AMANDA System Audit
August 2008

Patrice Randle, City Auditor
Craig Terrell, Assistant City Auditor
Roshan Jayawardene, Internal Auditor

ARLINGTON

City Auditor's Office

August 29, 2008

Honorable Mayor and Members of the City Council:

I am pleased to present the City Auditor's Office's report on the AMANDA System Audit. AMANDA is the system used by the City to manage the development process. The purpose of the audit was to evaluate the adequacy of internal controls in the AMANDA system, and ensure data accuracy and data integrity within the application.

Management's responses to our audit findings and recommendations, as well as target implementation dates and responsibilities, are included in the following report. Within twelve months, the City Auditor's Office will conduct a follow-up audit and comment on management's implementation of these audit recommendations.

We would like to thank City staff for their cooperation and assistance during this project. We look forward to continuing our efforts to ensure that adequate controls exist within implemented systems and that those systems meet the business needs of the City.

Patrice Randle

Patrice Randle, CPA
City Auditor

c: Jim Holgersson, City Manager
Fiona Allen, Deputy City Manager
Bob Byrd, Deputy City Manager
Gilbert Perales, Deputy City Manager
Trey Yelverton, Deputy City Manager
Louis Carr, Information Technology Director
James Parajon, Community Development and Planning Director

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Exhibit A – AMANDA Enhanced System Maintenance Process Diagram

AMANDA System Audit

Office of the City Auditor

Patrice Randle, CPA
City Auditor

Project #07-17 **August 29, 2008**

Executive Summary

AMANDA appears to have increased the efficiency of the development process

Citizens can now monitor permit progress without staff interaction

City Auditor's Office identified control deficiencies

Opportunities for Improvement

- ***Documented testing***
- ***Tracking of work orders and system maintenance***
- ***Restrict fee alteration capability***
- ***Separation of duties***
- ***More timely upgrades***
- ***Enhanced customer service for on-line customers***
- ***Restrict access to sensitive data***

As part of the 2007 Annual Audit Plan, the City Auditor's Office has conducted an audit of AMANDA, a system used by the Community Development and Planning Department for development tracking. The audit was conducted in accordance with Generally Accepted Government Auditing Standards (GAGAS). The objectives of the audit were to determine whether:

- The system maintenance process is efficient, effective and includes adequate internal controls
- Adequate audit trails exist for critical transactions
- The AMANDA web application consists of adequate internal controls that maintain transaction integrity and results in accurate transactions
- Access to sensitive data is secure and based on job requirements
- AMANDA and its mobile module meet the business needs of the Community Development and Planning Department

The City Auditor's Office concluded that AMANDA is functionally operational. Due to a scope limitation explained in the Audit Scope and Methodology section of this report, the City Auditor's Office was not able to determine if testing performed prior to implementation was adequate.

The City Auditor's Office concluded that audit trails for some critical transactions were inadequate or nonexistent, conflicting duties have been assigned to the System Administrator and access to sensitive data has not been restricted.

The findings and recommendations are discussed in the Detailed Audit Findings section of this report.

Audit Scope and Methodology

The City Auditor's Office reviewed activity and data entered into Application MANagement and Data Analysis (AMANDA) since its inception in April 2006 through December 2007.

The following methodology was used in completing the audit:

- Interviewed management and staff associated with system operations
- Gained an understanding of system operations
- Conducted sample transactions
- Examined audit trails and internal controls for critical activity
- Reviewed the efficiency and effectiveness of the system administrator function
- Reviewed financial transactions, including payment refunds
- Reviewed the AMANDA mobile module
- Examined the AMANDA web application

Although management and staff indicated that sufficient testing was conducted prior to system implementation, the City's Information Technology and Community Development and Planning Departments were not able to provide the City Auditor's Office with adequate documentation supporting test results and acceptance. The System Administrator stated that documentation which contained system testing information prior to the go-live date had been accidentally deleted in August 2007.

Working sheets for AMANDA Phase I and II folders are stored on the AMANDA intranet. A working sheet is an Excel spreadsheet that lists business rules for the folder, pseudo code for the business rules and procedures utilized within each folder. Review of the working sheets on the intranet site did not show test records, test results or acceptance of processes implemented prior to August 2007. The system went live with Phase I on April 17, 2006. Given the lack of system test documentation, the City Auditor's Office was unable to determine if all folders were adequately tested (documented test plan; inspection, analysis, demonstration, and testing of data; user approval, etc.) prior to implementation.

Background

AMANDA was selected by the Community Development and Planning Department in February of 2005 to automate the permitting process and to fulfill a March 2001 Building Inspections Process internal audit recommendation. Management plans to implement AMANDA in four phases. Phases I and II have been implemented and the system is expected to be expanded to include Phases III and IV in the future.

Phase I included the introduction of 14 folders for building permitting. Phase II consisted of seven folders for land development processes. Each permit type is contained in an individual folder. Each folder contains tracking processes for designated steps in permit approvals.

Folders implemented in Phases I and II are listed as follows.

Phase I	Phase II
▪ Business Registration	▪ Board of Adjustment
▪ Concrete Permit	▪ Plat History
▪ Certificate of Occupancy	▪ Public Improvements
▪ Commercial Permit	▪ Plat
▪ Fence Permit	▪ Site Plan
▪ Fire Permit	▪ Zoning Case
▪ Mechanical Permit	▪ Zoning History
▪ Plumbing Permit	
▪ Residential Permit	
▪ Sign Permit	
▪ Swimming Pool Permit	
▪ Trust Account Folders	
▪ Violations Folders	
▪ Electrical Permit	

In February 2007, during the AMANDA Phase II implementation, management initiated the One Start Development Center where multiple building processes (land development to building structures) were incorporated into one process. As a part of the One Start Development Center, a customer's first stop is the Information Desk. At the Information Desk, customers are greeted by a "Professional of the Day" who directs them through the development process. The development process includes permitting, building inspection, plan review and land development. The One Start Development Center is staffed by employees with development experience in water utilities, health, information systems, public works and fire inspection. Customers no longer have to schedule an appointment to conduct business. According to the Community Development and Planning Department, the average processing time for a building permit has decreased from 15 days to 10 days. In addition, permitting progress can be monitored more effectively.

Planned upgrades to AMANDA in Phases III and IV include code enforcement, health, animal control and impact fees. These components would also become a part of the "one-start" concept. These services are currently processed in a mainframe environment, which the City plans to phase out in favor of a client-server environment.

Detailed Audit Findings

AMANDA Post Implementation Review

The primary objective of AMANDA is to automate the permitting and land development process, which includes the "one-start" concept, where permitting and zoning processes are seamless to developers. The system was introduced to eliminate a common complaint among developers - that it takes too long to obtain a building permit. Permitting and land development were processed in the mainframe environment which included reviews by multiple City departments.

Documentation and statistical data computed by the Community Development and Planning Department shows that the time to review site plans has been reduced to 12.6 days compared to 22 days in February of 2007. In addition, the department calculated a two-day reduction in residential permit reviews and a seven-day reduction in the commercial permit review process.

1. Adequacy of AMANDA testing, prior to implementation, could not be verified.

Working sheets for AMANDA Phase I and Phase II folders are stored on Share Point, the AMANDA intranet. The City Auditor's Office was informed that pre-implementation test documentation was accidentally deleted in August 2007. For documentation that was available for review, the City Auditor's Office could not interpret test records, test results or acceptance of processes. Given the difficulty in interpreting test documentation that was available combined with the fact that some test documentation had been deleted, the City Auditor's Office was unable to determine if all folders were adequately tested.

