflow-contaminated waterways can experience a reduction in their property values.

Sanitary sewer overflows occur in wastewater collection systems because of insufficient capacity and untimely maintenance and cleaning schedules.

Population growth and rain events can reduce available capacity and increase the risk of overflows. This risk can be controlled by effective, routine maintenance and good public education.

Rapid population growth and excess inflow to a wastewater collection system are factors that reduce the capacity of a collection system and increase the risk that an overflow will occur.

The capacity of a wastewater collection system refers to the amount of space available in the sewer pipes and the amount of wastewater that can be processed by the treatment plants. However, any analysis of capacity must also include the amount of flow that will enter the collection system. For example, increased flow from rapid population growth can stress capacity if necessary infrastructure upgrades do not keep pace. Likewise, excess rainwater flowing into a wastewater collection system will increase the likelihood of an overflow.

During a rain event, defects in a wastewater collection system can allow excess runoff water to enter the system. Ideally, a wastewater collection system should be a contained or sealed system with no broken or leaking pipes. However, the majority of Austin's collection system infrastructure is over fifty years old and includes damaged or broken pipes and unsealed manholes. These defects allow excess inflow to enter the collection system. Austin's wastewater collection system processes an estimated four billion gallons of excess water runoff, called infiltration and inflow or excess inflow, each year. An estimated two billion gallons, or half of the total excess inflow per year, enters the system from damaged or broken private laterals and illegal connections. This excess inflow unnecessarily utilizes collection system space thereby reducing the system's capacity.

Root obstructions cause multiple problems in a wastewater collection system, but can be controlled with an effective maintenance and cleaning program. First, roots can crack and even break pipes, allowing excess inflow to the system. Second, roots can penetrate sewer pipes and cause an obstruction. Third, roots in the pipe can combine with other materials causing an even more severe obstruction. These obstructions can cause localized sewer system overflows.

Roots can be controlled through common methods including mechanical removal and chemical treatment. Mechanical removal methods can involve the use of a cutting device that saws away roots in the pipe. Generally, this method is the only effective way to open a sewer line that has been clogged by roots. However, for on-going maintenance purposes, mechanical removal is a less effective and more expensive alternative to chemical treatment. In addition, the process of sawing roots in the pipe can be dangerous for the workers and can damage or break the existing pipe. Also, sawed roots tend to grow back more quickly and thicker than before. Sections of pipe where roots are present need to be treated once a year.

Chemical root control treatment methods involve the use of herbicides. While the use of some herbicides are restricted for environmental or public safety reasons, the use of some specific herbicides may prove to be a safe and effective method to control current and future root growth in a sanitary sewer system. Several cities across the United States have adopted the use of a contact herbicide as an economical part of an on-going maintenance and cleaning program. Application

of this method is achieved by injecting herbicidal foam in the sewer system to kill the roots and prevent future root growth. This type of application is effective for up to three years.

Grease buildup can clog sewer lines and must be controlled with an effective maintenance and cleaning program in conjunction with public education. Grease buildup in sewer pipes is a problem akin to cholesterol buildup in blood vessels. The buildup reduces system flow and can cause an obstruction that, in the case of a sewer system, causes an overflow. The majority of grease-related overflows are caused by restaurant grease. However, citizens contribute to the problem by disposing of grease down their drains.

While restaurants are required to possess and properly maintain a grease trap, many of the repeat overflows are in areas with a high concentration of restaurants. Most of the residential grease-related overflows occur near apartment buildings and multi-family dwellings. An effective, timely maintenance and cleaning program in high-risk locations and public education regarding the proper method and location to dispose of grease are two methods used to control this problem.

Even without root obstructions or grease buildup in a wastewater collection system, proper maintenance of wastewater pipes is needed. Effective, timely maintenance and cleaning of a wastewater collection system is essential to keep the system operating at an optimal level. Routine inspection and maintenance of wastewater pipes helps identify problems such as sagging pipes, broken pipes, and pipe obstructions. Performing system maintenance reduces defects in the infrastructure, which in turn reduces the problem of excess inflow to the system.

To address this need for effective and timely maintenance, many communities have instituted a Capacity, Management, Operation, and Maintenance (CMOM) program. The CMOM program was created by the EPA to formalize an effective process for operating and managing a wastewater collection system. The program stresses a comprehensive knowledge and evaluation of the system, clear documentation of roles and responsibilities, and a shift from reactive to preventative maintenance. Implementation of a CMOM program includes:

- Adopting and documenting system goals and standards,
- Monitoring system performance,
- Creating an overflow emergency response plan,
- Creating a System Evaluation and Capacity Assurance Plan, and
- Conducting a regular CMOM program audit.

A major sanitary sewer overflow in Austin triggered the United States Environmental Protection Agency to issue an Administrative Order to the City of Austin calling for the elimination of sanitary sewer overflows by the end of 2007.

Austin's history of sewage overflows has triggered action by the Environmental Protection Agency. This action, in the form of an Administrative Order, calls for Austin to eliminate overflows by the end of 2007.

In July 1998, a lightning strike knocked out power to the Onion Branch lift station that caused 167,000 gallons of raw sewage to flow into Brushy Creek. This overflow caused the contamination of drinking water wells that serve an area of 10,000 people. Estimates are that 6,000 residents were exposed to *Cryptosporidium*, an intestinal parasite that can cause diarrhea. Nearly 1,300 of the exposed residents became ill with cryptosporidiosis.

In May 1999, the United States Environmental Protection Agency (EPA) issued an Administrative Order to the City of Austin directing the City to eliminate all sanitary sewer overflows by the end of 2007. Prior to 1998, Austin had experienced numerous sanitary sewer overflows and repeat overflows. However, the Brushy Creek overflow and subsequent public health effects prompted the EPA to take action. The EPA issued an Administrative Order that details fourteen specific activities to be accomplished as well as a timeline for each activity. The City's failure to comply with the terms of the Administrative Order could subject the City to a penalty provision of \$27,500 per day per violation.

