



CITY OF RICHMOND
CITY AUDITOR

DATE: July 29, 2021

TO: Lincoln Saunders
Acting Chief Administrative Officer

FROM: Louis Lassiter *LL*
City Auditor

SUBJECT: Department of Information Technology:
IT Project Management Audit

The City Auditor's Office has completed the IT Project Management audit and the final report is attached.

We would like to thank the DIT staff for their cooperation and assistance during this audit.

Attachment

cc: The Richmond Audit Committee
The Richmond City Council
Charles Todd, Director of Information Technology

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City of

RICHMOND

Office of the City Auditor

Audit Report# 2022-02
Department of Information Technology
IT Project Management Audit
July 29, 2021



Audit Report Staff

Lou Lassiter, City Auditor
Lily Hernandez, Deputy City Auditor
Ryan Gartin, Lead Auditor
Chassidy Kelly, Auditor
Rochelle Carter, Management Analyst

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July 2021

Highlights

Audit Report to the Audit Committee, City Council, and the Administration

Why We Did This Audit

The Office of the City Auditor conducted this audit as part of the FY2021 audit plan approved by the Audit Committee. The objectives for this audit were to review the City's Project Management policies and practices and evaluate controls of the systems development process for implementation readiness into the production environment.

What We Recommend:

The Information Technology Department Director:

- Establish a quality assurance process to ensure compliance with the Waterfall Project Management Methodology.
- Develop and implement a process for establishing guidelines for prioritizing IT Projects.
- Require the IT Operating Committee to enforce documentation of IT Project Classifications.
- Develop and implement IT Project documentation retention procedures to guide staff on management's expectations.
- Train all departments' IT Project Managers on the City's IT Project Management policies and procedures.



Department of Information Technology: Information Technology Project Management Audit

Background - The Department of Information Technology (DIT) manages all Information Technology (IT) projects throughout the City of Richmond. IT Projects are initiated either by DIT or through requests by City departments. DIT follows the Waterfall Project Management Methodology. This Methodology consists of several sequential phases where no phase begins until the previous phase is complete. DIT's Project Management is comprised of six checkpoints, which require approvals before initiating the next phase. A Steering Committee oversees the IT Projects and an Operating Committee has direct oversight of the Project Management process.

What Works Well

Best Practices – The Auditors reviewed the New York State Project Management Guidebook and noted DIT management implemented or partially implemented 73% of these best practices.

Needs Improvement

Finding #1 – Project Approvals – The Auditors analyzed ten IT Projects to determine whether the Team Members and the Operating Committee approved each applicable checkpoint. One hundred percent of the projects did not contain the required Team Members' approvals and Ninety Percent did not contain the Operating Committee's approvals. DIT did not have a quality assurance process in place to ensure compliance with their Project Management Methodology.

Finding #2 – Project Prioritization – DIT did not have a process for prioritizing work performed for IT Projects. Staff completed their IT Projects' tasks as time permitted, along with other responsibilities. Prioritization of IT Projects was left to the discretion of the staff.

Finding #3 – Project Classification – A review of DIT's policies and procedures revealed that DIT had an established Policy for IT Project Classification. However, this was not tracked within the project repository. The Operating Committee did not enforce the Policy for Classifying IT requests.

Finding #4 – Project Timelines - The Auditors analyzed ten projects to determine whether DIT staff completed them timely. Eight projects did not contain the necessary documentation in order to establish the actual completion dates. Two projects contained the necessary documentation. However, they were 357 and 168 days over the projected completion dates. DIT did not have policies and procedures to provide record retention guidance to staff. Without formal guidance, projects may not be completed according to a priority ranking.

Finding #5 – Project Documentation Retention – The Auditors reviewed ten IT Projects and identified nine projects that did not retain the required documentation for each phase of the projects. DIT did not have policies and procedures to provide record retention guidance to staff.

Finding #6 – Training for IT Project Managers – During the scope of the audit, DIT had developed Project Management Policies and Procedures. However, the Procedures were not available to the assigned IT project team members unless they requested access. Also, DIT did not provide training to all assigned IT project team members on policies and procedures.

Management concurred with 5 of 5 recommendations. We appreciate the cooperation received from management and staff while conducting this audit.