The Information Technology and Community Development and Planning Departments indicated that thorough testing was conducted prior to implementation. Since, overall, AMANDA is working to meet the City's business needs, it can be assumed that testing was performed. However, the City Auditor's Office could not conclude as to the adequacy of such testing. Based on the following, there may have been inadequate testing or a lack thereof.

- On March 14, 2006, a risk analysis conducted by the vendor project manager indicated that the project was experiencing delays/slowdowns in testing and lack of any testing for the mobile module. This was approximately four weeks prior to the go-live date.
- The AMANDA implementation project team's to-do lists indicated that testing was not concluded for various folders as of March 30, 2006, two weeks prior to go-live date.
- A status report dated March 31, 2006 indicated many unresolved issues with the mobile module.
- Work orders indicated failures in basic functionality of folders. For example, trust accounts were allowed to go negative, re-inspections were scheduled for days past, and permits could be issued with inactive business registrations.
- The AMANDA project director stated that test scripts were not used to conduct acceptance testing by users. Test scripts contain instructions on the type of tests that need to be conducted and explain successful test results. The working sheets unique to each AMANDA folder did not list test scripts.

- Although City policy disallows alterations to closed permit folders, audit testing indicated that fees could be added to finalized folders and billed.

Subsequent to AMANDA implementation, the Information Technology Department drafted a new policy regarding system implementations. The new policy addresses system testing and documentation processes, and necessary approval of test results prior to system go-live dates. The City Auditor's Office reviewed the newly created policy/test plan as it related to the recent implementation of air cards for mobile connectivity. Under the recently drafted policy, adequate acceptance testing is designed to discover and eliminate basic errors in processing.

Recommendation:

The Information Technology Director should ensure that future AMANDA system testing is conducted and retained in accordance with the newly adopted testing standards.

Management's Response:

Concur. This practice has been in place since fall 2007.

Target Date: Complete
Responsibility: Gary Allison, Assistant IT Director

Audit Comment:

It is common in post-implementation audits to review the adequacy of testing conducted prior to system implementation. Although new testing standards have been implemented, adequate documentation of testing conducted prior to system implementation was not available for review. By fall 2007, when the new testing standards were established, both Phases I and II of AMANDA had already been implemented.

2. Staff assigned for AMANDA administration and maintenance is inadequate.

Currently, one employee is assigned to administer and maintain AMANDA. The City of Arlington has a staff analyst position funded but not filled. Arlington's lack of resources to maintain AMANDA is evidenced by prolonged work orders and the inability to test system enhancements and launch them to production.

Comparison to three other cities that use AMANDA shows a greater number of system administrative and maintenance staff assigned to AMANDA than the number assigned at the City of Arlington. Although the installation and use of AMANDA at these cities differ due to customization, the Information Technology Department indicated that the complexity of the AMANDA installation will be similar to the other cities as the system is expanded. The four city comparison is presented as follows.

City	Population	Staff Count	Version	No. of Folders	Mobile Version	Cost of Vendor Maintenance Contract
Portland, OR	568,000	1 Technology Manager 6 Analysts 6 Programmers 1 Database Administrator (Part-time)	4.4.12	81	5.4.4	$90,000
St. Paul, MN	275,150	1 Analyst 2 Programmers 2 Web Programmers (Part-time) 1 Database Administrator (Part-time)	4.4.21	115	3.6	$50,000
Austin, TX	709,893	3 Programmers 1 Analyst 1 Trainer	4.4.21	58	N/A	$180,000
Arlington, TX	***367,197***	***1 Administrator 1 Database Administrator (Part-time)***	***4.3***	***21***	***4.2.4***	***$108,751***

The City Auditor's Office did not observe any evidence of assessments made by Community Development and Planning management that would have identified staffing needed to maintain AMANDA after implementation. Staffing assessments are usually made during the pre-implementation stage, where adequate funding could be allocated to maintain the system after the go-live date.

AMANDA is classified as an enterprise system, which encompasses a wide range of processing activity ranging from permitting, land zoning, mobile use and financial processing. The system is slated for expansion in order to include fire and code enforcement processes in Phases III and IV. Lack of adequate human resources to maintain the system is considered an additional operational risk. As a result, unattended system deficiencies may lead to system exploitation by users.

Recommendation:

The Community Development and Planning Director, in conjunction with the Information Technology Director, should conduct an analysis of staffing needed to maintain the

system efficiently. Budget needed to obtain the necessary staff should be communicated to City management and appropriated.

Management's Response:

Do not concur. The product, nor its support for City of Arlington is at risk. This is a budget issue primarily, which affects timeliness of support. [The] City of Arlington has been identified as having less IT support staff than other AMANDA users. While this is believed to be true, [the] City of Arlington currently supplements our IT staff level through the use of vendor support. This approach is more costly on an hourly basis, and delays support of user needs. However, it does not prevent us from meeting the needs of City of Arlington and does not pose a risk in our use of AMANDA.

Target Date: On-going
Responsibility: N/A

AMANDA Data Security

The City Auditor's Office's review of AMANDA data security included an assessment to ensure sensitive data is secured and access to sensitive data is based on job needs. Sensitive data is limited to the AMANDA business registration folders, which includes personal and professional licensing information for contractors.

Review of AMANDA data security also included assessing access rights to the application and conducting test transactions under several access profiles (roles) established in AMANDA. Established access roles include system and user administrator, staff, senior staff, public and read-only access levels. The City Auditor's Office tested financial transactions, voiding of payments and alterations to sensitive data.

3. The ability to alter fee amounts is not restricted.

Within AMANDA, permit fees are defaulted to the authorized amount. However, internal audit testing indicated that permit fees could be changed and billed in amounts other than those authorized by City Ordinance. The City Auditor's Office was able to alter permit fees by typing over the default amounts. Permit fees could also be added via the "add fee" or "insert row" functions. The "add fee" button lists applicable fees for the permit, as defaulted within AMANDA. The "insert row" function lists fee types in a drop-down box.

In some instances, it may be necessary to revise fee amounts due to changes in construction valuations. However, the ability to alter fees should be restricted to a limited number of users. Not limiting the number of users with the ability to change and collect a permit fee could result in employee dishonesty.

Recommendation:

The Community Development and Planning Director should require that the ability to alter permit fees is restricted.

Management's Response:

Concur. Manual processes are in place that control for potential abuses. The cashier must react to circumstances when fee amounts have to be modified in order to issue a permit (i.e. presented checks made out for the wrong amount, 380 agreements that waive permit fees, partial payments, changes in construction valuation, etc.). All payment transactions are accompanied by a paper receipt that is provided to the paying customer. CD&P will conduct business analysis to determine feasibility of restricting fee modification authority to cashiers and selected managers.

Target Date: September 2009
Responsibility: Bruce Payne, Assistant Director CD&P

4. Access to sensitive data within the business registration folder is not restricted.

Information technology standards dictate that access to sensitive information should be granted to users on an as-needed basis. Analysis of the security permissions folder shows all users having a minimum of read-only permission to all folders except the trust account (escrow) folders.

Approximately 250 employees have access rights to AMANDA. The 250 users have access to the business registration (BR) folder that contains personal information of contractors and contractor employees. Since 250 users have at least read-only rights to the BR folder, the opportunity to misuse information for identity theft purposes exists.

Stored data in the BR folder include names, addresses, some social security numbers, professional license numbers, copies of drivers' licenses and in some instances, copies of pay stubs obtained to establish the identity of contractor employees. Although most of the information is public record (e.g., names and addresses), information such as social security numbers is not public information and should be considered sensitive and confidential.