The EPA Administrative Order specifies three basins where the City must conduct remediation projects: Cross-Town, Onion Creek, and Govalle. The Cross-Town basin includes the area of Austin north of Martin Luther King Boulevard. The Onion Creek basin includes the area of Austin south of Highway 71/Highway 290. The Govalle basin includes central Austin from Martin Luther King Boulevard south to Highway 290.

Originally, the EPA established staggered deadlines for each basin (Cross-Town by October 2005, Onion Creek by October 2006, and Govalle by October 2007). In order to avoid concentrated disruptions in specific areas of Austin, the City requested and received permission from the EPA to finish work in all three basins by a deadline date of September 30, 2007. See Appendix B for detailed information.

Austin adopted a two-track strategy to resolve its sanitary sewer overflow problem and achieve compliance with the EPA's Administrative Order by 2007.

The Austin Water Utility created the Austin Clean Water Program to implement a two-track compliance strategy. Track one focuses on repairing and upgrading sewer system infrastructure, while track two focuses on preventing future problems in the upgraded system.

There are recognized methods to reduce the occurrence of sanitary sewer overflows.

Recognized methods to address excess inflow and insufficient capacity include:

- Repair deficient pipes and infrastructure,
- Implement an effective, timely sewer system maintenance and cleaning program,
- Reduce and control system obstructions,
- Reduce excess inflow in both public and private sectors of the system,
- Increase the capacity of sewer pipes and treatment facilities,
- Re-route excess flows to pipes that have available capacity, and
- Construct storage facilities to reduce peak flows during wet weather conditions.

In November 2001, the Austin Clean Water Program (ACWP) was created to manage the City's effort to comply with the EPA Administrative Order. The personnel that make up ACWP are a combination of City staff and outside consultant staff. In late 2001, Earth Tech, Inc. was selected as the program management consultant. Earth Tech was tasked with developing a compliance strategy and managing the capital improvement projects related to the effort. City of Austin departments that contribute to ACWP include the Austin Water Utility, Watershed Protection and Development Review, Public Works, Small and Minority Business Resources, and Parks and Recreation.

The Austin Clean Water Program developed a two-track strategy through 2007 to achieve compliance with the EPA Administrative Order. Track one efforts are designed to address the immediate problems that are causing sanitary sewer overflows. Track one activities include:

- A public information program,
- Relationship-building activities with the regulatory agencies,
- An enhanced collection system maintenance program,
- A capital improvement program, which includes major construction projects, based on Sewer System Evaluation Surveys (SSES), and
- Documentation of overflow elimination efforts, grease control strategies, and revised overflow reporting standards.

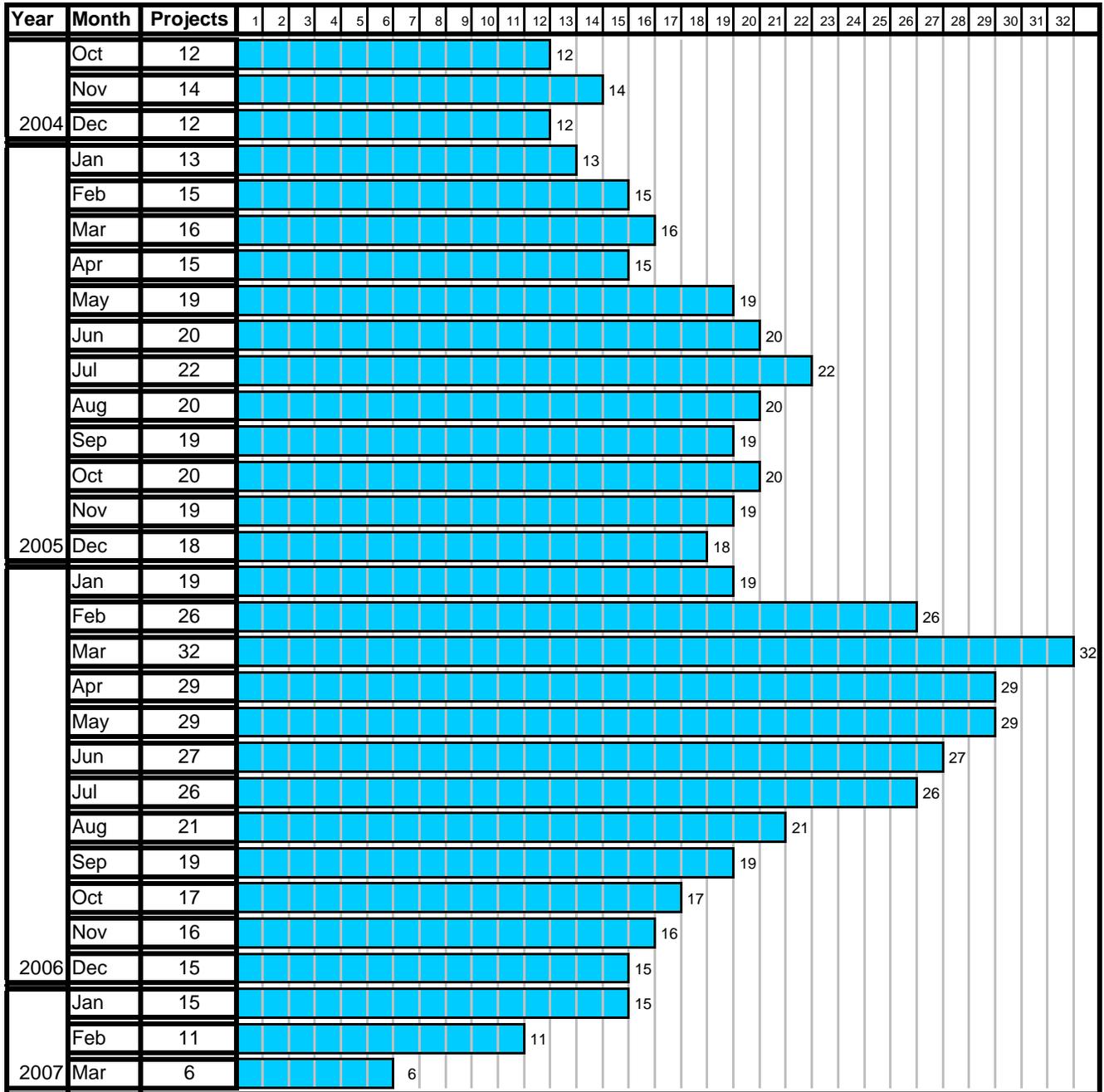
There are 60 major construction projects included as part of track one efforts. As of October, seven have been completed while an additional twelve are in progress. The remaining construction projects are scheduled to begin at various times between now and the 2007 deadline. See Figure 1 for a breakdown of the number of projects by month. (The current schedule reflected in Figure 1 is compared to prior schedules in Appendix F.)

