



Audit of Water System Operations

Distribution

The City of Denton's water distribution infrastructure is generally maintained effectively. However, formalized asset management planning and improved record keeping would increase the effectiveness of replacement activities.

Additional staff guidance for leak repairs would ensure compliance with the City's established practices and statutory requirements.

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Table of Contents

Audit at a Glance	3
Introduction	4
Management Responsibility.....	4
Audit Objectives, Scope, and Methodology	4
Findings & Analysis.....	6
Formal Asset Management Plan May Improve Replacement Planning.....	6
Replacement Project Management Process Seems Adequate; Critical Documentation Not Maintained	8
Moratorium Checks and ROW Permit Requirements Not Established	10
Replacement Project Material & Labor Costs Not Effectively Reconciled	13
Replacement Project Infrastructure Not Capitalized Timely	15
Leak Repair Timeliness Can't Be Determined Due to Data Limitations, Lack of Parameters.....	17
Additional Guidance Would Improve Compliance with Established Practices and Requirements for Minor Maintenance	20
Safety Assurance Activities Generally Seem Effective	22
Appendix A: Management Response Summary	25

Audit at a Glance

Why we did this Audit:

The City maintains about 630 miles of water lines that distribute treated water to customers. In order to effectively provide water service, the Water Department must adequately maintain, replace, and repair these water lines to minimize water losses and ensure continual service. This audit project was included on the City's fiscal year 2020-21 Audit Plan as approved by the City Council. This report details findings and recommendations from phase two of the project.

What we Recommend:

Recommendation 1 & 2

Develop a formal asset management plan & ensure replacement projects are adequately documented.

Recommendation 3 & 4

Clarify process for moratorium checks and right of way permits with the Streets and Public Works Inspections Division.

Recommendation 5 & 6

Refine processes to reconcile replacement project labor & material costs.

Recommendation 7 & 8

Ensure replacement project infrastructure is capitalized timely.

Recommendation 9 & 10

Develop formal parameters for leak repair timeliness and prioritization.

Recommendation 11 & 12

Formalize guidance for staff on how to complete work orders and comply with safety requirements.

What we Found:

This audit generally evaluated the City's water distribution maintenance activities including, infrastructure replacement projects and leak repairs. Findings about each of these operational areas are summarized below:

Infrastructure Replacement Projects. The Department has generally designed an effective process to identify and carry out small water line replacement projects; however, documentation of some critical steps in this process is not well maintained. Furthermore, the Department has not established processes to ensure proper communication with other stakeholders in the small water line replacement process such as the Streets and Public Works Inspections Divisions.

In addition, replacement project costs for labor and materials are not adequately reconciled by the Water Department to ensure new infrastructure value is accurately calculated. Similarly, coordination issues and lack of guidance on defined time periods for closing projects may be delaying the capitalization of replacement project infrastructure.

Leak Repairs. The Water Department does not proactively identify leaks in the distribution system and instead generally relies on resident reports. Due to data limitations, it is not possible to determine how quickly a leak is repaired after a report is received. In addition, the Department has not established parameters around how quickly repairs should be made or to help prioritize repair work.

Finally, while some standard operating procedures have been developed, there are inconsistencies in how leak repair activities are documented, potentially leading to quality issues.

Introduction

The Internal Audit Department is responsible for providing: (a) an independent appraisal¹ of City operations to ensure policies and procedures are in place and complied with, inclusive of purchasing and contracting; (b) information that is accurate and reliable; (c) assurance that assets are properly recorded and safeguarded; (d) assurance that risks are identified and minimized; and (e) assurance that resources are used economically and efficiently and that the City's objectives are being achieved.

The Internal Audit Department has completed a performance audit of the City's water distribution infrastructure projects and maintenance activities. We conducted this performance audit in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Management Responsibility

City management is responsible for ensuring that resources are managed properly and used in compliance with laws and regulations; programs are achieving their objectives; and services are being provided efficiently, effectively, and economically.

Audit Objectives, Scope, and Methodology

The Internal Audit Department has completed an audit of the City's water system distribution infrastructure projects and maintenance activities. This report is intended to provide assurance that the City's water distribution infrastructure is effectively constructed and maintained.

This report is the second phase in an audit project series covering water system operations. Phase One Rate Structure was published in June 2021 and Phase Three Production is expected to be published in September.

Audit fieldwork was conducted during March, April, May, and June 2021. The scope of review varied depending on the procedure being performed. The following list summarizes major procedures performed during this time:

¹ The City of Denton's Internal Audit Department is considered structurally independent as defined by generally accepted government auditing standard 3.56.