Due to the nature of information contained within BR folders, the folders could be considered confidential. Encrypting data within these folders and limiting access to select employees would improve data security. When implementing the system, Community Development and Planning believed that all staff would need access to information within the BR folder in order to perform their job functions. Sensitive information within the BR folders was, therefore, not encrypted.

Recommendation:

The Community Development and Planning Director, in conjunction with the Information Technology Department Director, should ensure that: 1) business registration folders are classified as confidential; 2) sensitive information is encrypted; and 3) access limited, based on job requirements.

Management's Response:

Concur. CD&P concurs that driver's license numbers and social security numbers should be encrypted or deleted as applicable. CD&P will conduct business analysis and work with Information Technology to determine feasibility of encrypting these information fields. CD&P does not concur that the business registration folder should be classified as confidential. Wide city employee access to the business registration folder is chosen business practice. Registration status, license status, insurance status, names and phone numbers are necessary for city enforcement personnel to adequately perform their duties. In its current configuration, the general public is only able to view the name of the business, business address, business contact and business telephone number of registrants.

Target Date:	September 2009
Responsibility:	Bruce Payne, Assistant Director CD&P Gary Allison, Assistant IT Director

5. Former employees were included on the AMANDA access rights table.

The City Auditor's Office identified nine former employees (full-time and temporary) on the AMANDA active access rights table. Eight of the former employees were included in the "staff" security group and one employee was included in the "read-only" group. Access rights are maintained by the IT System Administrator, who noted that it may not be possible to remove former employees from the access table if the users are associated with prior AMANDA transactions. However, it is possible to modify the access rights of former employees to "read-only" or "inactive" status.

Although the City Auditor's Office did not identify any unauthorized data alterations or compromises due to the noted exceptions, former employees with active access levels could potentially alter existing records if they obtain physical access to a computer loaded with the AMANDA client.

The lack of a methodology to notify the IT System Administrator of terminating employees resulted in the noted exceptions. The Information Technology Department has indicated that it is currently in the process of drafting a notification methodology.

Recommendation:

The Information Technology Director should require that the IT Systems Administrator update former employees' AMANDA access status rights to "inactive."

Management's Response:

Concur. IT staff have reviewed current AMANDA user access, and made changes to AMANDA access rights to disable those users who are no longer City employees.

Target Date: Complete
Responsibility: Gary Allison, Assistant IT Director

Recommendation:

The Information Technology Director should ensure that in the future, the IT System Administrator revokes terminated employees' access to AMANDA, upon proper notification.

Management's Response:

Concur. IT System Admin[istration] staff now receives a biweekly report/notification from Lawson regarding newly terminated employees. This employee list is compared against current AMANDA users, and appropriate action to de-activate specific user accounts is taken.

Target Date: Complete
Responsibility: Gary Allison, Assistant IT Director

6. The number of users granted administrator access in AMANDA can be limited.

Seven administrators are defined in the current AMANDA security table. Three of the seven are assigned to employees within the Information Technology Department, two are assigned to management-level employees within the Community Development and Planning Department and the remaining two are generic accounts that can be used by non-specified employees. Administrators have rights to alter stored procedures, data tables, security settings, etc. A stored procedure is a group of SQL codes that form a logical unit and perform a particular task. Business rules are represented as stored procedures in a database, for fast execution. Administrators do not have access to AMANDA program code, which is contractually limited to the vendor.

While the two management level employees within the Community Development and Planning Department have been granted administrator status, they are also AMANDA users. More risk exists when system users are granted administrator status. By granting an AMANDA user administrator status, it places that individual in a position to alter system functionality without timely detection, if any. The Community Development and Planning Department indicated that job duties assigned to these two managerial positions require AMANDA access beyond day-to-day operations. Examples include making urgent changes to data tables, such as updating a default value in a fee table.

The City Auditor's Office is aware that there may be instances where staff requires AMANDA access beyond normal day-to-day operations. However, such system functionality could be granted without extending to the administrator status level.

Recommendation:

The Information Technology Director should limit the number of employees with administrator access (e.g., ability to change stored procedures, security settings, etc.) to a limited number of Information Technology Department employees.

Management's Response:

Concur. Information Technology system administration staff has removed this access from CD&P staff and will continually review user access rights to ensure that only designated staff (within Information Technology) have administrative access to AMANDA.

Target Date: Complete
Responsibility: Gary Allison, Assistant IT Director

7. Voided payment transactions do not require managerial approval.

Audit testing indicated that prior day payments could be voided within AMANDA without managerial approval. Although management has instructed staff to not void prior day payments, there is no systematic restriction.

At the end of each day, Community Development and Planning management prints AMANDA reports and reconciles those reports to daily deposits. Although the AMANDA reports include

information relating to voids, the voids would have already been processed. AMANDA currently has the capability to require an approval code from a cashier manager for voided transactions.

Recommendation:
The Community Development and Planning Director should require that management level staff systematically approve voided payment transactions.

Management's Response:

Concur. CD&P controls voided transactions with the manual cash drawer balancing process. In the AMANDA environment, only same day voids are allowed. Voided transactions are printed, noted, and turned in at the end of each day to be included in the cash balance, which is reviewed by the supervisor. CD&P will perform business analysis to enable AMANDA to require supervisor approval for any prior day voided transactions, and to generate a monthly report of voided transactions.

Target Date: September 2009
Responsibility: Bruce Payne, Assistant Director CD&P

8. Reasons for voiding folders within AMANDA are sometimes not documented.

Folders within AMANDA are voided due to data entry errors, withdrawn permit applications, and applications for unknown addresses. Although system users have the ability to document reasons for voids in the AMANDA folder description field, such documentation is not mandated by policy or AMANDA. The City Auditor's Office observed voided folders that did not list reasons as to why they were voided. A process to review voided folders by management in order to assess validity was also not detected. Without documented reasons for voids, management may not be able to conclude if voided folders were legitimate.

Recommendation:

The Community Development and Planning Director should ensure that AMANDA is modified to require mandatory data entry to document reasons why folders are being voided.

Management's Response:

Do not concur. Permits cannot be issued and approvals cannot be obtained if the corresponding folders are voided, which eliminates any concern over the commencement of unauthorized construction activities. The person who voids project folders (i.e. permits) is tracked via their sign-on and password. While the department presently trains staff to document the reasons for voiding folders in AMANDA, the resources necessary to reconfigure AMANDA to disallow the voiding of folders without entered documentation would be prohibitive, and the results would be inconsequential.

Target Date: No action to be taken
Responsibility: Bruce Payne, Assistant Director CD&P

9. **Negative trust account balances are not systematically prevented.**

Trust accounts are set up by frequent users of AMANDA. Under a trust account, contractors are allowed to place money into an account and use the money placed in the account to pay for future permit and inspection fees. There are no limits on amounts that can be placed into the trust accounts.

The City Auditor's Office noted that the system allowed a trust account balance to go negative. City staff was aware of this situation and had reported the malfunction to the vendor in September 2006. During the audit fieldwork, management indicated that the vendor was still working to resolve the error.

As a temporary fix, management has defaulted trust accounts to an "inactive" status. The Assistant Building Official manually changes the status from "inactive" to "active" when transactions need to be posted against the trust account. If trust accounts are not manually monitored, the cost of services received by the contractor could exceed the amount that the contractor has placed in his/her trust account, resulting in a negative trust account balance.

Recommendation:

The Community Development and Planning Director, in conjunction with the Information Technology Director, should request that the vendor expedite the work order related to negative trust account balances.