Track two efforts are designed to develop and implement programs to prevent sanitary sewer overflows in the future. Track two activities include:

- Creating and instituting a Capacity, Management, Operation, and Maintenance (CMOM) program,
- A high flow storage strategy,
- Strategies to address other special issues, and
- A root control strategy.

With regard to a root control strategy, the Utility plans to conduct a pilot test on a contact herbicide being considered for use in Austin's collection system. This testing program, developed jointly by the Utility, the Health and Human Services Department, and the Watershed Protection and Development Review Department will provide the information necessary to determine if the use of this herbicide will have adverse effects on the environment and/or the bio-solids reuse program (Dillo Dirt).

Figure 1: Number of ACWP Projects by Month



SOURCE: OCA analysis of ACWP summary of projects as of 10/26/2004.

OBJECTIVES, SCOPE, AND METHODOLOGY

Objectives

Our long-term objective is to determine the extent to which the \$200 million expenditure and efforts planned by the Utility will bring the City into compliance with relevant Environmental Protection Agency (EPA) regulations. This is a multi-year audit objective, with our 2004 work focusing on a risk and vulnerability assessment. The objectives for this risk and vulnerability assessment were to:

- Obtain background information on the Austin Water Utility's EPA compliance efforts.
- Identify areas of high risk within the Utility's compliance efforts.
- Identify strategies and controls in place to manage identified risks.

Scope

This project covers all activities of the Austin Clean Water Program (ACWP) from March 2004 to October 2004, with specific focus on efforts being made by the Austin Water Utility to achieve compliance with an Administrative Order from the EPA.

Methodology

In order to conduct this risk and vulnerability assessment, the audit team attended ACWP weekly meetings, collected and analyzed documentation and data from various sources, and interviewed ACWP team members.

In auditing, risk is defined as the likelihood that an event or action could adversely affect the City's operations, customers, or mission. Types of risk include both inherent risk and vulnerability. **Inherent risk** is the uncertainty or risk that is intrinsic to an operation based solely on the type of work performed, the amount of resources involved, or the complexity of the operations performed. **Vulnerability**, also known as "control risk," is the probability that a particular risk might actually occur and have a negative impact on the organization if controls are not in place or are not functioning effectively to mitigate inherent risks.

We summarized the information into inherent risk areas and assessed vulnerability to those inherent risks, using the criteria shown in the two tables on the following page.

Criteria for Inherent Risk Ratings

HIGH	MEDIUM	LOW
Potential for relatively rapid large financial loss, or smaller financial loss repeated frequently	Potential for midrange rapid financial loss or smaller financial loss repeated with moderate frequency	Potential for small rapid financial loss
No or little progress made in achieving mission, goals, and objectives	Some progress made towards achieving mission, goals, and objectives	Measurable progress made toward achieving mission, goals, and objectives.
Serious consequences other than financial (loss of life or limb)	Moderate consequences other than financial (inconvenience to citizens, other departments)	Mild or no consequences (inconvenience to one department or not at all)
Major loss of credibility and/or public support	Minor loss of credibility and/or public support	No loss of credibility and/or public support
Noncompliance with laws (where there is an identified effect)	Noncompliance with regulations/administrative bulletins	Equity issue, but not required by law

Criteria for Vulnerability Ratings

HIGH	MEDIUM	LOW
A significant weakness exists that management is not taking corrective action or corrective action in place is not sufficient to adequately address identified weaknesses	A significant weakness exists which management is aware of, and planning for correction is underway	Management is in the process of taking action to correct a significant control weakness

The matrix on the following pages shows the high risk areas identified in this project with information on risks, vulnerabilities, and the controls in place to address risks. It also shows risk and vulnerability ratings, assigned using the criteria tables above. In some cases, the risk or vulnerability rating fell between two criteria categories and was assigned an in-between rating, e.g. low-medium.

This risk assessment was conducted in accordance with generally accepted government auditing standards.

Risk and Vulnerability Matrix Summary

	High Inherent Risks	Inherent Risk Rating	Vulnerability Rating
1	Not Meeting Deadline - The Austin Clean Water Program (ACWP) should be managed so that Austin does not violate the terms of the EPA Administrative Order, which includes penalty fines of up to \$27,500 per day per violation.	High	Medium-High
2	Shortage of Contractors – Controls should be in place to ensure an adequate number of qualified contractors for projects.	High	Medium-High
3	Funding and/or Estimates Not Adequate - For a project of this size to be successful, there must be adequate funding available to complete all ACWP projects.	High	Medium-High
4	New System Not Maintained - Implementation of an effective sewer system maintenance program is key to eliminating future sanitary sewer overflows (SSOs).	High	Medium
5	Contractor Oversight - Construction contractors need to be prudently managed to keep projects within planned schedules and budgets. Construction contractors must be held accountable for completing work according to contract terms.	High	Medium
6	Continued Overflows (SSOs) - Projects should improve capacity and eliminate future sanitary sewer overflows (SSOs).	High	<i>Medium (not tested)</i>
7	Financial Impacts of Administrative Order - ACWP projects should eliminate the potential for EPA fines by accomplishing the Administrative Order by the December 31, 2007 deadline.	High	Low-Medium
8	Environmental Impacts - ACWP should work to minimize impacts of projects on the environment.	Medium-High	Low-Medium
9	Public Information and Impact - To ensure project success, ACWP should be working to create and maintain relationships with the public, regulatory agencies, and other City departments. The program should also include strategies to minimize the impact of projects on the public.	High	Low
10	Distracted From Other Utility Projects - The ACWP projects should be managed in such a way as to not distract from other Utility priorities.	Medium-High	Low