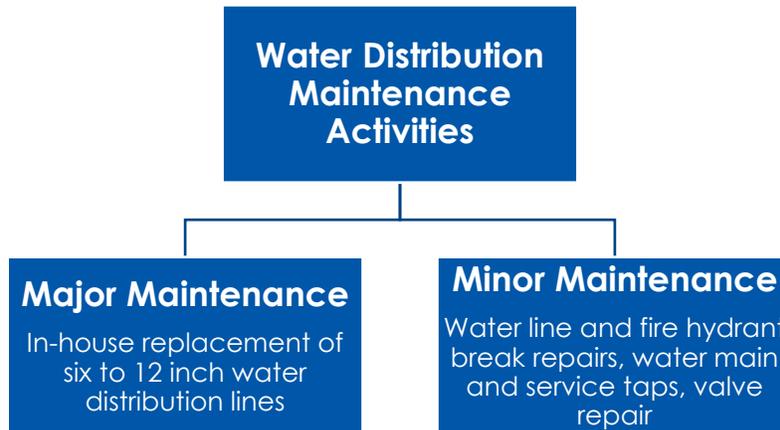
- Reviewed documentation to develop criteria including industry standards, best practices, policies, and procedures;
- Developed process narratives to identify current control activities in water distribution maintenance and capitalization processes that were certified by Water Department and Finance Department staff;
- Interviewed Water Department and Finance Department staff and reviewed policies and procedures pertaining to water distribution projects;
- Interviewed Safety Department staff and examined safety measures and standards observed in water distribution maintenance projects' job sites;
- Reviewed a statistical sample² of 262 work orders to verify the timeliness and effectiveness of leak repairs;
- Reviewed six water distribution small water line replacement projects completed since March 2020 to analyze and verify the management and administration of those projects;
- Reviewed project closure and capitalization details of 21 small water line replacement projects completed since November 2018 to verify that the completed projects were timely closed and capitalized;
- Reviewed small water line replacement project documentation to determine that moratorium check and right of way permit requirements are being followed; and
- Reviewed small water line replacement project records to verify that material and labor costs are regularly reconciled to ensure accurate cost allocation.

² This sample size provides with 95 percent confidence that the true population mean is within ± 5 percent of the sample estimate.

Findings & Analysis

The City of Denton’s water distribution system currently consists of a water line network that provides water service to approximately 140 square miles. The City’s Water Department is generally responsible for maintaining the water lines within this service area. Water distribution maintenance³ is generally broken into two categories as shown in Figure 1:

Figure 1: Water Distribution Maintenance Activities



During fiscal year 2019-20 and fiscal year 2020-21, the Department completed 19 water line replacement projects with a total capitalized value of \$2.61 million and repaired almost 500 water line breaks.

This audit generally evaluated the City’s water distribution maintenance activities including small water line replacement projects and water line leak (i.e. from breaks or cuts) repairs – fire hydrant repairs, main and service taps, and valve repairs were not reviewed.

Formal Asset Management Plan May Improve Replacement Planning

The Government Finance Officers Association best practices recommend that local governments adopt formal policies for their capital improvement and asset replacement activities. Additionally, the Environment Protection Agency recommends that water utilities conduct asset management activities through an asset management program and have an asset management plan covering asset replacement and funding planning.

³ Water lines greater than 12 inches are generally replaced as part of the City’s capital improvement process, which is managed by the City’s Capital Projects Delivery Division of the Engineering Department.

What We Found

- The Water Department utilizes a geographic information-based asset management and capital planning software, as an asset management program for water line replacement projects.
 - The asset management program recommends rehabilitation actions for each section of water line based on predefined parameters including: break rates, location information, condition score, criticality score, and risk score.
 - The Water Department's asset management program is administered by an asset management group consisting of Water Department staff. The asset management groups activities are generally overseen by the asset management committee, which includes a Deputy Director and Water Department Managers.
- The Water Department's asset management and replacement activities appear to generally align with the Environmental Protection Agency's best practices on asset management except for formal financial and strategic planning.
 - Asset management related activities broadly cover asset inventory planning, condition assessment, critical assets identification, replacement planning and performance tracking.
 - The asset management program has not been formally adopted through an asset management plan covering that covers financial and strategic planning aspects.
 - The costs of replacement projects are generally recovered through the City's water revenues. Budgeting for these projects is included in the City's annual budgeting process.
- According to Water Department staff, the amount of water line to be replaced is planned annually based on historical data and replacement capacity.
 - The Water Department planned to replace 16,000 linear feet of small waterlines during fiscal year 2020-21 with an estimated cost of \$27.2 million.
 - The Water Department appears to have replaced 19,473 and 12,875 liner-feet of water lines during fiscal year 2019-20 and fiscal year 2020-21, respectively.

Why It Matters

Adopting a comprehensive asset management plan would help increase the effectiveness of the asset management program by providing clear guidance to staff about the strategic and financial objectives of asset management and replacement activities.

Additionally, having formal guidance on asset management activities would help Water Department staff retain institutional knowledge and promote consistency when planning for asset replacement.

Recommendation:

1. Develop and adopt a formal, comprehensive asset management plan, including the annual asset replacement planning considerations and strategic and financial planning objectives.

