June 22, 2017

Kathryn Sorensen
Water Services Director

SUBJECT: **CC&B SYSTEM IMPLEMENTATION**

This is our final report. A summary of the work is presented in the Executive Summary, which immediately follows. The department’s responses to our recommendations immediately follow the Executive Summary.

Sincerely,

[Signature]
Ross Tate
City Auditor

1170068f

Audit Team: Irene Larkin, Deputy City Auditor
Stacey Linch, Senior Internal Auditor - IT

Attachment

cc: City Manager’s Office
    Ed Zuercher, City Manager
    Milton Dohoney, Jr., Assistant City Manager
    Karen Peters, Deputy City Manager

    Water Services
    Pam Willier, Management Assistant II (Audit Liaison)
    Alsha Solano, Assistant Water Services Director
    Michele Joyner, Deputy Water Services Director
CC&B System Implementation

Water Services Department

June 22, 2017

Project Team:
Irene Larkin, Deputy City Auditor
Stacey Linch, Senior Internal Auditor - IT

Project Number: 1170068

City Auditor Department

Ross Tate
City Auditor

City of Phoenix
City Auditor Department
140 N. Third Avenue
Phoenix, AZ 85003

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**CC&B System Implementation**

**Executive Summary**

**PURPOSE**

We reviewed the Water Services Customer Care and Billing (CC&B) system upgrade project to determine if controls were in place to identify and mitigate risks associated with the planning, design and configuration for refund and adjustment transactions. We also verified the testing, training, and implementation schedules were completed as stated in the contract.

**BACKGROUND**

The CC&B Upgrade Project was a $17.5M project designed to move from CC&B version 2.1 to version 2.4, enable web services, and change database and server operating system platforms. A professional services firm, Ernst & Young (EY), was hired in July 2015 to help the City install the new version. Additional contracted resources were utilized to assist with the system implementation and with the establishment of the process to outsource customer water bills.

We had previously evaluated earlier phases of the project and other risks in *CC&B Project Management Review* (1160041) and *CC&B System Development* (1160091).

**RESULTS IN BRIEF**

On April 3, 2017 the CC&B application was successfully upgraded from version 2.1 to version 2.4. Staff from Water Services, Public Works, Finance, and Information Technology Services, along with several contracted resources were involved in the implementation to upgrade the application, and the underlying operating system and database environments. In addition to the application upgrade, new services were also implemented including bill print outsourcing, on-line account portal (OUCSS), and the internal on-line training module (BRAINS).

*Sufficient application controls appeared to be in place for processing refunds and adjustments to ensure that transactions were authorized and within specified user limits. Additional controls were implemented to restrict users from changing a customer’s address when issuing a refund.*

We observed adjustment and refund processing and found controls were in place for supervisory approval of transactions that exceeded the user’s authorization level. If an amount exceeded the user’s authorization level, the application would allow the user to enter the transaction and would queue the transaction to a user with the next level of approval (e.g., team lead). If a transaction was rejected, the system prompted the user to select a reason for rejecting the transaction and created a customer contact in the
account history. We noted controls were configured in the application to restrict the ability to change the customer address when issuing a refund to a limited number of management staff.

**Previously identified risks regarding the lack of technical City staff to support CC&B has been mitigated through additional contracted resources. Prior to application support transitioning back to City staff, knowledge transfer plans should be documented and implemented.**

During the project implementation, the City identified gaps in technical skills and added contracted resources or additional resources from EY to meet the skills gap. Additionally, Exalogic system administration training was provided to five City staff. At the close of the project there were three contractors supporting the application and a management services agreement was established with EY to support the application after go-live for a period of 15 months. In the initial scope of work, one of the contract deliverables was for a knowledge transfer plan to be established. With EY now supporting the application through the managed services contract, staff will need to ensure that a knowledge transfer plan is maintained and updated as new information is identified so that upon the end of the managed services contract with EY the City has sufficient knowledge and staff to support the application.

**Use of a Quality Control Analyst during the CC&B project implementation provided the project team an independent resource to identify project risks and mitigation recommendations for the project.**

During the CC&B project implementation an external Quality Control Analyst (QA) was contracted to provide an independent monitoring of the project team and project progress. Through an initial assessment and on-going weekly assessment reports the QA was able to identify project risks, advise risk mitigation recommendations, and report on lessons learned throughout the project. As needed, the QA provided regular updates to the executive team, City management, and City Audit.