Management's Response:

Concur. This issue was initially elevated to the vendor and the vendor provided an initial finding of resolution. However, subsequent testing reveals that the issue has not been completely resolved. This issue has been elevated to the vendor for a second time for resolution. This is a software programming issue and not a configuration issue. Staff is awaiting the solution and will take steps to address approval authority for overriding trust accounts once the vendor has responded.

Target Date: Spring 2009
Responsibility: Gary Allison, Assistant IT Director

9. Deleted folders were not recorded.

Existing business rules established by the Community Development and Planning Department prohibit the deletion of folders. However, during audit testing in the AMANDA test environment, the City Auditor's Office was able to delete a total of four folders. The deleted folders were folders without financial activity and included active violation folders. The system did not allow deletion of folders with financial activity or folders in closed status.

The IT System Administrator stated that deletion activity was not recorded in the test system due to the administrator turning off the audit log triggers to selected data tables during a system enhancement. After the discovery, the IT System Administrator turned on the audit triggers and the City Auditor's Office was no longer able to delete folders in the test environment.

The City Auditor's Office found no evidence of deleted folders in the production environment. However, according to the IT System Administrator, the audit triggers were turned off in the production environment as well. He was able to identify only one deleted folder in the production environment. The system did not allow folders with payments or folders with links to other data tables to be deleted, minimizing the risk of loss.

Recommendation:

The Information Technology Director should assign appropriate staff to verify that audit log triggers are turned back on after system upgrades and enhancements.

Management's Response:

Concur. IT System Admin[istration] staff will ensure that any and all future AMANDA upgrades that involve changes to the system database structure account for the turn-off and turn-on of audit triggers as part of any future AMANDA project plan.

Target Date: Complete
Responsibility: Gary Allison, Assistant IT Director

11. The ability to conduct payment related transactions is not limited to cashiers.

Any AMANDA user, other than a read-only user, is capable of conducting financial transactions within AMANDA. Although the daily cash report identifies all individuals with cashiering activity, cashiering functions may be performed by employees whose job duties have nothing to do with cash handling and who probably have not attended the City's mandatory cash handling course.

AMANDA security permissions are segmented by roles and groups. Designated roles include staff, senior staff, user, system administrator, public (internet user) and read-only. Many employee groups are included in the staff role, including permit technicians, plans reviewers, cashiers, inspectors and managers. Internal audit testing of payment activity was conducted under administrator, permit technician and plans reviewer permissions. Current procedures allow an engineer to process payments.

Recommendation:

The Community Development and Planning Director, in conjunction with the Information Technology Director, should ensure security permissions are re-configured to limit users to system transactions that are related to their assigned job duties.

Management's Response:

Concur. Manual procedures are in place to control for any unauthorized system transactions. Any employee who is signed on and uses the payment button is recorded in the daily report. Additionally, only employees designated as cashiers have access to the cash drawer and can make change from it. The cashier's station is in public view and is situated in front of the supervisor's office, and the cash drawer is locked and requires a key to gain access. The department will conduct business analysis to reconfigure AMANDA to limit system transactions to assigned job duties.

Target Date: September 2009
Responsibility: Bruce Payne, Assistant Director CD&P

AMANDA System Administration and Maintenance Function

The City Auditor's Office's review of the AMANDA system administration and maintenance function was conducted to ensure that:

- Adequate staffing resources exist to maintain AMANDA
- The system is maintained to meet the business needs of the Community Development and Planning Department
- Internal controls in the system administration function are adequate

The AMANDA system administration tasks are conducted by a Senior Programmer Analyst assigned to the Information Technology Department. A secondary employee is also assigned to assist the designated System Administrator. The primary job function of the System Administrator is to:

- Assign user access rights to AMANDA
- Monitor and enhance stored procedures to optimize AMANDA performance
- Respond to AMANDA work orders that users open in the IT Magic work order management system
- Communicate with CSDC, the AMANDA vendor, and coordinate system fixes and enhancements
- Ensure system upgrades are performed per the system maintenance agreement

AMANDA consists of an annual maintenance contract with the vendor which cost $108,751 for 2007. Under the maintenance agreement, the vendor is contracted to provide telephone support, problem diagnosis, corrections to errors, enhancements to software and to maintain release currency. Support to resolve issues other than software bugs are charged at $200 per hour.

12. Production AMANDA has not been upgraded.

Software upgrades are released by the vendor and made available to users via downloads. Per the service agreement, users are responsible for upgrading the system.

With a go-live date of April 2006, AMANDA was launched with version 4.3. Although additional AMANDA versions (4.3 to 4.3.41, 4.4 to 4.4.22, and 5.4 to 5.4.22) have been released, the City has not performed an upgrade to the original version.

It may not always be practical to upgrade an application upon each software version release; however, upgrades to selected key versions are generally recommended. Periodic upgrades to application software are aimed at eliminating known software bugs and optimizing application performance. Management at CSDC indicated that some of the pending work orders experienced by the City of Arlington are attributable to not having the most current version of AMANDA.

According to Information Technology management, the City is currently preparing for an upgrade to AMANDA. The City expects to gain additional functionality as a result of the upgrade.

Recommendation:
The Community Development and Planning Director, in conjunction with the Information Technology Director, should ensure that AMANDA is upgraded as needed.

Management's Response:

Concur. The regular upgrading of AMANDA is an enterprise issue and is managed by the IT Department. AMANDA was successfully upgraded to version 5.4.4 on July 13, 2008, after more than six months of preparatory work.

Target Date: Complete
Responsibility: Gary Allison, Assistant IT Director

13. AMANDA maintenance requests are not prioritized to ensure timely resolution.

AMANDA maintenance requests are submitted through the City's information technology work order system. The IT System Administrator determines the order in which the work orders should be corrected and then forwards work orders to the vendor, if considered necessary. Some system maintenance requests are e-mailed by the Community Development and Planning System Analyst to the IT System Administrator and logged into a spreadsheet (derived from the IT Magic work order management system). An estimated time to correct the problem is not documented.

The vendor has designed a severity rating system to define the level of response needed to fix identified malfunctions. Severity 1 is classified as a critical problem that renders AMANDA inoperable. Severity 2 is listed as a problem that results in AMANDA not operating correctly. And, severity 3 is listed as a minor problem or defect with little effect on overall operations. These ratings were absent from work orders assigned to the vendor.

Audit results indicated that work orders stay open and unresolved for extended periods of time. Documentation provided by the Information Technology Department showed a total of 36 open work orders as of January 2008. The work order status report provided by the Information Technology Department lists instances of resolutions for AMANDA waiting for user testing and acceptance, prior to implementation. A work order status report generated by the Community Development and Planning System Analyst showed a total of 52 unresolved work orders as of October 2007. The 52 open work orders dated as far back as August 2006.

The City Auditor's Office noted ten pending work orders that were waiting user testing. According to the IT System Administrator, sufficient staff may not exist to test the solutions in a timely manner prior to production launch. The number of solutions that require user testing and acceptance are also listed in the CSDC work order website as "awaiting client response." A CSDC work order report provided to the City Auditor's Office showed 34 work orders "awaiting client response" as of January 2008.

The Information Technology Department is in the process of establishing system implementation guidelines. The City has hired a quality assurance consultant, who has drafted written policy, test plans, a methodology to launch solutions to production and a new documentation policy. The proposed guidelines for system work order management mirrors the process presented in

Appendix A. The major component of a successful system management process is dedicated subject matter experts from each area of system use (building inspections, mobile, plans review, web, customer service, engineering) that report/discuss system malfunctions with an experienced System Analyst that will facilitate and prioritize system fixes. Prioritization is a continuous process, where system emergencies would also be accommodated. The System Analyst will then document and channel the work order to either IT or the vendor and monitor progress. The subject matter expert group would meet periodically to monitor and prioritize work orders on a continuous basis. Some elements of the proposed work order management guidelines are already in place in Community Development and Planning. However, in order to be successful, sufficient resources will need to be allocated to the process. Currently, the System Analyst position within Community Development and Planning is vacant.