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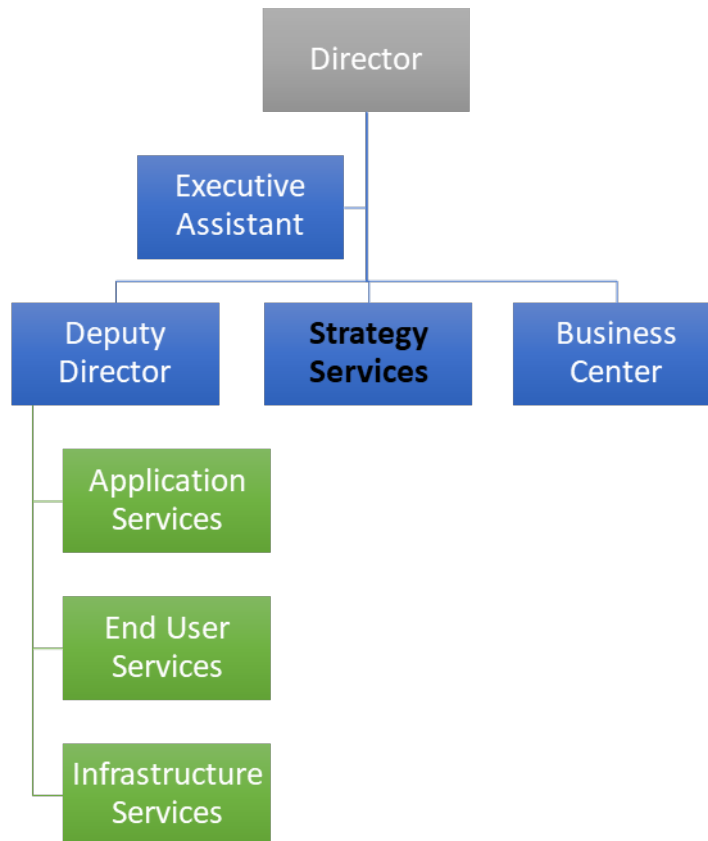
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**BACKGROUND, OBJECTIVES, SCOPE, METHODOLOGY,
MANAGEMENT RESPONSIBILITY and INTERNAL CONTROLS**

This audit was conducted in accordance with the Generally Accepted Government Auditing Standards promulgated by the Comptroller General of the United States. 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 the audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on the audit objectives.

BACKGROUND

The Department of Information Technology (DIT) manages all Information Technology (IT) projects throughout the City of Richmond. DIT consists of five divisions as depicted on the following organizational chart:



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The roles and responsibilities of the Divisions are as follows:

- ***Application Services*** – Responsible for developing and maintaining software for City departments.
- ***End User Services*** – Provides oversight for coordination with deployment services for the enterprise standard operating system and software complement, repair or replacement, software installation, and acquisition and provision of vendor quotes for new hardware/software.
- ***Infrastructure Services*** – Responsible for the management of servers, databases, storage, information technology security and networking. Infrastructure Services is responsible for the backup and recovery of the systems residing in the City Data Center.
- ***Strategy Division*** – Responsible for four main areas, including service strategy, service design, service transition inclusive of change management processes, and project management/customer engagement.
- ***Business Center*** – Provides support to DIT in the areas of budget management, payroll, purchasing, and human resource services. Enterprise wide support services are delivered in the areas of printing, mail, and telecommunications.

DIT Project Management Organizational Structure

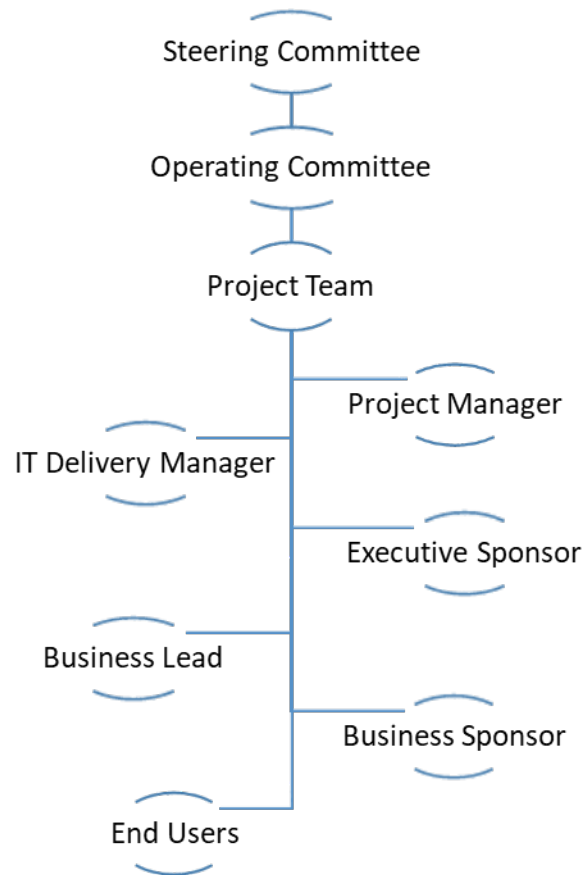
IT Projects are overseen by the IT Steering Committee, which consists of direct reports of the Chief Administrative Officer (CAO) or their designees. Members of the Steering Committee meet on a monthly basis. The following chart represents the hierarchy of the IT Project Management structure:

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The Operating Committee has direct oversight of the project management process. It is comprised of DIT staff as follows:

- Director
- Division Managers
- Strategy Division staff

The Operating Committee meets weekly and they review City Departments' requests and make recommendations to the Steering Committee.

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System Development Life Cycle (SDLC)

SDLC is set of steps used to create software applications. The steps separate the development process into tasks that can be assigned to specific individuals, completed and measured. SDLC applies standard business practices to building software applications. Usually, there are six SDLC phases as follows:

- Analyze
- Design
- Build/Development
- Test
- Implement
- Operate

DIT Project Classification

Approved projects are classified into groups of small, medium, or large. Project classification depends on the projected hours to complete the project, cost, complexity, risk level, etc. The criteria for each project classification are as follows:

Size of Project	Criteria
Business As Usual	<ul style="list-style-type: none">○ Not problematic, routine○ Service fulfillment – ordered off DIT service catalog○ Low risk, limited impacts○ Less than 40 hours of effort or less than three months in duration○ Implementation service request created for tracking○ May lead to the initiation of one or more projects○ Useful for investigations, prior to approval to initiate a formal project
Small	<ul style="list-style-type: none">○ 40 to 160 hours AND○ Complies with all IT Standards AND○ Budget is available OR○ Has no impacts on other users, has no risk, etc. OR○ Service fulfillment – initiate order off service catalog, but requires customization
Medium	<ul style="list-style-type: none">○ 161 to 500 hours OR○ Not compliant with IT standards, policies and/or procedures OR○ Requires funding approval

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Large	<ul style="list-style-type: none">○ May cross many boundaries OR○ 500+ hours OR○ Significantly not compliant with IT standards OR○ Higher risk OR○ Requires funding approval not available within DIT
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Source: DIT Policies & Procedures

DIT Project Management Process

As defined by DIT's policies and procedures, a project is "a business activity having a specific beginning and end with dedicated resources and clearly defined deliverables or outcomes." DIT uses the *Waterfall Project Management Methodology*, which is also known as the Linear Sequential Lifecycle Model. The Waterfall Project Management Methodology consists of several sequential phases, where no phase begins until the prior phase is complete.

The Operating Committee reviews IT Projects' requests and determines whether to initiate a project or proceed on a "Business As Usual" basis. If a Project is approved, its lifecycle and checkpoints are as follows:

Lifecycle Step	Documentation Needed	Operating Committee Approval
Project Initiation	<ul style="list-style-type: none">○ Information System Request (ISR) Form○ DIT Impact Assessment (optional)○ Business Case (optional)	CHECKPOINT #1: <ul style="list-style-type: none">○ To initiate a project OR○ To reject a request
Project Planning	<ul style="list-style-type: none">○ Project Scope○ Project Charter (required for Medium or Large Projects)	CHECKPOINT #2: <ul style="list-style-type: none">○ To start planning a project OR○ To cancel the project
Project Planning: <i>SDLC Initiation</i>	<ul style="list-style-type: none">○ Project Plan	CHECKPOINT #3: <ul style="list-style-type: none">○ To start design phase of project OR○ To cancel the project
Project Execution: <i>SDLC Design</i>	<ul style="list-style-type: none">○ Project Requirements○ Project Technical Specifications	CHECKPOINT #4: <ul style="list-style-type: none">○ To start development phase of project OR○ To cancel the project

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Project Execution: <i>SDLC Development</i>	<ul style="list-style-type: none"> ○ Project Test Plan & Results ○ Project Move to Production Plan 	CHECKPOINT #5: <ul style="list-style-type: none"> ○ To start move to production phase of project OR ○ To cancel the project
Project Close-Out	<ul style="list-style-type: none"> ○ Project Close Form ○ Lessons Learned ○ Punch List with Status ○ Final Documentation 	CHECKPOINT #6: <ul style="list-style-type: none"> ○ To accept closure of project OR ○ To require additional work