Risk and Vulnerability Matrix

	High Inherent Risks	Inherent Risk Rating	Vulnerability Indicator	Controls In Place	Vuln. Rating
1	<p>Not Meeting Deadline - The Austin Clean Water Program (ACWP) should be managed so that Austin does not violate the terms of the EPA Administrative Order, which includes penalty fines of up to \$27,500 per day per violation.</p>	High	<ul style="list-style-type: none"> • ACWP has encountered some schedule delays due to initial planning issues, real estate challenges, and construction-related delays. • Of the ten projects scheduled to be complete by 10/31/04, five have been completed, two delayed past the expected completion date, two postponed, and one terminated. In addition to these ten projects, one project that was expected to be completed in December of 2004 was completed early. <u>See Appendix C.</u> • Potential delays related to real estate acquisition, project bidding, or construction conditions could impact the December 2007 deadline. <u>See Appendix D.</u> • The project schedule has been adjusted to move projects to later start dates than originally anticipated. <u>See Appendix F.</u> 	<ul style="list-style-type: none"> • Hired a program management consultant (Earth Tech, Inc.) to manage the project schedules. • Adopted a “six months early” approach in creating the project schedule. • Worked to build a relationship with the EPA that has helped gain some flexibility in complying with the Administrative Order (two deadline extensions). • Hired a consultant to help expedite real estate issues. • Although some risks are not “controllable,” the Utility could incorporate lessons learned from earlier projects into later projects. ACWP is doing this with design problems encountered in early projects. 	Medium-High
2	<p>Shortage of Contractors – Controls should be in place to ensure an adequate number of qualified contractors for projects.</p>	High	<ul style="list-style-type: none"> • ACWP is currently experiencing a shortage of contractors bidding on projects. A running average of bidders per project on 11/6/03 was 6.50, declining to 4.35 on 10/7/04. <u>See Appendix E.</u> The contractor shortage will be compounded if there are any delays on current projects (contractors not available for subsequent projects). • This shortage can also increase project cost and increase the potential for collusive fraud by bidders. Bids originally came in near or below engineer’s estimates. Now, the bids are coming in above engineer’s estimates. <u>See Appendix E.</u> • As the program proceeds, the need for more contractors will become critical as more projects are underway at the same time. <u>See Appendices E and F.</u> 	<ul style="list-style-type: none"> • Gathering information from contractors through forums and monthly trade meetings to increase/encourage bidding. • Working with COA Purchasing to simplify the process for demonstrating a “good faith effort” in recruiting M/WBE sub-contractors. • Reducing the amount of paperwork necessary for bidders. • Establishing a contractor assistance program to increase the pool of contractors. This should increase competition and lower project costs. However, this action probably will not have an immediate impact on project bids. • Identifying out-of-area contractors that could bid on ACWP projects. • Continuously monitoring contractor shortage. 	Medium-High

Risk and Vulnerability Matrix

	High Inherent Risks	Inherent Risk Rating	Vulnerability Indicator	Controls In Place	Vuln. Rating
3	Funding and/or Estimates Not Adequate - For a project of this size to be successful, there must be adequate funding available to complete all ACWP projects.	High	<ul style="list-style-type: none"> \$200 million in funding has been secured to fund the program. Number and amount of cost changes (change orders) to projects thus far appears to be in line with industry standards. The first round of projects was under budget. However, as the timeline progresses there are fewer contractors bidding (See #2) which is driving up project costs. 	<ul style="list-style-type: none"> Monitoring project estimates, bids, and costs at weekly ACWP status meetings. Using a change order committee to review and approve project changes. Working to improve number of contractors bidding on projects (See #2). 	Medium-High
4	New System Not Maintained - Implementation of an effective sewer system maintenance program is key to eliminating future sanitary sewer overflows (SSOs).	High	<ul style="list-style-type: none"> Currently experience major problems with grease and roots as well as damage to both private and public lines within the current wastewater collection system. Maintenance schedule needs to be improved to encompass more of the collection system more often. 	<ul style="list-style-type: none"> Proactively included maintenance as part of ACWP (originally, program was only for construction projects). Developed an operations and maintenance manual as part of ACWP. Put strategies in place (root control pilot program, grease ordinance and public education campaign, plans for private lateral repairs) to address obstruction and maintenance concerns. Instituting a CMOM program to improve the maintenance schedule. Aware of need to maintain or improve current maintenance cycle time. 	Medium
5	Contractor Oversight - Construction contractors need to be prudently managed to keep projects within planned schedules and budgets. Construction contractors must be held accountable for completing work according to contract terms.	High	<ul style="list-style-type: none"> Several issues with contractors have surfaced. However, ACWP appears to be handling contract issues quickly and effectively to keep projects moving. Early on, construction inspections were not occurring as frequently as needed to ensure project success. Due to the number of ACWP projects that will be in progress, ACWP estimates that there will be a shortage of inspectors starting in May 2005. ACWP expects to have a maximum of 17 inspectors with a maximum of 32 simultaneous projects. <u>See Appendix F.</u> 	<ul style="list-style-type: none"> Discussing contract issues at weekly ACWP status meetings. Using front-end controls over project design and contractor selection. Utilizing several strategies to address construction contractor non-performance or under-performance (e.g. termination and re-bid, close oversight/cooperation). Increasing current inspector-to-project ratio to improve inspection (and construction) quality and continuously monitoring inspectors in the field. Planning for future inspector shortage. 	Medium