In addition, the City's Information Technology Department has recently hired a contractor to assist the AMANDA System Administrator with programming/analyst duties. Additional help in systems programming should enable the System Administrator to deliver solutions in a timely manner.

Recommendation:

The Community Development and Planning Director, in conjunction with the Information Technology Director, should require that AMANDA work orders be prioritized and communicated to the appropriate person(s) in a timely manner.

Management's Response:

Concur. This finding is a reference to the priority ranking given to work orders in Information Technology's Magic Work Order system, which is separate and distinct from the process of prioritizing work orders emanating from departments utilizing AMANDA. CD&P has had a process of interaction with IT since March 2007 to properly characterize and prioritize work orders.

Target Date: Implemented in March 2007
Responsibility: Bruce Payne, Assistant Director CD&P

Recommendation:

The Community Development and Planning Director should require that the Community Development and Planning System Analyst monitor work order status and report any issues that are outstanding for an extended period of time to upper management within the Community Development and Planning Department in a timely manner.

Management's Response:

Concur. This has been the practice of CD&P since March 2007.

Target Date: Implemented in March 2007
Responsibility: Bruce Payne, Assistant Director CD&P

Audit Comment:

Although management indicates that a priority ranking system has been used since March 2007, documentation submitted to the City Auditor's Office indicated that AMANDA work orders were not prioritized. A Magic work order report provided to the City Auditor's Office did not include prioritization data. In addition, a work order report from the vendor's website indicated that work orders had not been prioritized by City staff.

Subsequent to the completion of audit fieldwork, the City Auditor's Office provided a more detailed Magic work order report that included prioritization data. The majority (295 of 299) of the work orders included on the report were assigned a "medium" priority. The remaining work orders were assigned a "high" priority.

Although it appears that the ability to prioritize work orders in Magic exists, it was not evident to the City Auditor's Office that such prioritization was communicated to the vendor or facilitated the timely resolution of work orders.

14. The IT System Administrator is assigned conflicting job duties.

Generally accepted IT standards promulgated by the Information Systems Audit and Control Association (ISACA) suggest that system administrator job duties be limited to ensure adequate separation of duties, prevention of unauthorized activity and to ensure objectivity for each role in the system management process. When conflicting job duties exist, a system administrator could conduct inappropriate activity and effectively conceal the activity in order to prevent being detected.

The IT System Administrator is currently listed as a Senior Programmer Analyst in the IT organization structure. The IT System Administrator's job duties include project manager, backup database administrator, web master and quality assurance documenter. Based on IT standards, the AMANDA System Administrator has conflicting job duties as database administrator and project manager. Review of work orders and project management records in AMANDA confirm conflicting roles for the IT System Administrator. The Information Technology Department has separated the job duties for the positions of project manager for Phases III and IV of AMANDA; however, records show the current IT System Administrator performing project management duties for Phase II, as a result of an employee departure.

The Information Technology Department consists of designated database administrators who perform backup routines and monitor performance in the AMANDA database. The IT System Administrator also performs database administrator duties, mainly when upgrades are launched to production.

The IT System Administrator also listed business rules developer as a task currently performed. Based on review of the working sheets, the City Auditor's Office noted that the administrator also performs programming duties, as part of business rules development.

Resource and staff limitations may force the IT System Administrator to have conflicting job duties. However, compensating controls could be established such as periodic managerial

review of transactions performed in the conflicting role. In addition, transactions performed in a conflicting role could be recorded in an audit trail for management's review.

Recommendation:

The Information Technology Director should segregate conflicting duties in the system administrator function and ensure compensating controls exist if resource allocations limit segregation of duties.

***Management's Response*:**

Concur. IT Management has reviewed roles and responsibilities with the AMANDA system administration staff and has completed changes required.

Target Date: Complete
Responsibility: Gary Allison, Assistant IT Director

15. Test data for system fixes and enhancements are not adequately documented.

Testing for system fixes were documented in working sheets designed by the vendor. The working sheets were Excel spreadsheets that listed business rules for each permit folder in pseudo code. Pseudo code is basically statements written to depict the steps to be performed, in a particular sequence.

The Information Technology Department produced testing information for two out of seven system fixes (performed between July 2006 and May 2007) selected by the City Auditor's Office. The working sheets indicated that the two fixes were tested; however, they lacked test scripts and actual test results. Management indicated that test data for the remaining five fixes were contained in working sheets that were accidentally deleted by an employee. Management was unable to recreate or recover the deleted working sheets.

As discussed previously, the Information Technology Department drafted new testing, test script and test documentation standards that require more thorough documentation than that contained in the working sheets. This includes narrative test plans and scripts written step by step and clear documentation of user acceptances. The IT Department has begun operating under these standards.

Recommendation:

The Information Technology Director should require that future AMANDA fixes be tested in accordance with the newly adopted testing standards.

Management's Response:

Concur. Improved testing and documentation procedures were implemented in the fall of 2007 and will be followed on all future upgrades, patches, and system release implementations.

Target Date: Completed Fall 2007
Responsibility: Gary Allison, Assistant IT Director

16. **A complete analysis of user-written stored procedures for AMANDA has not been performed.**

The main benefit of code analysis is assurance that the system would not be affected by past activity. It also prevents conflicts when system enhancements are made in the future. Code analysis for AMANDA would consist of examining stored procedures for permitting business processes and assessing if the existing code is consistent with the business rules developed and communicated in the working sheets. Detailed analysis of the stored procedures was beyond the scope of the current audit and requires special analysis tools.

The City Auditor's Office noted recurring and sudden errors. Sudden errors may be an indication that an unauthorized change was made. In addition, the following also indicates a need to analyze existing stored procedures:

- Administrator rights have been granted to user groups. Individuals with Administrator rights can alter stored procedures for AMANDA. Community Development and Planning staff members had Administrator access rights until they were revoked by the IT Business Systems Manager prior to AMANDA Phase II implementation. The possibility exists that any one of several administrators could have made unauthorized changes to the stored procedures.
- The IT Business Services Manager and Planning Assistant Director noted that there may have been unauthorized changes made due to a lack of adequate resources. The lack of resources may have forced Community Development and Planning Department managers with administrator access to make the system operate under any event.
- Conflicting job duties assigned to the IT System Administrator may have resulted in unauthorized changes.
- An adequate quality assurance methodology did not exist and there was not always documented testing of system fixes prior to production launch. Also, the Building Official noted that there were instances in the past where alterations to stored procedures were directly coded into Amanda and not recorded in the working sheets. Absence of controls in the system maintenance methodology would not deter an unauthorized system change from being launched to production.

Recommendation:

The Community Development and Planning Director should consider performing an analysis of existing stored procedures to ensure business rules listed in the working sheets are accurately reflected in the AMANDA application.

Management's Response:

Do not concur. There are literally thousands of stored procedures in the AMANDA system. Existing stored procedures related to specific activities are investigated when folders do not work properly or when there is a change in business practice. When/if discrepancies are found, they are corrected. CD&P chooses not to spend staff time analyzing stored procedures that are working as intended.

Target Date: No action to be taken
Responsibility: Bruce Payne, Assistant Director CD&P

AMANDA Limited Applications Control Review

The application control review conducted by the City Auditor's Office was limited to selected, key transactions. Traditionally, application control reviews include detailed review of input, processing and output. The City Auditor's Office conducted detailed reviews of key transactions, selected based on risk assessment.