Source: DIT Policies & Procedures

During CY2019 and CY2020, DIT had a total of 181 projects in various stages as depicted on the following table:

<i>Status</i>	<i>CY2019</i>	<i>CY2020</i>	<i>Total</i>
<i>Active</i>	3	27	30
<i>On Hold</i>	1	7	8
<i>Completed</i>	77	18	95
<i>Cancelled</i>	27	21	48
<i>Total</i>	108	73	181

Auditor Prepared from Replicon data

The following table outlines the number of projects *completed* in CY2019 and CY2020 by department:

Department	Number of Project(s)
13th District Court - Services Unit	1
All Agencies (Enterprise)	10
Assessor of Real Estate	2
Budget and Strategic Planning	1
Chief Administrative Officer	3
City Attorney	1
City Auditor	1
Commonwealth Attorney	1
Emergency Communications	2
Economic Development	3
Finance	7

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Fire and Emergency Services	3
General Registrar	3
Human Resources	7
Information Technology	24
Justice Services	2
Office of Community Wealth Building	1
Parks, Recreation, and Community Facilities	1
Planning & Development Review	2
Procurement Services	1
Public Utilities	9
Public Works	6
Police	1
Public Library	1
Sheriff's Office	1
Social Services	1
Total	95

Source: Auditor Prepared from Replicon

OBJECTIVES

The objectives for this audit were to review the City's Project Management policies and practices and evaluate controls of the systems development process for implementation readiness into the production environment.

SCOPE

The scope of the audit covered information technology project requests, approval documentation, project listings, and other supporting documentation submitted during the 24 months ended December 31, 2020 and the current environment.

METHODOLOGY

The Auditors performed the following procedures to complete this audit:

- Interviewed staff;
- Reviewed and evaluated documentation retention for IT Projects;

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- Reviewed and evaluated DIT's Project Management policies and procedures for compliance;
- Reviewed the New York State Project Management Guidebook;
- Reviewed and evaluated project checkpoints and approvals;
- Performed other tests, as deemed necessary.

MANAGEMENT RESPONSIBILITY

City of Richmond management is responsible for ensuring 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.

INTERNAL CONTROLS

According to the Government Auditing Standards, internal control, in the broadest sense, encompasses the agency's plan, policies, procedures, methods, and processes adopted by management to meet its mission, goals, and objectives. Internal control includes the processes for planning, organizing, directing, and controlling program operations. It also includes systems for measuring, reporting, and monitoring program performance. An effective control structure is one that provides reasonable assurance regarding:

- Efficiency and effectiveness of operations;
- Accurate financial reporting; and
- Compliance with laws and regulations.

Based on the audit test work, the Auditors concluded internal controls over IT project approvals, prioritization, classification, and documentation need improvement. These deficiencies are discussed throughout the report.

FINDINGS and RECOMMENDATIONS

What Works Well

Project Management Best Practices

The Auditors reviewed the New York State Project Management Guidebook. The Guidebook includes 22 SDLC best practices in the following phases:

- Initiation
- Requirement Analysis
- Design
- Construction
- Acceptance
- System Implementation

The Auditors compared these best practices to DIT's Project Management practices and noted DIT management has implemented or partially implemented 73% of the best practices.

What Needs Improvement

Finding #1 – Project Approvals

Condition:

The Auditors analyzed ten IT Projects to determine whether the Team Members and the Operating Committee approved each applicable checkpoint and noted the following:

Team Members Approval:

One hundred percent of the projects tested did not contain the required Team Members' approvals as depicted on the following table:

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Checkpoint No.	In Compliance		
	Yes	No	N/A*
<i>One:</i> Project Initiation & Approval to Proceed		10	
<i>Two:</i> Project Scope & Charter	6	4	
<i>Three:</i> Detailed Project Plan	7	1	2
<i>Four:</i> Technical Design	4	4	2
<i>Five:</i> Development & Movement to Production	3	3	4
<i>Six:</i> Acceptance & Closeout	2	4	4

* Not Applicable

Operating Committee:

Ninety percent of the projects tested did not contain the required Operating Committee's approvals as depicted on the following table:

Operating Committee Checkpoint No.	In Compliance		
	Yes	No	N/A*
<i>One:</i> Project Initiation & Approval to Proceed	8	2	
<i>Two:</i> Project Scope & Charter	8	2	
<i>Three:</i> Detailed Project Plan	5	3	2
<i>Four:</i> Technical Design	5	3	2
<i>Five:</i> Development & Movement to Production	2	4	4
<i>Six:</i> Acceptance & Closeout	5	1	4

* Not Applicable

Criteria:

DIT staff follows the Waterfall Project Management Methodology for IT Projects, which requires completing a phase before starting the next phase.