Risk and Vulnerability Matrix

	High Inherent Risks	Inherent Risk Rating	Vulnerability Indicator	Controls In Place	Vuln. Rating
6	Continued Overflows (SSOs) - Projects should improve capacity and eliminate future sanitary sewer overflows (SSOs).	High	<ul style="list-style-type: none"> • Assertions that improvements are evident in areas where capacity improvements have occurred. 	<ul style="list-style-type: none"> • Not tested. At this time, only seven ACWP projects have been completed, while 53 more projects are currently in progress or scheduled. • Additional work (preferably once a few more projects have been completed) would be needed to determine more about the effects of ACWP projects on system capacity in the project areas. • Overflow information is tracked by address in the Utility's maintenance management system. 	Medium (not tested)
7	Financial Impacts of Administrative Order - ACWP projects should eliminate the potential for EPA fines by accomplishing the Administrative Order by the December 31, 2007 deadline.	High	<ul style="list-style-type: none"> • The EPA Administrative Order established staggered deadlines for each basin in the City. This has been revised to a single deadline for all basins. • The penalty provision, which includes fines of up to \$27,500 per day following the compliance deadline, remains in place. 	<ul style="list-style-type: none"> • EPA granted flexibility in completing the wastewater collection system improvements for the entire City by September 30, 2007, rather than by the original deadlines for each of the basins. <u>See Appendix B.</u> • ACWP has worked to improve relations with the EPA and to demonstrate that they are making a good-faith effort to eliminate Austin's sanitary sewer overflows. 	Low-Medium
8	Environmental Impacts - ACWP should work to minimize impacts of projects on the environment.	Medium-High	<ul style="list-style-type: none"> • ACWP is working to minimize the impact of projects on the environment. 	<ul style="list-style-type: none"> • ACWP has worked closely with Watershed Protection and Development Review department (WPDR) and engaged local environmental groups to minimize impacts on the environment. • Environmental inspectors watch out for conditions that could impact the environment and WPDR inspectors have issued stop work orders on projects when warranted. • ACWP is proactively identifying and addressing environmental concerns that could delay project schedules. 	Low-Medium

Risk and Vulnerability Matrix

	High Inherent Risks	Inherent Risk Rating	Vulnerability Indicator	Controls In Place	Vuln. Rating
9	<p>Public Information and Impact - To ensure program success, ACWP should be working to create and maintain relationships with the public, regulatory agencies, and other City departments. The program should also include strategies to minimize the impact of projects on the public.</p>	High	<ul style="list-style-type: none"> ACWP is successfully working with the public and other agencies to create and maintain working relationships and minimize program impacts. 	<ul style="list-style-type: none"> Program includes major public relations efforts and involves keeping citizens (especially those in impacted areas) informed of the program/project status by distributing newsletters and bill inserts. A public relations firm addresses citizen issues and makes efforts to accommodate citizens during construction. Hotline established to provide ACWP information and to let citizens report any concerns. Citizens have been very responsive to ACWP needs, indicated by their presence and involvement at 'Meet the Contractor' and Citizens Advisory Group meetings. 32-member City-wide Citizens Advisory Group appointed to represent the community. Continuous efforts to maintain positive relations with public and regulatory agencies. 	Low
10	<p>Distracted From Other Utility Projects - The ACWP projects should be managed in such a way as to not distract from other Utility priorities.</p>	Medium-High	<ul style="list-style-type: none"> Other Utility priorities are proceeding. 	<ul style="list-style-type: none"> Contract with outside firm (Earth Tech, Inc.) for program management services. Consolidation of water and wastewater pipeline management under one assistant director. Coordination with non-ACWP capacity improvements. 	Low

**APPENDIX A
MANAGEMENT RESPONSE**



MEMORANDUM

TO: Corrie Stokes, CIA, CGAP, Auditor
Office of the City Auditor

FROM: Chris Lippe, P.E., Director
Austin Water Utility

DATE: December 8, 2004

SUBJECT: Management's Response on EPA Compliance Risk Assessment

We appreciate the opportunity to provide management's response on the EPA Compliance Risk Assessment completed by the Office of the City Auditor. This assessment identified areas within the Austin Clean Water Program (ACWP) which could potentially impact meeting the deadlines as outlined in the EPA Administrative Order.

The Utility concurs with your assessment of high risk issues as identified in your assessment. It is reassuring to learn from your report that the Utility has already implemented many of the controls identified in the assessment. As we shared with you, given the complexity of the ACWP, the Utility has anticipated these issues from the outset and accordingly, has specifically put in place appropriate programs to address such issues in a timely and organized manner. In addition, the Utility plans to implement additional controls as recommended in the risk assessment. We strongly believe that these additional controls will further reduce our risks and potentially eliminate such vulnerabilities.

The following are the Utility's specific responses to respective findings identified in the EPA Compliance Risk Assessment:

Finding:

Delays related to real estate acquisition, bidding, or construction conditions could impact the December 2007 deadline.

Response:

Real estate acquisition has been a major issue since the initiation of the ACWP three years ago. We had identified this issue early on for the projects in the Cross-town Tunnel Basin and developed a practical solution. As a result, the Utility acquired approximately four hundred individual easements primarily using the services of an outside real estate firm specializing in easement acquisitions supported by the City's Real Estate Division of the Public Works Department.

The Utility is anticipating that fifty percent or more easement acquisitions than were needed for the Cross-Town Tunnel Basin will be required for the Onion Creek and Govalle Basins. To address this issue, the Utility has identified all easements necessary for the projects well in advance. We have already held meetings with all the design engineers to provide them with



specific deadlines by which the easement field notes must be completed. In addition, the Utility has requested the design engineers and their surveying sub-consultants to provide us with their current work loads and available resources in order to assess the probability of meeting the schedule for easement acquisitions as planned. Based on these efforts thus far, we have already adjusted the performance schedules for a few surveying firms in order to ensure all deadlines are met.

Furthermore, the Utility is presently working with the Real Estate Division of the Public Works Department to devise a plan, which will identify and, if necessary, reallocate their workload and resources to assist in the acquisition of easements within the specified deadlines. The Real Estate Division is currently finalizing the plan and it should be available for review soon. If it becomes necessary, the Utility is prepared to supplement the City Real Estate Division with services from outside firms in order to acquire the easements on schedule.