16. Required processes can be deleted from permit folders.

Within AMANDA, Community Development and Planning staff has established required processes for permits based on state law, local building codes and City preference. For example, for a concrete permit, one required process is a pre-pour inspection. Business rules have been established in AMANDA to include these required processes before the final permit is issued. In the test environment, the City Auditor's Office was able to delete a required process before the permit was finalized.

The City Auditor's Office also noted that individual processes can be deleted after a permit has been issued or a folder has been finalized. Current business rules do not allow alterations to issued permits or closed folders.

Controls that would limit, prevent and/or track process deletions were not included when the permitting processes were set up in AMANDA. Lack of such controls could contribute to misuse and the possibility of a critical process such as a fire review not being performed before a permit is issued. Per the Building Official, he is at times given the discretion to omit certain inspections by City Ordinance. In those cases, AMANDA can be configured to allow a restricted number of users to inactivate a process within a folder, as opposed to deletion.

Recommendation:

The Community Development and Planning Director, in conjunction with the Information Technology Director, should seek assistance from the vendor and System Administrator to enhance AMANDA so that required permitting processes can not be deleted.

Management's Response:

Concur. In order to maximize accountability, CD&P will conduct business analysis to evaluate sign-off of unneeded permitting processes during application review instead of their deletion in advance of the review.

Target Date: September 2009
Responsibility: Bruce Payne, Assistant Director CD&P

17. The ability to "sign-off" on permit review processes or scheduled inspections is not limited to designated employees.

To ensure appropriate segregation of duties, finalizing a permit process should be limited to designated employees. The City Auditor's Office noted that scheduled inspections could be signed off by a user that is not an inspector. During the audit testing, permit processes were signed off by the City Auditor's Office, using staff access.

When a citizen applies for a permit, permit reviews are assigned to employees by management. Tasks assigned to an employee can be re-assigned to another employee, without management involvement. The ability to reassign engineering processes is not limited to the Engineering Services Manager.

Permits require reviews and inspections by various employee groups such as plans reviewers, engineers, fire code reviewers and code inspectors. Any general AMANDA user with more than "read-only" access can sign off on a process designated to the engineers, plans reviewers, fire code staff or building inspections staff. Ideally, sign-off for each specialty area should be limited to the professionals in each area.

Fire, engineering and planning reviews require specialized staff with training and certifications. Limiting the sign-off to designated professional staff would introduce credibility and internal control to the permit review process. When the system was implemented, internal controls for review processes were not established within the system.

Recommendation:

The Community Development and Planning Director should request assistance from the vendor and System Administrator to enhance AMANDA by limiting the ability to "sign off" or reassign permitting processes to designated employees.

Management's Response:

Concur. CD&P will conduct business analysis to determine the complexity of the problem and resources required to correct.

Target Date: September 2009
Responsibility: Bruce Payne, Assistant Director CD&P

18. Fee refunds on zoning-related permit folders are not recorded in AMANDA.

The City Auditor's Office identified five zoning-related refunds that were not recorded in AMANDA. Upon request, management provided documentation to support the refunds. No exceptions were noted.

To ensure data accuracy and system reliability, all significant financial transactions should be recorded on the system. This will help ensure that duplicate refunds are not provided and that customer records are accurate.

Management indicated that zoning-related refunds are processed manually because they could not be done in Phase II AMANDA. According to the System Administrator, the ability to process refunds was included in Phase I AMANDA and can be migrated to Phase II.

Recommendation:

The Community Development and Planning Director should request the vendor to enable AMANDA to process refunds for zoning related folders and discontinue the manual refund process for zoning related fees.

Management's Response:

Concur. No examples of abuses or meaningful risks have been identified. This problem was corrected with the AMANDA upgrade to version 5.44.

Target Date: Complete
Responsibility: Bruce Payne, Assistant Director CD&P

19. Permits can be finalized with "open" processes.

In order to maximize internal control over an automated routine procedure, sound business practices would require that only necessary steps be included in the procedure. This would allow management, auditors or other interested individuals to monitor compliance with expected results.

Processes that are populated by the system during the course of folder finalization or permit issuance are not customized according to the type of permit or folder. For example, when a plumbing permit is requested, both gas and electrical inspections are populated along with rough-ins for plumbing. Rough-ins are only required on new construction. Processes that are not applicable are left as "open" when the permit or folder is processed. The processes that need to be completed are selected based upon individual employee knowledge of the requested permit or folder type.

During the review process, the City Auditor's Office was unable to determine if the processes left as "open" were necessary steps in granting a permit. Each inspection or review category has a "final" stage, which follows after the individual steps are performed. However, it was difficult to determine whether a permit or folder was actually "final", considering the non-applicable processes that were still left as "open".

Recommendation:

The Community Development and Planning Director should require that inspectors identify non-applicable processes as such before issuing permits or closing folders.

Management's Response:

Do not concur. This is chosen business practice. The auditor's stated interest is to make AMANDA as fully automated as possible. The responsibility of insuring that the necessary minimal required inspections have been performed is delegated to the building inspector. CD&P chooses not to delegate this level of responsibility to the AMANDA system.

Target Date: No action to be taken
Responsibility: Bruce Payne, Assistant Director CD&P

20. Applicants are allowed to apply via the web for a permit for an unknown address.

The AMANDA web application allows a citizen to apply for a permit with an unknown address and also pay associated fees for the permit type. When citizens find out the actual address is outside Arlington city limits, they request a refund of the permit fees from the City. Analysis of

AMANDA refunds showed five instances where citizens applied for permits on the web for addresses listed as "unknown." The permit applications were for addresses that were eventually determined to be outside the Arlington city limits. If the address is inside City of Arlington limits, citizens have to call the Planning Division to manually change the address to a valid one. Permit applications for unknown addresses resulted in over 1,500 voided folders since the implementation of AMANDA.

Preventing citizens from applying for a permit if the address is unknown may reduce the number of refunds and voided folders. However, in many cases citizens that initially apply for permits with unknown addresses update their application with valid addresses. The City Auditor's Office was not able to determine the number of times unknown addresses resulted in refunds or the number of times citizens applied for permits for an unknown address. Community Development and Planning management indicated that allowing applicants to apply for permits for unknown addresses reduces data input time. However, the data input saved may be offset by the time required to process the voided folders.

Recommendation:

The Community Development and Planning Director should determine whether the webmaster should enhance the web application to prevent users from applying for a permit for an unknown address.

Management's Response:

Do not concur. This is chosen business practice and a customer service issue. The applicant is not always aware of the correct address for the property in question. The department prefers that the applicant can initiate the permit application process which allows staff to begin processing the request. Such applications often occur when property is being platted and new addresses have not yet been assigned.

Target Date:	No action to be taken
Responsibility:	Bruce Payne, Assistant Director CD&P

21. Contractors are not allowed to renew business licenses via the web.

The ability to renew an existing business registration on the website was not provided when AMANDA was implemented. According to the Community Development and Planning Building Official, there is currently no methodology to verify the validity of insurance and licensing requirements for registration renewals over the web.

Article IV, Section 4.01.B.4. of the Arlington Construction Code states that every registrant doing work in any City rights-of-way shall carry contractor's public liability insurance, making the City of Arlington a certificate holder and present proof of insurance at time of registration and all subsequent renewals.