According to DIT Management, all project team members and the Operating Committee are responsible for approving all project checkpoints.

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Cause:

DIT management did not have a quality assurance process in place to ensure compliance with Waterfall Methodology for project management.

Effect:

Management may not have any assurance that each checkpoint is approved before proceeding to the next phase of the project.

Recommendation:

- 1. We recommend the Department of Information Technology Director establish a quality assurance process to ensure compliance with the Waterfall Project Management Methodology.*

Finding #2 – Project Prioritization

Condition:

DIT did not have a process for prioritizing work performed for IT projects. Staff completed their IT projects' tasks as time permitted along with other responsibilities.

Criteria:

A formal process for prioritizing projects based on established criteria provides guidance for staff when executing their duties.

Cause:

DIT did not have a policy in place to provide guidance on prioritizing IT project activities. Prioritization of IT projects was left to the discretion of the staff.

Effect:

Without proper guidance, DIT staff may not prioritize high impact and high risk IT projects appropriately.

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Recommendation:

- 2. We recommend the Department of Information Technology Department Director develop and implement a process for establishing guidelines for prioritizing IT Projects.*

Finding #3 – Project Classification

Condition:

DIT staff did not track project classifications within the project repository.

Criteria:

According to the DIT Standards for Classifying IT Requests, “All projects within DIT shall be classified according to this Standard. Governance reviews shall confirm the appropriateness of classification and the completeness of the resulting project management activities.”

Project classifications as outlined by the Policies and Procedures are as follows:

<i>Project Size</i>	<i>No. of Hours</i>	<i>Criteria/Description</i>
<i>Business As Usual</i>	Less than 40 or 3 Months	Low risk, not problematic or routine.
<i>Small</i>	40 -160	Complies with IT Standards & budget is available or has no risk or impact to other users.
<i>Medium</i>	161 - 500	Not compliant with IT Standards, Policies & Procedures, or requires funding approval.
<i>Large</i>	500 or more	Significantly not compliant with IT Standards, higher risk, requires funding outside of DIT.

Cause:

The DIT Operating Committee did not enforce the DIT Policy for Classifying IT Project requests.

Effect:

The DIT Operating Committee cannot properly review the IT projects if DIT staff do not properly identify and document the project classifications.

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Recommendation:

- 3. We recommend the Department of Information Technology Director require the DIT Operating Committee to enforce documentation of IT Project Classifications.*

Finding #4 – Project Timelines

Condition:

The Auditors analyzed 10 projects to determine whether DIT staff completed them timely, as outlined in the detailed project plan (*checkpoint three*). The results of the analysis were as follows:

- Eight projects could not conclude as documentation was not available to establish the actual completion dates.
- Two projects contained the necessary documentation. However, those projects were 357 and 168 days over the projected completion dates.

Criteria

According to DIT's Project Closing Form, project documentation must be retained for three years after closing a project. If the project is historically significant, documentation should be retained permanently.

Cause

DIT did not have policies and procedures to provide record retention guidance to staff.

According to management, the project timeline goes beyond the project plan date due to lack of project resources or vendor delays.

Effect

Without formal guidance, projects may not be completed according to a priority ranking, which causes delays in delivering the projects to the departments.

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Additionally, the lack of documentation could lead to management’s inability to retrieve pertinent project information.

Recommendation:

A recommendation will not be issued as this is being addressed in the record retention and project prioritization recommendations.

Finding #5 – Project Documentation Retention

Condition

The Auditors reviewed 10 IT projects to determine whether DIT staff maintained proper documentation for each checkpoint and noted nine of ten projects did not have the required documentation. The following table depicts the testing results for each checkpoint:

Checkpoint No.	In Compliance		
	Yes	No	N/A*
<i>One:</i> Project Initiation & Approval to Proceed	2	8	
<i>Two:</i> Project Scope & Charter	10		
<i>Three:</i> Detailed Project Plan	8		2
<i>Four:</i> Technical Design	8		2
<i>Five:</i> Development & Movement to Production	3	3	4
<i>Six:</i> Acceptance & Closeout	5	1	4

* Not Applicable

Documentation for some of the checkpoints were not applicable as some projects were:

- cancelled after initiation and approval,
- still active, or
- on-hold

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Criteria:

According to DIT's Project Closing Form, project documentation must be retained for three years after closing a project. If the project is historically significant, documentation should be retained permanently.