Bidding the projects has occasionally brought unforeseen complications that have caused the City to have to re-bid projects. Usually these problems result from the contractor's failure to properly complete necessary bid forms accurately. The ACWP staff has been working aggressively with the contracting community to train and assist them with the requirements for the bid documents. The requirements are clearly identified and discussed at the pre-bid meetings. We have observed a declining level in the number of bid related errors and will continue this educational effort supported by our Construction Assistance Program team.

Construction related problems are always a concern for programs of such magnitude and complexity as the Utility's ACWP. We have invested a great deal of resources in clarifying the City's Standard Bid Specifications to require prospective contractors to better describe their relevant experience for successfully performing the sewer related improvements. This has given the City more flexibility in addressing unqualified contractors. Further, the Utility has increased the level of construction inspection to provide more in-depth review of the ongoing work with the added objective of anticipating and avoiding construction problems. These efforts along with extensive oversight from experienced construction management personnel have paid dividends so far in the reduction of construction related problems.

Finding:

A shortage of contractors bidding on ACWP projects could drive up project costs, increase the potential for collusive fraud by bidders and impact project schedules.

Response:

The Utility and its Program Management Consultant for the ACWP have identified this issue from the beginning of the program. The Utility's ACWP staff has provided extensive contractor outreach from the initiation of the program in association with the departments of Public Works and Small Minority Business Resources (SMBR). To date, the Utility has been regularly holding ongoing network meetings with contractors, trade associations, and small, minority and women owned businesses to apprise them of all upcoming projects and the related schedules. However, it is our recent observation that the availability of contractors to perform the volume of specialized utility work resulting from the ACWP assessments has been declining to some extent. The declining number of contractors bidding on ACWP projects further evidences this.



The Utility has recently brought on board a consultant specializing in construction contracting to assist the Utility in enhancing its Contractor Assistance Program (CAP). This firm has an excellent track record of stimulating contractor interest in these types of specialized collection system improvement programs and has already shown positive results. For example, after only a few weeks of coming on board, we have seen an increase in the number of contractors attending our most recent pre-bid meetings. We believe that these special initiatives will translate to an increased number of potential bidders on ACWP projects.

In addition, the Utility is actively encouraging participation by out of area contractors to supplement the pool of contractors in the Austin area. With the Utility's Contractor Assistance Program fully functional at an enhanced level, we plan to outreach contractors in other major Texas cities through trade associations. We will also obtain feedback from both local and out of Austin area contractors to appropriately size the projects in order to make the bidding process streamlined and user friendly. We will continuously monitor our progress and make process changes when necessary.

Finding:

A number of factors could increase planned expenditures on ACWP projects.

Response:

The Utility is confident that based on the completion of all Sanitary Sewer Evaluation Surveys within the three collection basins and the majority of Sanitary Sewer Overflow investigations, the cost estimate identified at outset will be adequate to complete the projects. As in any construction program especially those for underground utilities, we recognize that any number of unforeseen circumstances could result in significant cost increases. We have developed strategies including proactive techniques for quality assurance and quality control review, construction management techniques and contractor claims to mitigate and control cost increases.

In summary, the Austin Water Utility management appreciates the opportunity to review the results of the risk assessment and to provide its response. The Utility's management team is committed to monitoring the risks identified by the Office of the City Auditor and will ensure the implementation of necessary controls and strategies to eliminate the impact of these risks.

If you have any questions or would like to discuss the management's response, please contact me or Gopal Guthikonda, ACWP Manager at 972-1557.

A handwritten signature in black ink, appearing to read "Chris Lippe".

Chris Lippe, P.E.
Director
Austin Water Utility

cc: Toby Futrell, City Manager
Joe Canales, Deputy City Manager
Reynaldo Cantu, P.E., Assistant Director, AWU
Perwez Moheet, CPA, Assistant Director, AWU
Gopal Guthikonda, P.E., Division Manager, AWU

APPENDIX B
ENVIRONMENTAL PROTECTION AGENCY (EPA)
ADMINISTRATIVE ORDER SCHEDULE

**United States Environmental Protection Agency (EPA) Administrative Order
Schedule for the City of Austin, Texas**

ACTIVITY	START DATE (original)	COMPLETION DATE (original)	COMPLETION DATE (revised)
1. Lift Station Elimination	04/01/1999	12/31/2003	Same - Completed
2. Lift Station Upgrade	04/01/1999	12/31/2003	Same - Completed
3. Lift Station SCADA System	04/01/1999	11/30/2001	Same - Completed
4. Collection System Improvements (open cut, trenchless, and spot repairs)	04/01/1999	09/30/2007	Same
5. Cross-Town Infiltration/Inflow (I/I) Study	Completed		
6. Cross-Town Sewer System Evaluation Survey (SSES)	10/01/1999	01/31/2002	Same - Completed
7. Cross-Town Remediation	10/01/2000	09/30/2005	09/30/2007
8. Onion Creek I/I Study	01/01/1999	01/31/2000	Same - Completed
9. Onion Creek SSES Study	10/01/2000	09/30/2002	Same - Completed
10. Onion Creek Remediation	10/01/2002	09/30/2006	09/30/2007
11. Govalle I/I Study	10/01/1999	09/30/2000	Same - Completed
12. Govalle SSES Study	10/01/2001	09/30/2003	Same - Completed
13. Govalle Remediation	10/01/2003	09/30/2007	Same
14. Achieve Compliance		12/31/2007	Same
<i>-- Other requirements: Semi-annual reports to EPA and notification of actual start and end dates.</i>			

SOURCE: EPA Administrative Order, April 29, 1999 and EPA Interim Schedule Letter, January 12, 2004.