***Water Department Comments:** There is an asset management program (Software) that the City currently uses to develop a list of annual asset replacement projects. This program does not include strategic and financial planning. Water Utilities staff will develop and adopt a comprehensive asset management plan that includes strategic goals and financial planning objectives to guide the long-term maintenance plan.*

Replacement Project Management Process Seems Adequate; Critical Documentation Not Maintained

The Project Management Body of Knowledge – PMBOK – provides best practices on project management including five basic process groups and ten knowledge areas typical of almost all projects. In general, the project management process includes: initiating, planning, executing, controlling & monitoring, and closing. PMBOK recommends the following knowledge areas for effective administration of projects:

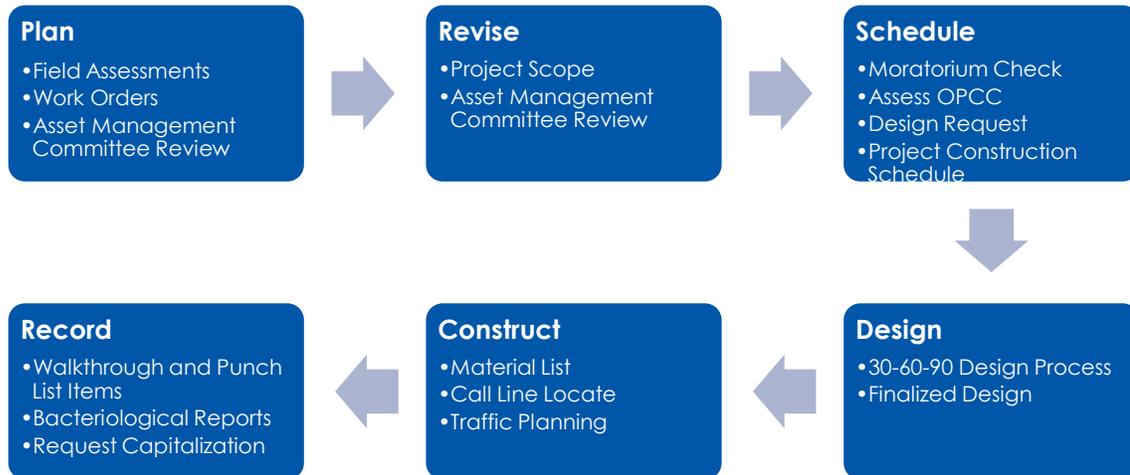
- Integration
- Scope
- Time
- Cost
- Quality
- Resources
- Communication
- Risk
- Procurement
- Stakeholders

What We Found

- The Water Department has developed a capital improvement process guide for small water line replacement projects. Based on this guide, staff should

also document critical process steps in replacement projects as outlined in Figure 2.

Figure 2: Water Line Replacement Project Critical Steps



- Based on a comparison of PMBOK's best practices to the process guide and other Water Department activities, the process followed for managing replacement projects generally aligns with PMBOK's recommended knowledge areas and project management process.
- Small water line replacement projects are managed and tracked in the Water Department's work order system and the City's collaborative work management software. The Engineering Design Division designs plans for these replacement projects.
- Based on a review of six small water line replacement projects completed since March 2020, some project documentation needed for quality and monitoring assurance was missing.
 - Documentation relating to the 30-60-90 project design process and the project completion walkthrough process could not be obtained.
 - In addition, some documentation was not centrally stored in the Department's work order system or work management software. According to Water Department staff, the City is working to implement a new construction management software, which can centrally track and store project documentation.

- Established traffic impact planning was followed for all reviewed projects by submission of a Utilities Traffic Impact Information Sheet (UTILITIIS).⁴

Why It Matters

PMBOK's methodology is recognized as an industry best practice for project management. In general, the Water Department appears to have designed a water line replacement project management process that follows this methodology. That being said, without documenting critical steps in this process, it is difficult to determine if projects were administered per the established capital improvement project guide.

Specifically, ensuring the results from the final walkthrough are documented and these punch list items are completed is essential for quality assurance. Similarly, the capital improvement process guide calls for a 30-60-90 design process, which is generally used to help focus design review by providing increasing detail at each level. Ensuring that design plans and reviews are documented at each of these stages should help to timely resolve any discrepancies found during the process and save time and City's resources.

Recommendation:

2. Instruct Water Department staff to execute and maintain project documents for the steps and activities prescribed under the capital improvement process guide. Consider designating a central repository to facilitate document retention.

Water Department Comments: *Water Utilities staff is currently working on implementing Procore (software) to manage the in-house asset replacement projects. Once implemented, project documents, review's, approvals, walkthrough, etc. can be documented and stored at a central location for easy access in the future.*

Moratorium Checks and ROW Permit Requirements Not Established

Checking street moratorium and obtaining right of way – or ROW – permits are important steps in planning water line replacement projects. City ordinance requires every party, external or internal, to apply for a ROW permit if they plan to engage in construction, excavation, or occupy a work area within or upon any right of way.

⁴ Utilities Traffic Impact Information Sheet (UTILITIIS) is a form to be filled out in the Department's work management software for traffic impact planning for construction activities.

Additionally, the City's Streets Department currently places a moratorium on streets that have recently been improved. These moratoriums are intended to prevent the accelerated deterioration that comes when a street is cut into and patched. Streets current practices state: "Utilities should request authorization to be able to construct in [moratorium] areas." In general, construction activities are not permitted for projects under moratorium streets unless there is an emergency.