Although businesses are not notified when their business registrations have expired, functionality to renew business registrations in the existing web application would further enhance the customer service that is currently being provided by the Community Development and Planning

Department. Within the web business registration data input screen, a field exists for the applicant to include his/her certificate of liability insurance expiration date. The website also includes a button that the user can click on in order to add an attachment. Providing a means for the applicant to attach a copy of his/her insurance certificate for staff's review and subsequent approval could make the renewal process more efficient for both the applicant and City staff. Additionally, by attaching the insurance certificate copy to the application, a soft copy of the certificate is maintained electronically along with the application renewal record.

Recommendation:

The Community Development and Planning Director, in conjunction with the Information Technology Director, should evaluate the feasibility of enhancing AMANDA to allow contractors to submit insurance certificates as an attachment to business license renewals processed via the web. If deemed feasible, AMANDA should be enhanced to allow the renewal of business licenses via the web.

Management's Response:

Do not concur. State law requires the applicant provide the license information and city policy for drivers license and insurance, which the applicant cannot supply over the web. CD&P prefers to match the photo ID with the applicant at the time of renewal, and obtain any necessary additional qualifying information as necessary, which is most efficiently accomplished face-to-face.

Target Date: No action to be taken
Responsibility: Bruce Payne, Assistant Director CD&P

22. A process to monitor failed or expired fire permits in AMANDA does not exist.

Currently, inspections for fire compliance are done in two different systems. Fire process reviews associated with new construction or any building activity are conducted in AMANDA. The annual fire inspection process, mandatory for commercial properties, is conducted in a legacy mainframe system. There is no process to coordinate activity in both systems. The information necessary to oversee permit compliance is not readily available at the time the annual inspection is conducted.

If a fire-related review fails or if a fire permit were to expire in AMANDA, a process to examine the failed or expired process during the annual fire inspections does not exist. Considering the negative impact a failed or missed fire-related review process could have on public safety, coordination of reviews are crucial. Fire review activity currently in the mainframe is planned to be moved to AMANDA when Phase III is launched.

Recommendations:

The Fire Chief should seek assistance from the System Administrator to develop a tracking methodology for fire permits that do not reach "Issued Status" to investigate at which point in the process it failed or expired.

Management's Response:

Concur. Fire Prevention personnel will work with the AMANDA Systems Administrator, the Information Technology and the CD&P Departments to develop and test the needed program changes to alleviate the issues. The auditor was advised that most, if not all of this issue is anticipated to be resolved in AMANDA Phase 3, which is presently underway.

Target Date:	Spring 2009
Responsibility:	Brian Riley, Assistant Chief/Fire Marshal

AMANDA Web Application Review

AMANDA web capabilities can be accessed at www.arlingtonpermits.com. Citizens are able to visit the site to apply for a permit, pay permit fees and request inspections. Users have to first establish an account, a user ID and a password to access the website. Account setup requests are put in an inbox, which is checked several times a day. Web permits and inspection requests are transferred to a designated permit technician for review and transactions are reflected in the production environment on a real-time basis. Confirmations are emailed to citizens within a 24-hour period. Payment data is transferred using a secure protocol.

The City Auditor's Office reviewed the AMANDA web application to ensure accuracy, transaction integrity, availability and to ensure financial transactions conducted via the web are secure and reliable.

23. The AMANDA web site does not have a log off feature.

After conducting secure transactions with a user ID and password, the AMANDA website does not log users off when they exit the website. A secure transaction is conducted and transmitted under secure protocols such as https. Secure transactions basically encrypt the transmission of the transaction from a personal computer to the web host. After completing AMANDA transactions via the AMANDA website, pressing the back button on the browser would take the user back to the secure AMANDA site, where one could resume transactions in AMANDA.

It is a good business practice to include a log-off feature or automatically log the user off when exiting a website. Log-off features help ensure the integrity of computerized information resources by protecting them from unauthorized access, modification, destruction and to ensure the physical security of these resources. The City Auditor's Office conducted transactions in the AMANDA website, visited another website and returned to the AMANDA website without logging in again. The existing condition is a security risk, especially when public computers are used. Public computers may allow unauthorized access through use of the back button in the browser. As a result, information regarding prior payments and method of payment could be misused.

Recommendation:

The Information Technology Director should require that Information Technology staff establish a log off feature for the AMANDA website.

Management's Response:

Concur. IT system administration staff has requested the vendor to implement a log-off feature into their web product as quickly as possible. While we believe this should be a standard feature provided by the vendor, this may be delayed if the vendor expects City of Arlington to fund the effort for making this change.

Target Date: To be determined
Responsibility: Gary Allison, Assistant IT Director

25. Prior user records are automatically changed when personal information is updated.

When an AMANDA web user makes a change (e.g., name or e-mail) to his/her web account, it alters folders that are associated with the user, including folders that are closed and/or finalized. For example, if a home builder or contracting business changes their name, that home builder or contractor's prior records would reflect the new name. Audit testing indicated that names on payment receipts changed, even though the payments were not made under the new entity's name. This automatic update could create a challenging task for the Community Development and Planning Department staff.

Recommendation:

The Community Development and Planning Director, in conjunction with the Information Technology Director, should ensure that the current database accommodates master file changes that do not automatically alter prior records associated with the master file. If the relational database cannot be set up to accommodate master file changes to future transactions, the user should be required to set up a new account.

Management's Response:

Concur. CD&P will conduct business analysis to determine the complexity of the problem and resources required to correct.

Target Date: September 2009
Responsibility: Bruce Payne, Assistant Director CD&P

26. Non-applicable inspection choices were displayed to web users.

Available inspections were not customized to the inspection types requested via the web. For example, a web customer replacing a water heater is given many plumbing inspection choices that are not applicable to a water heater inspection. Some non-applicable inspection choices include:

- Plumbing, gas line
- Plumbing, gray water system
- Plumbing, grease and sand interceptor
- Plumbing, miscellaneous
- Plumbing, outside relay
- Plumbing, roof drain
- Plumbing, rough in
- Plumbing, shower pan replacement

Listing non-applicable choices could confuse web customers, require additional interaction with City staff, and negatively impact customer service.

Recommendation:

The Community Development and Planning Director should ensure that Planning staff continues its effort to limit inspection choices to those that are applicable to the inspection being requested by the web user.

Management's Response:

Do not concur. This is chosen business practice. The auditor's stated interest is to make AMANDA as fully automated as possible. However, specific circumstances related to construction activities are not fully known at the time inspections are called for by the contractor, and inspectors encounter other needed inspections in the field that require their approval. If those potential inspections are not included as options, requested ad hoc inspections could not be performed in the field and would require the contractor to have additional interaction with the customer service representatives at City Hall in order to schedule inspections. This would be a significant customer service issue.

Target Date:	No action to be taken
Responsibility:	Bruce Payne, Assistant Director CD&P

AMANDA Mobile Application

The AMANDA mobile application was designed mainly for field personnel such as building inspectors, code enforcement officers and fire inspectors. Field staff was provided with tablet computers, which were used to record daily work. After their daily duties were completed, field personnel synchronized their tablet computers with the production server, resulting in inspection results being recorded on the production server.

The City Auditor's Office was unable to conduct detailed testing in the AMANDA mobile test environment due to technical errors. The System Administrator was unable to activate the mobile test server due to an error that needed vendor assistance. Audit findings were, therefore, based on limited testing on the live production system and observation. The City Auditor's Office noted that:

- **the requirements for the mobile module were poorly defined in the initial request for quote (RFQ) document**

  The City Auditor's Office noted only one functional requirement under the "mobile computing/wireless communications" section of the RFQ and four other requirements applicable to mobile computing listed under the "workflow/electronic routing" section. The requirements did not include such features as synchronization requirements, tablet use and mobile security.