APPENDIX C
PROJECTS COMPLETED OR SCHEDULED
TO BE COMPLETED BY OCTOBER 2004

ACWP Projects Completed or Scheduled to be Completed by October 2004

No.	Project Name	Planned Finish as of 5/18/2004	Planned Finish as of 10/26/2004	Planned Difference in Days	Early/ (Late) in Days	Status
1	Wellington/Boggy Creek	05/14/03	05/14/03	0	0	Completed on time
2	West University (Phase I)	10/06/03	10/06/03	0	0	Completed on time
3	Highway 183 Siphon Replacement	12/05/03	12/05/03	0	0	Completed on time
4	Shoal Creek 25th to 29th St. (Seton Hospital Annex)	06/08/04	06/08/04	0	7	Completed early
5	West University Phase II	08/23/04	08/23/04	0	(10)	Completed late
6	Upper Tannehill-Lower Fort Branch: Old Manor Line	12/13/04	09/16/04	88	28	Completed early
7	Windsor (Phase I)	09/30/04	09/30/04	0	167	Completed early
8	South Congress Overflow Abatement	08/26/04	10/15/04	(50)	n/a	Delayed
9	Windsor Phase II	10/01/04	11/08/04	(38)	n/a	Delayed
10	Barn Swallow Project	09/27/04	08/30/05	(337)	n/a	Rescheduled
11	Little Walnut/Buttermilk at 290 & 183	07/23/04	12/07/05	(502)	n/a	Rescheduled

SOURCE: OCA analysis of ACWP construction project tracking, 5/18/04 and ACWP summary of projects, 10/26/04.

APPENDIX D
AUDITOR ANALYSIS OF CAUSES FOR
PROJECT CHANGES TO DATE

Auditor Analysis of Causes for Project Changes to Date

Changes to an ACWP project are submitted to a review committee. These changes fall into one of the following categories:

Allowance Increase – This category captures increases to the contract. There are two cases documented thus far. The first resulted in five additional contract days being granted to the contractor due to a miscommunication between a former project manager and the contractor. The second has not been finalized, but is for additional work that was not performed by a previous contractor.

Changed Conditions – This category captures changes in design, price, schedule, or scope that result from conditions that are different from expected conditions. These changes are discovered after work has started.

Contractor/Supplier Suggestion – These include suggestions from contractors or suppliers that modify project design or materials.

Delay Costs – The single case documented resulted in an increase in the cost of soil removal due to a different classification of contaminated soil than was expected.

Design Deficiency – This category includes changes that occurred because issues were encountered that were not identified or incorporated into the original project design.

Real Estate Issue – This includes two cases where additional funding was needed to secure necessary real estate rights after project initiation.

User Requests – These are requests for changes to a project from the project team or other City staff. For example, the Watershed Protection and Development Review department (WPDR) may request a change to add controls when a project has potential impacts on the environment.

Utility Conflicts – This category captures changes in design, price, schedule, or scope that result from uncharted or inaccurately charted utilities. The utilities include City and third party (telephone) utilities. These changes are discovered after work has started.

Summary - ACWP Project Change Order Log (ten projects)		
Change Order Category	Number	Percentage
Changed Conditions	23	28.05%
Utility Conflicts	22	26.83%
Design Deficiency	13	15.85%
Contractor/Supplier Suggestion	7	8.54%
User Request – WPDR Environmental Inspection	6	7.32%
User Request – Austin Water Utility	3	3.66%
Allowance Increase	2	2.44%
Real Estate Issue	2	2.44%
User Request – Public Works Traffic Control	2	2.44%
Delay Costs	1	1.22%
User Request – Project Team	1	1.22%
TOTALS:	82*	100.00%

SOURCE: OCA analysis of ACWP project change order logs for ten projects.**

* Total number of change orders is 78. Two had multiple causes.

** Change order information was collected from the change order spreadsheets submitted by ACWP for ten projects. Change order information was not readily available for an additional five projects.

APPENDIX E
ANALYSIS OF CONTRACTOR BIDS PER PROJECT

Analysis of Contractor Bids per Project with Contract Savings

	Bid Opening Date	Number of Bidders	Number of Bidders-Running Average	Request in RCA (\$s)	Engineer's Estimate (\$s)	(Savings)/Overage	(Savings)/Overage % Change
1	10/30/2003	5		1.26 M	1.44 M	(0.17 M)	(13.69%)
2	11/06/2003	8	6.50	1.36 M	1.89 M	(0.52 M)	(38.40%)
3	11/07/2003	6	6.33	0.56 M	0.55 M	0.01 M	1.96%
4	11/20/2003	7	6.50	3.31 M	3.64 M	(0.33 M)	(9.91%)
5	11/20/2003	5	6.20	1.65 M	1.76 M	(0.11 M)	(6.62%)
6	12/04/2003	5	6.00	2.44 M	2.68 M	(0.24 M)	(9.79%)
7	12/05/2003	6	6.00	0.73 M	0.74 M	(0.01 M)	(0.95%)
8	01/08/2004	6	6.00	0.71 M	0.71 M	0.00 M	0.42%
9	04/01/2004	3	5.67	1.37 M	1.82 M	(0.45 M)	(33.16%)
10	04/15/2004	5	5.60	2.86 M	2.14 M	0.72 M	25.18%
11	04/20/2004	5	5.55	0.25 M	0.25 M	(0.00 M)	(1.63%)
12	04/21/2004	4	5.42	9.81 M	10.22 M	(0.41 M)	(4.17%)
13	04/21/2004	3	5.23	13.97 M	16.75 M	(2.78 M)	(19.92%)
14	04/22/2004	4	5.14	2.06 M	2.00 M	0.06 M	2.91%
15	05/20/2004	3	5.00	1.16 M	0.88 M	0.28 M	24.09%
16	07/08/2004	3	4.88	0.25 M	0.24 M	0.01 M	4.44%
17	08/05/2004	2	4.71	1.51 M	1.32 M	0.18 M	12.15%
18	09/02/2004	5	4.72	3.72 M	4.29 M	(0.57 M)	(15.37%)
19	09/09/2004	4	4.68	1.48 M	1.44 M	0.04 M	2.83%
20	10/07/2004	3	4.35	6.09 M	4.53 M	1.57 M	25.69%

SOURCE: OCA analysis of ACWP summary of projects as of 10/19/2004.