What We Found

- The Water Department does not obtain ROW permits for small water line replacement projects.
 - A ROW permit was not obtained for any of the 21 completed projects reviewed.
 - According to Water Department staff, a ROW permit is not required to be obtained for small water line replacement projects; however, based on discussion with Public Works Inspections staff, who issue right of way permits, it is unclear why these projects would be exempt from the ordinance requirements.
 - Water Department staff do generally obtain ROW permits for planned minor maintenance activities.
- During the project planning phase, Water Department staff check moratorium conflicts on a GIS map for the streets involved in proposed water line replacement projects. Based on the review of moratorium information available in the GIS map for 21 small water line replacement projects completed since November 2018:
 - Of the 21 projects, only two were at locations under a moratorium. According to Water Department staff, in one of these instances the moratorium was not identified before the project was initiated. For the other project, Water Department staff stated they received approval from Streets as the project was an emergency; however, there was no documented evidence of this discussion or approval.
 - There is currently no formal process or procedure for the Water Department to receive documented approval to conduct work on a moratorium road with the Streets Division for planned projects. Development of this kind of process was originally recommended to the Water Department as part of the [2019 Audit of Utility Street Cuts](#), which reviewed the moratorium process for water distribution minor maintenance activities.

Why It Matters

The City requires all work in the right of way to be permitted in order to ensure that the safe passage of pedestrian and vehicular traffic is maintained to the greatest extent possible. While the City's right of way ordinance does provide some exemptions to this requirement, it is unclear how small water line replacement projects qualify for one of these exemptions. For that reason, it is important to clarify if a right of way permit is necessary for water line replacement projects and, if so, that staff apply for these permits properly and in a timely manner.

Additionally, newly improved streets are placed under a construction moratorium in an effort to preserve their useful life, as any excavation weakens the street's integrity. For this reason, non-emergency work on water lines under moratorium streets should be minimized as much as possible and emergency work should be clearly communicated. Without proper documentation or a formalized process for approving construction on moratorium streets, it is unclear if all stakeholders were informed and approved of weakening the City's streets infrastructure.

Recommendations:

3. Clarify if the Water Department is required to obtain right of way permits for its small water line replacement projects by consulting with the Public Works Inspections Division and the City Attorney's Office. If right of way permits are required for small water line replacement projects, incorporate this step into the water capital improvement process guide.

Water Department Comments: *Water Utilities staff will consult with Public Works staff and the City Attorney's office to determine a path forward on the right-of-way permit requirement for replacing water infrastructure.*

4. Document and track formal approval from the Streets Division to perform water distribution projects on water lines under moratorium streets. For emergency projects, the Water Department should ensure that the Streets Division is notified even if formal approval is received after the fact.

Water Department Comments: *Water Utilities staff is currently working on implementing Procore (software) to manage the in-house asset replacement projects. Once implemented, the clearance of streets under moratorium can be obtained from the Streets department through the RFI process in the software.*

Replacement Project Material & Labor Costs Not Effectively Reconciled

Labor and material costs are major components of in-house water distribution project costs, which are ultimately capitalized as assets in the City's accounting records. Material usage and labor hours should be regularly reconciled to ensure project costs are accurate and labor and materials are used efficiently.

What We Found

- Material for small water line replacement projects is generally obtained from the City's Warehouse Division.⁵
 - Materials needed for each project are determined by the crew leader based on the project plans. This materials list is then approved by the Field Service Supervisor and forwarded to the Warehouse.
 - According to Water Department staff, crews then pick up materials from the Warehouse during construction as needed and do not collect material that will not be used in the project; however, there is currently no process to reconcile the materials used in the projects to those in the Department's work order system for each project.
 - Each month, Warehouse staff do send a report of issued materials to the Water Department. According to Water Department staff, this report is used to ensure materials are charged to the correct account and job code in the City's financial system.
- Daily, each crew leader records labor hours in the work order of their active project. Water crew members separately complete a physical timesheet, which is used by the Water Department's Administrative Assistant to record labor hours to each project in the City's time and attendance tracking software. The Field Service Supervisor verifies that labor hours in the time tracking software are accurately allocated to each project.
 - Based on a review of randomly selected crew members' 20 days' work hours in 14 cases, work hours were not appropriately logged in the work order system or were inaccurately allocated to projects in time and attendance tracking software in those cases.

⁵ Occasionally materials needed that are not in inventory are ordered through the standard procurement process.

- The City generally owns the equipment used in small water line replacement projects, and a process is in place to record the equipment used for the assigned project.

Why It Matters

Inaccurately recording material and labor costs lead to inaccurate project cost estimation and reporting.

Specifically, reconciling materials used to those ordered for each project would ensure that material costs have been correctly recorded in each replacement project and that any unused material is accurately reported and returned. Additionally, it would also help identify any discrepancies between estimated project costs and costs associated with used materials. While only collecting materials when they are needed does provide some assurance that materials are not wasted, it does not completely ensure that all materials collected are needed and recorded for each project.

Similarly, effectively reconciling labor hours in the work order system to those in the City's time keeping system would help the Water Department ensure project costs are accurate.

Recommendations:

5. Consider implementing a reconciliation process to verify and confirm that the materials obtained were used for the correct project and recorded in the work order system and to ensure that any unused material is accurately reported to Warehouse and returned.

Water Department Comments: *Water Utilities will develop and implement a process to confirm that the material checked out from the warehouse is tracked and allocated to the appropriate project.*

6. Evaluate opportunities to streamline the process of recording and allocating water crew labor hours to projects. If a more streamlined process cannot be implemented, ensure labor hour discrepancies between the work order system and time keeping system are minimized.