- **mobile tablet malfunctions were not corrected in a timely manner**

  A total of 21 tablet computers have been assigned to Community Development and Planning and Fire Department field staff. A total of seven tablet computers were not functioning, which included a total of five in the Building Inspections Division and two in the Fire Department. Four of the tablet computers in Building Inspections and the two in the Fire Department were experiencing software problems which prevented the tablets from being synchronized from the field.

- **the AMANDA mobile application was outdated**

  The City Auditor's Office noted that the AMANDA mobile version used by the City at time of testing was the original version (4.2.4.0) used when the system went live in April 2006. As of September 2007, seven updates had been issued by the vendor, with version 5 being the most recent. The City was testing version 4.4.1.5 for an upgrade during audit fieldwork. The maintenance agreement with the vendor makes it a user responsibility to upgrade to the most current version, which is made available for download via the vendor website. Patches for some software bugs are included in the upgrade. The vendor ceases to support outdated software after a period of 18 months.

Subsequent to the completion of audit fieldwork, the Information Technology Department identified an alternative solution to the AMANDA mobile application. The City now uses wireless air cards to directly link inspectors in the field to the AMANDA system via the existing tablet computers. This no longer requires synchronization as the field staff interaction with AMANDA is now consistent with desktop access.

Because AMANDA mobile is no longer used by the City, the findings noted above have not been presented in detail and recommendations related to the findings have been determined to be unnecessary. However, the City Auditor's Office did note that additional security features are needed for the tablet computers, as detailed in the finding below.

27. The mobile computers do not have sufficient security features.

The mobile tablet personal computers do not contain security features that minimize the City's risk if the tablets are stolen or lost. First, the mobile application in the tablet does not lock out users after a pre-determined number of unsuccessful attempts. Second, the hard drives are not encrypted to protect the data in the event of loss or theft. Lack of a lockout feature would allow unauthorized access to the mobile application through password guessing. A cracked password would also allow synchronization with the mobile server.

Since data in the mobile module mainly consists of customer home inspection data that is available to the public, the mobile data may not be considered of value to a perpetrator. However, the possibility of unauthorized access to the mobile server or City network is a greater risk. A lock out feature would prohibit unauthorized access to the City network.

Tablets are also used as desktop clients by the inspectors. When in use as desktops, the tablet cache could contain emails or documents viewed along with history of other activity. Accessing data in the cache could allow unauthorized access to the City network. Therefore, encrypting the hard drive is warranted.

Recommendation:

The Information Technology Director should establish additional security measures for tablet computers, including a lock-out feature and hard drive encryption.

***Management's Response*:**

Do not concur. Tablet computers currently have a network login with the same security parameters as other PC's within the City, including a lock-out feature if too many attempts are made unsuccessfully. In addition, a remote tablet user must successfully log into the remote network access with a separate login and password (for VPN access) and finally they must log into the AMANDA application itself. So there are three separate login and password entries that must be successfully navigated prior to access being granted.

AMANDA Mobile, referenced in the findings is no longer being used.

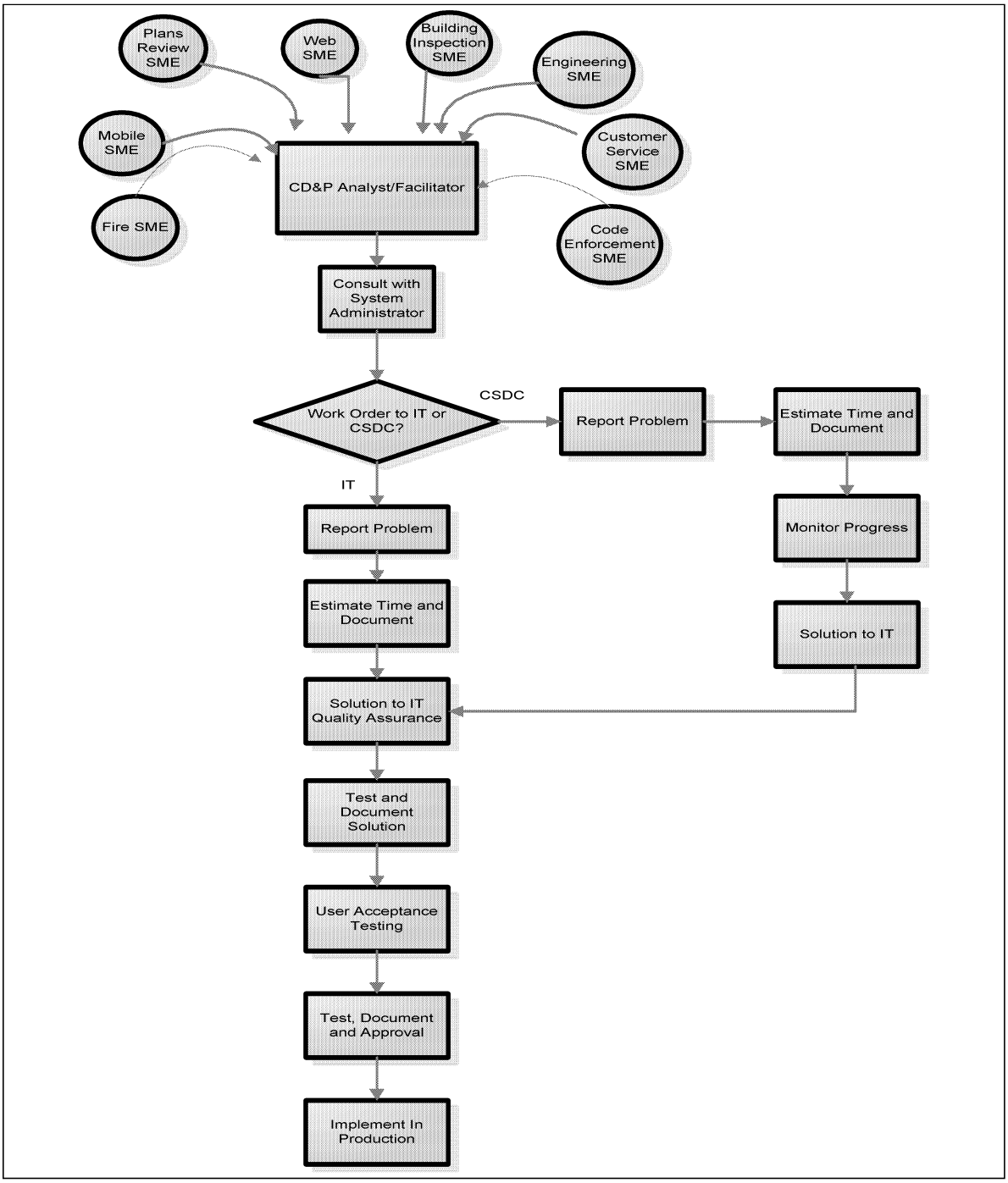
While AMANDA tablets do not have hard drive encryption, it should be understood that photographs are what is typically stored on a Community Development and Planning laptop. These photographs are not considered a security risk because they are taken in public and therefore available to anyone to take themselves. AMANDA data is stored on the server in the City's data center, not on the laptop. Access to the AMANDA server and associated data requires the three levels of logins described above**.** Any city data on the laptop, as described above, has the normal login and password requirement to

overcome to gain access. In summary, the fact that encryption does not exist, is not deemed to be a significant security risk due to the non-sensitive nature of the data.

Target Date:	No action to be taken
Responsibility	Gary Allison, Assistant IT Director

Exhibit A

AMANDA Enhanced System Maintenance Process Diagram



Prepared by the City Auditor's Office