Cause:

DIT did not have policies and procedures to provide record retention guidance to staff.

Effect:

Without formal guidance, management's expectations may not be carried out as intended. Additionally, the lack of documentation could lead to management's inability to retrieve needed information for decision-making purposes.

Recommendation:

- 4. We recommend the Department of Information Technology Director develop and implement IT Project documentation retention procedures to guide staff on management's expectations.*

Finding #6 – Training for IT Project Managers

Condition:

DIT developed project management policies and procedures to guide City departments' staff to help manage their IT Projects. However, DIT neither shared the Policy with the departments' IT Project team members, unless requested, nor provided training to them.

Criteria:

Training on policies and procedures develops a consistent process to execute IT Projects for all assigned IT Project Management roles, inclusive of department representatives. It also establishes management's expectations.

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Cause:

DIT management did not require training of the departments' IT project team members to guide them through expectations and the execution of their IT Project management roles and responsibilities.

Effect

Deliverables for IT project management processes may not be consistent with management's expectations. Additionally, IT Project Managers may not be familiar with the System Development Life Cycle Methodology (*expectations at each phase of the project*).

Recommendation:

- 5. We recommend the Information Technology Department Director train all departments' IT Project Managers on the City's IT Project Management policies and procedures.*

APPENDIX A: MANAGEMENT RESPONSE FORM

2022-02 DIT - IT Project Management Audit

#	RECOMMENDATION	CONCUR Y/N	ACTION STEPS
1	We recommend the Department of Information Technology Director establish a quality assurance process to ensure compliance with the Waterfall Project Management Methodology.	Y	DIT will review existing standards for IT Project Methodology to make sure that compliance expectations are clear and that there are processes for enforcement.
	TITLE OF RESPONSIBLE PERSON		TARGET DATE
	Director		30-Nov-21
	IF IN PROGRESS, EXPLAIN ANY DELAYS		IF IMPLEMENTED, DETAILS OF IMPLEMENTATION
#	RECOMMENDATION	CONCUR Y/N	ACTION STEPS
2	We recommend the Department of Information Technology Department Director develop and implement a process for establishing guidelines for prioritizing IT Projects.	Y	DIT will modify the standards for IT Governance to address prioritization of IT projects. We will also add metadata to the project tracking list to capture priority ratings/rankings once assigned.
	TITLE OF RESPONSIBLE PERSON		TARGET DATE
	Director		30-Nov-21
	IF IN PROGRESS, EXPLAIN ANY DELAYS		IF IMPLEMENTED, DETAILS OF IMPLEMENTATION
#	RECOMMENDATION	CONCUR Y/N	ACTION STEPS
3	We recommend the Department of Information Technology Director require the DIT Operating Committee to enforce documentation of IT Project Classifications.	Y	DIT's standards for IT Project Management include Project Classifications. We will implement a compliance mechanism and make sure the assigned classifications are captured in project tracking data.
	TITLE OF RESPONSIBLE PERSON		TARGET DATE
	Director		30-Nov-21
	IF IN PROGRESS, EXPLAIN ANY DELAYS		IF IMPLEMENTED, DETAILS OF IMPLEMENTATION
#	RECOMMENDATION	CONCUR Y/N	ACTION STEPS
4	We recommend the Department of Information Technology Director develop and implement IT Project documentation retention procedures to guide staff on management's expectations.	Y	DIT will review and revise its IT Project Management standards to include rules for documentation retention, using the Library of Virginia's rules for local governments as the minimum standard.
	TITLE OF RESPONSIBLE PERSON		TARGET DATE
	Director		30-Nov-21
	IF IN PROGRESS, EXPLAIN ANY DELAYS		IF IMPLEMENTED, DETAILS OF IMPLEMENTATION

APPENDIX A: MANAGEMENT RESPONSE FORM

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#	RECOMMENDATION	CONCUR Y/N	ACTION STEPS
5	We recommend the Information Technology Department Director train all departments' IT Project Managers on the City's IT Project Management policies and procedures.	Y	IT Director will establish training and educational resources for City IT project management standards. DIT will have conversations with HR to see if general project management training might become part of common training resources.
			TARGET DATE
	Director		30-Nov-21
	IF IN PROGRESS, EXPLAIN ANY DELAYS		IF IMPLEMENTED, DETAILS OF IMPLEMENTATION