Water Department Comments: *Water Utilities staff will work on evaluating opportunities for streamlining the allocation of labor hours to the appropriate replacement project.*

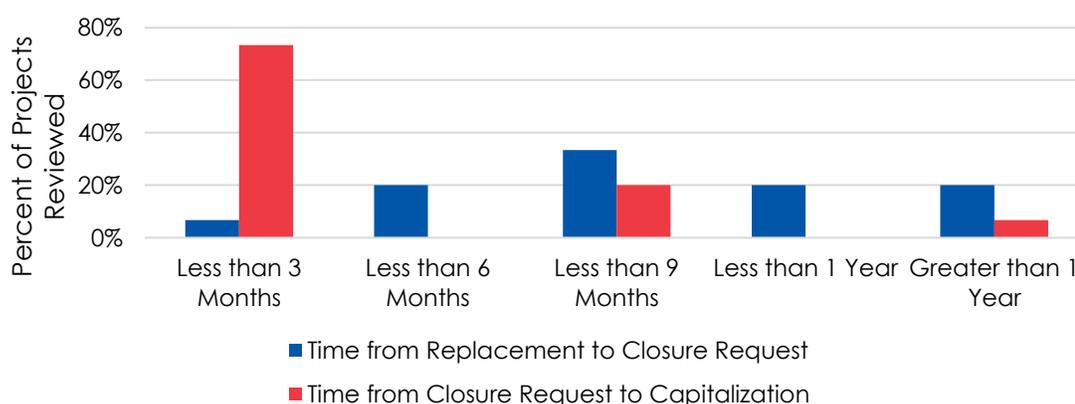
Replacement Project Infrastructure Not Capitalized Timely

Project closure and asset capitalization are the final steps of small water line replacement projects. Ideally, an asset should be capitalized when it is placed in service and the economic benefit of that asset is being received. Therefore, water project closure requests should be communicated as soon as a project is completed, enabling the Finance Department to initiate the capitalization process timely.

What We Found

- After completing a small water line replacement project, a Water Department project manager is required to submit a project closure request to the Finance Department. In order to complete a replacement project, not only does the water line have to be replaced, but all costs associated with the right of way restoration must also be finalized.
 - Of the 21 reviewed projects with complete water line replacement since November 2018, six closure requests have not yet been submitted to the Finance Department. These projects have been open after the replacement was finished between three and 22 months.
 - Based on review of the 15 capitalized projects, it takes an average of eight months from water line replacement completion for Water Department staff to request project closure. The time taken from water line replacement to closure request to capitalization for these projects is illustrated in Figure 3.

Figure 3: Timeliness of Replacement Project Capitalization⁶



⁶ The timeliness presented here are based on the estimated project end dates recorded in the Department's work management software.

- There are currently no guidelines to define how long it should take after the water line replacement is complete before requesting the project be closed.
- In general, it took the Finance Department less than three months to capitalize water projects after receiving a closure request as illustrated in Figure 3.
 - According to the Finance Department, sometimes capitalization may be delayed due to a higher number of transactions involved in closing the project or because additional capitalization information may be needed from the Department.
- According to Finance's Budget Division staff, they generally discuss project closures with the Water Department as part of the preparation for the quarterly capital improvement project department presentation; however, Finance's Accounting Division, which is responsible for closing and capitalizing infrastructure projects, has not typically been included in these meetings. The Accounting Division has developed a formal Project Closure Request Form that must be submitted to initiate the closure and capitalization process.
- Of the 15 capitalized projects, nine projects valued at around \$2.5 million had not been capitalized by the end of the applicable fiscal year.
 - It should be noted that the City does not lose depreciation benefits if expenses incurred under the project were not capitalized in the in the fiscal year. In addition, project costs not yet capitalized are included as construction work in progress in the City's financial statements.
 - Furthermore, the City of Denton's independent auditor's report on the comprehensive annual financial report for fiscal years 2017-18, 2018-19, and 2019-20 did not identify any material misstatements.

Why It Matters

Timely capitalization of capital projects is crucial for effective record keeping per government accounting standards. Based on discussions with Finance and Water Department staff, most delays appear to be due to coordination issues between the Water and Finance Departments during the closure and capitalization process. Similarly, without guidelines for how quickly project closure should be requested after the water line is replaced, the capitalization process may be delayed as project managers shift their focus to other active projects while restoration work is being completed and paid.

Recommendations:

7. Streamline the communication process for the closure and capitalization of water distribution projects between the Water and Finance Departments.

Water Department Comments: *Water Utilities staff will work with Finance staff to develop and implement a process for streamlining the closure and capitalization of the replaced water assets.*

Finance Department Comments: *The Finance Department is now utilizing Smartsheet software for tracking project maintenance requests. This includes project set up, project funding, project closure, and fixed asset capitalization in JDE. Finance maintains a database of all completed requests and will be implementing a process to communicate with departments monthly regarding job status.*