Comparison of First Ten ACWP Bids to Subsequent Ten ACWP Bids

	Average Number of Bids	Number of Bids Under Estimate	Average (Savings)/Overage
ACWP Bids – Projects 1 -10	5.6	7	(8.50%)
ACWP Bids – Projects 11 -20	3.6	4	3.10%

SOURCE: OCA analysis of ACWP summary of projects as of 10/19/2004.

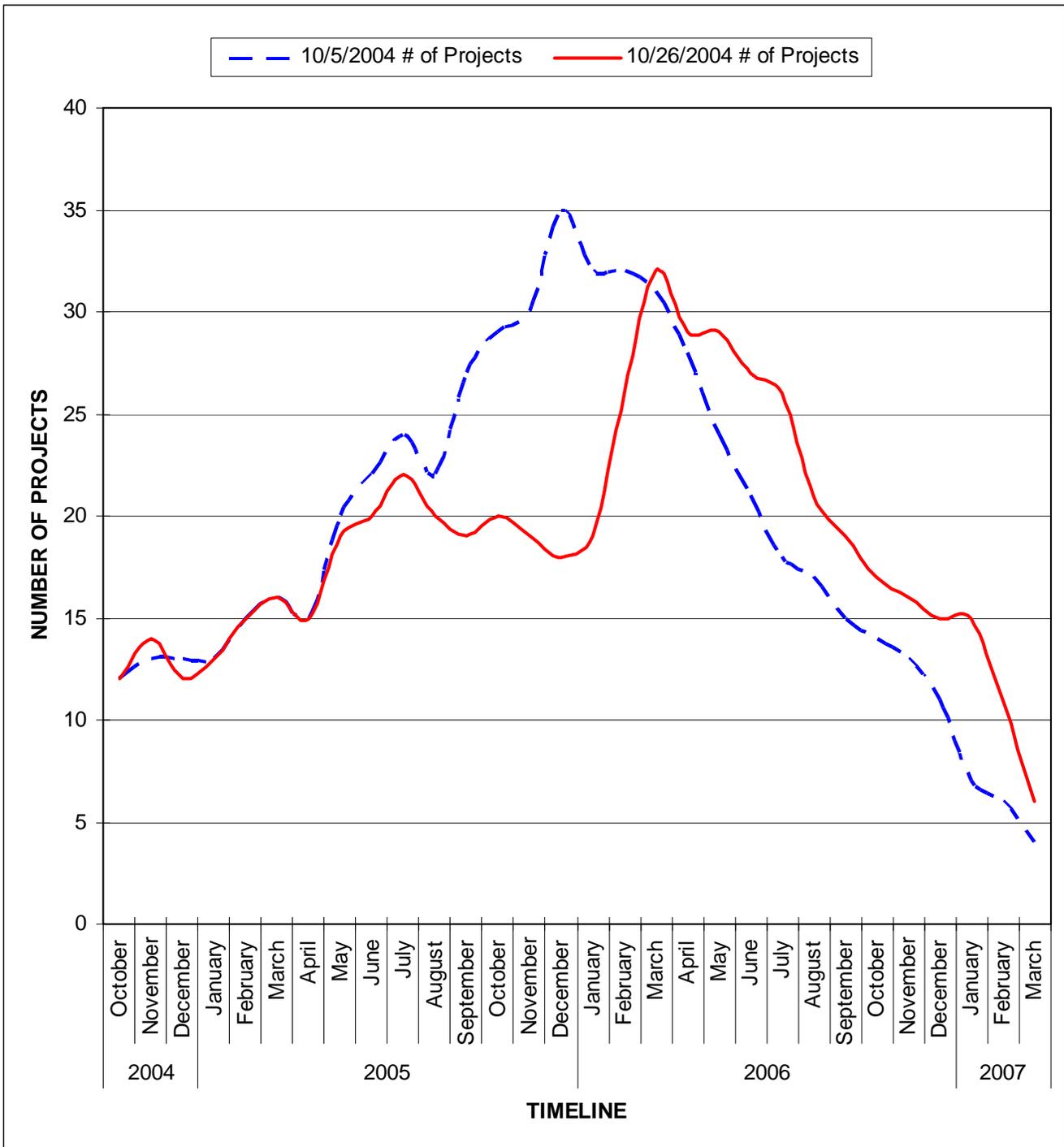
APPENDIX F
CHANGES IN NUMBER OF PROJECTS SCHEDULED BY MONTH

Table of Changes in Number of ACWP Projects Scheduled by Month

Year	Month	Projects Scheduled		Net Change (March to October 5)	Projects Scheduled	
		As of March 2004	After Revisions to Schedule on October 5, 2004		After Revisions to Schedule on October 26, 2004	Net Change (Oct. 5 to Oct. 26)
2004	October	19	12	(7)	12	0
	November	20	13	(7)	14	1
	December	18	13	(5)	12	(1)
2005	January	18	13	(5)	13	0
	February	20	15	(5)	15	0
	March	24	16	(8)	16	0
	April	24	15	(9)	15	0
	May	19	20	1	19	(1)
	June	21	22	1	20	(2)
	July	27	24	(3)	22	(2)
	August	26	22	(4)	20	(2)
	September	23	27	4	19	(8)
	October	24	29	5	20	(9)
	November	26	30	4	19	(11)
	December	28	35	7	18	(17)
2006	January	28	32	4	19	(13)
	February	28	32	4	26	(6)
	March	26	31	5	32	1
	April	24	28	4	29	1
	May	23	24	1	29	5
	June	22	21	(1)	27	6
	July	20	18	(2)	26	8
	August	18	17	(1)	21	4
	September	16	15	(1)	19	4
	October	15	14	(1)	17	3
	November	5	13	8	16	3
	December	5	11	6	15	4
2007	January	5	7	2	15	8
	February	4	6	2	11	5
	March	3	4	1	6	2

SOURCE: OCA analysis of ACWP summary of projects from March 2004; October 5, 2004; and October 26, 2004.

Chart of Changes in Number of ACWP Projects Scheduled by Month



SOURCE: OCA analysis of ACWP summary of projects from March 2004; October 5, 2004; and October 26, 2004.