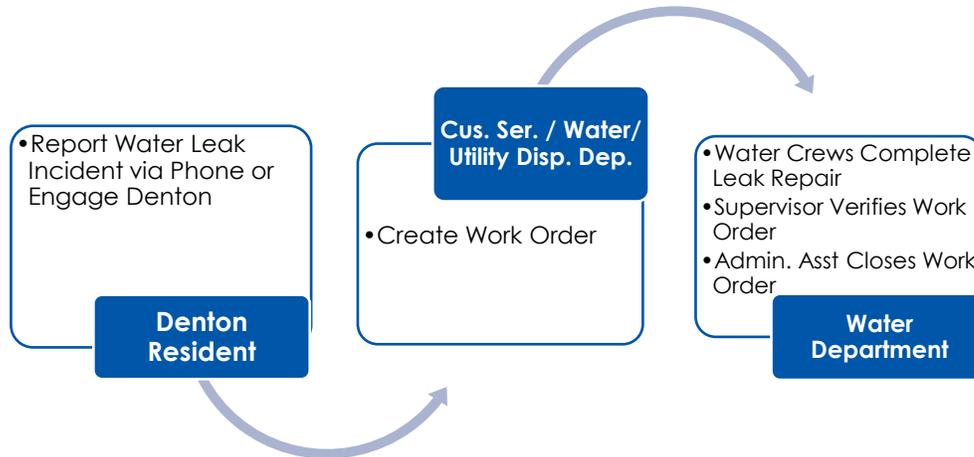
8. Establish guidelines for how quickly a replacement project closure request should be submitted to Finance after completing construction. While not all projects may meet this guidance due to delays, guidance will help ensure projects are closed as quickly as possible.

Water Department Comments: *Water Utilities will work with Finance staff on developing guidelines for closing a project in a timely manner.*

Leak Repair Timeliness Can't Be Determined Due to Data Limitations, Lack of Parameters

The bulk of minor maintenance activities include water line leak repairs. During the past three years, about 800 work orders relating to water main break and service line repairs were created and completed. The leak repair process is briefly outlined in Figure 4.

Figure 4: Minor Maintenance Process

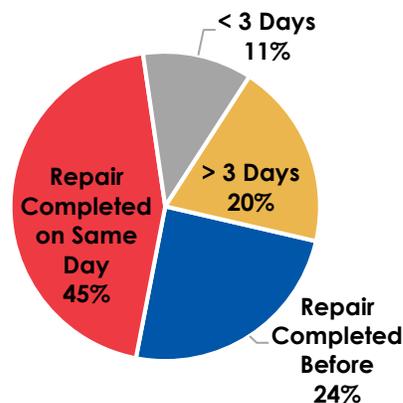


In order to ensure that reported leak incidents are timely completed, there should be parameters around how quickly water leak repairs are completed after being reported that are tied to the type and urgency of each work order.

What We Found

- Water leak incidents are generally reported by Denton Residents to City staff via phone calls or through the City's 'EngageDenton' web portal. According to Water Department staff, a work order should be created for all reported leaks in order to tracked and manage work; however based on a review of a statistical sample of 262 work orders, it is unclear how quickly after a leak is reported it is repaired.
 - Based on a review of work order creation dates to repair completion dates, almost one fourth of work orders are created after the repair is complete as shown in Figure 5, indicating that the work order was not created on the same day that the leak was reported.

Figure 5: Time Between Repair Completion and Work Order Creation



- According to Water Department staff, leak repair requests are generally completed as quickly as possible on a first-come, first-serve basis. Formal parameters for how quickly leak repair work orders should be created and completed after being reported have not been established.
- Based on review of a statistical sample of 262 work orders created from 2018 to 2021, water leaks generally only take one day to repair after work is begun.
 - Leak repairs for 74 percent of work orders were completed on the same day the crew started repairing the leak and another 23 percent were completed within seven days.
- Similarly, guidelines for categorizing repair work as general or emergency have not been defined. Instead, work orders are automatically categorized by the work order system depending on the nature of work selected.
 - About 93 percent of reviewed leak repair work orders were categorized as emergencies. According to Water Department staff, emergency work orders for repairing major leaks are completed as soon as possible; however, as previously discussed, due to data issues, it is difficult to tell how quickly after being reported these leaks were repaired.
- Water Department staff do not have a process to proactively identify leaks in the water distribution system.
 - According to Denton's 2019 Water Loss Audit,⁷ real losses (i.e. from line breaks or leaks) accounted for about 9 percent of water produced. In addition, the Audit calculated that Denton's water system had an infrastructure leakage index⁸ of 2.13, which is within the appropriate target range for the City based on American Water Works Association guidance.

Why It Matters

Establishing parameters for when leak repair work orders should be created and completed would help staff prioritize repair work and further minimize the City's real water losses. It would also help regulate the time taken in restoration work and permit inspections, benefiting the residents.

⁷ The Water Loss Audit is generally completed each year by Water Department staff. Results for this Audit were not independently verified as part of this audit.

⁸ The infrastructure leakage index is a ratio of estimated unavoidable real losses based on the water system's design to calculated real losses. For example, an index of three would mean real losses are three times higher than unavoidable real losses.

Additionally, establishing criteria for general and emergency work orders would help staff assign and complete work orders by priority according to the nature and urgency of the repair work.

Recommendations:

9. Establish parameters for how quickly leak repair work orders should be created and completed.

Water Department Comments: *Water Utilities will work on developing an appropriate level of service plan that will establish the parameters and timeframes for minor maintenance activities.*

10. Define criteria for general and emergency work orders to help further prioritize repairs.

Water Department Comments: *Water Utilities will work on developing criteria for defining general and emergency work orders to help prioritize repairs.*

Additional Guidance Would Improve Compliance with Established Practices and Requirements for Minor Maintenance

In order to be a work order system effective, work orders should contain complete information about the job performed for review.

What We Found

- Performing a leak repair includes various activities such as obtaining a right of way permit, calling a utility line locate⁹ and arranging street restoration work. As per the work order approval process followed, once the water crew completes the work order, a Field Service Supervisor reviews the work order to verify the job completed.
- Based on a review of sample 262 work orders, it was observed that support documentation for leak repair activities is not consistently attached with work orders.
 - About 11 percent of work orders did not have any pictures of the job site or work performed. Job site pictures are essential to verify that completed work is adequate before the supervisor closes the work order as they are not always onsite.
 - Right of way permit details are not available in the work order system for about 25 percent of work orders. The Water Department has

⁹ The Texas One-Call law requires everyone digging 16 inches or deeper at any site using mechanical equipment to call 811 Line Locate at least two working days before beginning excavation.

- recently started recording and tracking the right of way permit based on work order number.
- About 47 percent of work orders did not have documentation indicating that a utility line locate call was made.
 - About 32 percent of work orders did not have attached documentation showing that contracted right of way restoration had been paid. Based on a review of ten randomly selected work orders, the invoices were paid according to the contracts executed with the contractors.
- The Water Department has developed standard operating procedures for performing minor maintenance activities that contain guidance and instructions, including the steps, job procedures, and safety guidelines; however, standard operating procedures for creating and completing work orders for minor maintenance activities are in draft form and have not yet been implemented. Additionally, these draft procedures do not contain guidance on:
 - Staff responsible for creation and closure of work order in the work order system;
 - Documentation to be attached to each work order such as number and type of pictures, right of way permit information, and restoration work invoices; and
 - Steps and requirements for calling for a utility line locate.

Why It Matters

Supporting documents attached to leak repair work orders provide assurance that the repair was completed following the City's established practices and statutory requirements. Without a copy of the right of way permit or permit number or a reference number for the utility line locate, it is difficult to determine if leak repairs followed State and City regulations around construction work in the right of way.

In addition, attaching all records relating to restoration work to each work order would act as a repository for the Water Department staff for future reference and tracking for timely completion and payment.

Finally, adopting formal standard operating procedure that incorporate the requirements mentioned earlier would provide the Water Department staff with institutional knowledge, facilitate consistency, help navigate emergency situations and provide further clarity on water maintenance work and responsibilities.

Recommendation:

11. Finalize and implement draft standard operating procedures for creating work order and documenting minor maintenance activities. Procedures should cover staff responsible for creating, approving, and closing work orders, information about utility line locates, and details of work order supporting documentation attachments.

Water Department Comments: *Water Utilities will develop and implement standard operating procedures for creating work orders and properly documenting the minor maintenance activities in Cityworks.*

Safety Assurance Activities Generally Seem Effective

Best practices recommend that water utilities have a safety program based on a 'Job Safety Analysis.' According to Occupational Health and Safety Standards, job safety analysis means studying and recording steps and hazards involved in a job and determining the best ways to perform the job to reduce or eliminate these hazards.

Therefore, a job safety manual or standards based on job safety analysis as part of the safety program would help the Water Department staff understand and follow the safety measures and standards observed in the water distribution maintenance projects.

What We Found

- The Water Department staff regularly attends safety training organized by the Safety Department. The Safety Department has determined training needs based on the job requirements and the risks involved in water distribution maintenance projects.
 - As part of the Safety Department's initiatives, a safety committee consisting of Water and Safety Department staff has been formed that meets monthly to discuss safety concerns, procedures, and initiatives.
 - The Safety Department staff also regularly meets with Water Department staff to discuss any safety concerns and get feedback.
- Safety on water distribution project job sites is monitored through safety inspections carried out by the Safety Department.
 - The assigned Safety Manager conducts weekly safety inspections at water distribution project job sites to verify that work is appropriately carried out to ensure the safety of water crews and residents.

- Safety inspections are conducted using an inspection checklist. The results of these inspections are generally discussed with the site crew and supervisor onsite.
- Results of inspections are recorded in the City's collaborative work management software, along with the discrepancies observed, and corrective measures are taken.
- A job site safety practices and standards manual has not been developed to aid water crews in complying with the safety checklist.
 - The Safety Department is in the process of developing policies and procedures to ensure safety in the City's operations.
 - The safety inspections checklist created by Safety Department staff appears to be in line with the activities undertaken in the water distribution maintenance projects.

Why It Matters

Education and specialized safety training are important tools for making construction crews aware of the hazards and safety procedures involved in their jobs. If any safety incident happens at a job site, it may result in injury to City staff and financial losses, and project delays.

The Safety Department provides knowledge and education to water crews through safety training and safety inspection feedback. However, without a construction project safety manual, water crew members may not know what safety standards they are required to follow to reduce job site hazards and avoid injury and loss.

A comprehensive safety manual describing the safety standards and procedures would help provide clear guidance to water crews on how to adhere to the safety measures incorporated in the compliance checklist utilized by the Safety Department staff for water distribution maintenance projects safety inspections.

Recommendation:

- 12.** Develop a water distribution maintenance projects safety manual in consultation with Safety Department for water crews' guidance. The manual should for based on job safety analyses to reduce job site hazards and avoid injury and loss.

Water Department Comments: *Water Utilities will work with Safety staff on developing a safety manual for water distribution maintenance projects.*

Safety Department Comments: *The Safety Department will work with Water Utilities to develop a safety manual that defines safe work practices and standards to be used during work activities.*

Appendix A: Management Response Summary

The following summarizes the recommendations issued throughout this report. The auditors found that staff and the Department were receptive and willing to make improvements where needed. Management has provided their response to each recommendation.

1	<i>Develop and adopt a formal, comprehensive asset management plan, including the annual asset replacement planning considerations and strategic and financial planning objectives.</i>	Concur	Expected Completion: Dec 2022
Water Department Comments: There is an asset management program (Software) that the City currently uses to develop a list of annual asset replacement projects. This program does not include strategic and financial planning. Water Utilities staff will develop and adopt a comprehensive asset management plan that includes strategic goals and financial planning objectives to guide the long-term maintenance plan.			Responsibility: Water Utilities
2	<i>Instruct Water Department staff to execute and maintain project documents for the steps and activities prescribed under the capital improvement process guide.</i>	Concur	Expected Completion: September 2021
Water Department Comments: Water Utilities staff is currently working on implementing Procure (software) to manage the in-house asset replacement projects. Once implemented, project documents, review's, approvals, walkthrough, etc. can be documented and stored at a central location for easy access in the future.			Responsibility: Water Utilities
3	<i>Clarify if the Water Department is required to obtain right of way permits for its small water line replacement projects by consulting with the Public Works Inspections Division and the City Attorney's Office.</i>	Concur	Expected Completion: September 2021
Water Department Comments: Water Utilities staff will consult with Public Works staff and the City Attorney's office to determine a path forward on the right-of-way permit requirement for replacing water infrastructure.			Responsibility: Water Utilities
4	<i>Document and track formal approval from the Streets Division to perform water</i>	Concur	Expected Completion: September 2021

	<i>distribution projects on water lines under moratorium streets.</i>		
	Water Department Comments: Water Utilities staff is currently working on implementing Procore (software) to manage the in-house asset replacement projects. Once implemented, the clearance of streets under moratorium can be obtained from the Streets department through the RFI process in the software.		Responsibility: Water Utilities
5	<i>Consider implementing a reconciliation process to verify and confirm that the materials obtained were used for the correct project and recorded in the work order system and to ensure that any unused material is accurately reported to Warehouse and returned.</i>	Concur	Expected Completion: July 2022
	Water Department Comments: Water utilities will develop and implement a process to confirm that the material checked out from the warehouse is tracked and allocated to the appropriate project.		Responsibility: Water Utilities
6	<i>Evaluate opportunities to streamline the process of recording and allocating water crew labor hours to projects.</i>	Concur	Expected Completion: July 2022
	Water Department Comments: Water Utilities staff will work on evaluating opportunities for streamlining the allocation of labor hours to the appropriate replacement project.		Responsibility: Water Utilities
7	<i>Streamline the communication process for the closure and capitalization of water distribution projects between the Water and Finance Departments.</i>	Concur	Expected Completion: City Wide – January 2022
	Water Department Comments: Water Utilities staff will work with Finance staff to develop and implement a process for streamlining the closure and capitalization of the replaced water assets.		Responsibility: Water Utilities and Finance
	Finance Department Comments: The Finance Department is now utilizing Smartsheet software for tracking project maintenance requests. This includes project set up, project funding, project closure, and fixed asset capitalization in JDE. Finance maintains a database of all completed requests and will be implementing a process to communicate with departments monthly regarding job status.		
8	<i>Establish guidelines for how quickly a replacement project closure request</i>	Concur	Expected Completion: January 2022

	<i>should be submitted to Finance after completing construction.</i>		
	Water Department Comments: Water Utilities will work with Finance staff on developing guidelines for closing a project in a timely manner.		Responsibility: Water Utilities
9	<i>Establish parameters for how quickly leak repair work orders should be created and completed.</i>	Concur	Expected Completion: July 2022
	Water Department Comments: Water Utilities will work on developing an appropriate level of service plan that will establish the parameters and timeframes for minor maintenance activities.		Responsibility: Water Utilities
10	<i>Define criteria for general and emergency work orders to help further prioritize repairs.</i>	Concur	Expected Completion: January 2022
	Water Department Comments: Water Utilities will work on developing criteria for defining general and emergency work orders to help prioritize repairs.		Responsibility: Water Utilities
11	<i>Finalize and implement draft standard operating procedures for creating work orders and documenting minor maintenance activities.</i>	Concur	Expected Completion: January 2022
	Water Department Comments: Water Utilities will develop and implement standard operating procedures for creating work orders and properly documenting the minor maintenance activities in Cityworks.		Responsibility: Water Utilities
12	<i>Develop a water distribution maintenance projects safety manual in consultation with Safety Department for water crews' guidance.</i>	Concur	Expected Completion: July 2022
	Water Department Comments: Water Utilities will work with Safety staff on developing a safety manual for water distribution maintenance projects.		Responsibility: Water Utilities and Safety
	Safety Department Comments: The Safety Department will work with Water Utilities to develop a safety manual that defines safe work practices and standards to be used during work activities.		