The following section includes our recommendations and the department’s response.
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Scope, Methods & Standards

Scope

CC&B 2.4 upgrade project Phase 3 – Data Conversion Planning and Execution through 7 – Production Readiness & Cutover. Prior phases and other items were evaluated CC&B Project Management Review (1160041) and CC&B System Development (1160091).

Methods

The following methods were used to complete this audit:

- Met with City staff, EY staff, and the external Quality Analyst to discuss project risks and other concerns
- Reviewed all Phase 3 through 7 deliverables and sign-offs, payments made to EY, the EY contracts and Statement of Work, and EY staff resumes
- Reviewed Pinnacle Data Systems contract
- Attended Core Team meetings
- Observed user acceptance testing
- Reviewed key financial indicator testing methodology
- Conducted post implementation testing

Unless otherwise stated in the report, all sampling in this audit was conducted using a judgmental methodology to maximize efficiency based on auditor knowledge of the population being tested. As such, sample results cannot be extrapolated to the entire population and are limited to a discussion of only those items reviewed.

Standards

We conducted this performance audit in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the performance audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.
1 – System Implementation

BACKGROUND

During May 2016 through March 2017 the CC&B Upgrade Project completed milestone phases 3 through 7 which included:

- Milestone 3 – Data Conversion Planning & Execution
- Milestone 4 – Design & Configuration
- Milestone 5 – Integration Testing
- Milestone 6 – Training
- Milestone 7 – Production Readiness & Cutover

The application upgrade was completed and went live on April 3, 2017.

The scope of our audit was related to the overall implementation risks as well and the specific controls implemented for the refund and adjustment process which had been previously identified in a prior audit as a high risk (Water Billing System Accounts Receivable, 1130095).

We met with the City project manager, various other business and technical City staff, EY staff, and the external Quality Analyst regarding system implementation, and to review test documentation and implemented controls related to the refund and adjustment transactions process. Additionally, we determined if training was provided to staff, and we evaluated the financial data reconciliation process.

RESULTS

*Sufficient application controls appeared to be in place for processing refunds and adjustments to ensure that transactions were authorized, and within specified user limits. Additional controls were implemented to restrict users from changing a customer’s address when issuing a refund.*

We observed adjustment and refund processing and found controls were in place for transactions to be approved if the amount exceeded the user’s authorization level. If a transaction exceeded the user’s authorization level, the application would allow the user to enter the transaction and then queue the transaction to the user with the next level of approval (e.g., team lead). If a transaction was rejected, the system prompted the user to select a reason for rejecting the transaction and created a customer contact in the account history. We noted controls were configured in the application to restrict the ability to change the customer address when issuing a refund to a limited number of management staff.
Application training was provided to staff prior to the upgrade to ensure staff had the appropriate knowledge to perform their job functions. Additionally, an on-line training database was established for users to search for instructions or policies. Staff from Water Services and Public Works were provided CC&B 2.4 training prior to the application being implemented. The instructor led training was provided by EY and consisted of 14 different modules covering basic access, customer service, billing, and field operations. We identified 851 attendees for the training classes held prior to the application upgrade.

In addition to the training courses offered, an on-line help guide was implemented where users can search by key words for instructions or policies related to various topics.

Procedures were in place to validate key financial indicators, such as record counts and account balances, during the CC&B application upgrade process. Finance staff performed three different financial reconciliations during the CC&B dress rehearsal upgrades and actual system upgrade:

- F1 – reconciling data after creating a copy of the 2.1 database
- F2 – reconciling data after converting the 2.1 database to the 2.4 database
- F3 – reconciling data after transformations were applied to the 2.4 database

For each reconciliation, staff compared the record counts and financial amounts and noted if there was a direct match or if reports had to be reconciled. A known issue was identified during the dress rehearsal with new Public Works service agreement codes that were created in CC&B but the reports to capture this data were not updated with the new codes. Finance was able to identify the impact on the financials due to the new codes during the dress rehearsal upgrade and noted the variance. Staff chose to delay updating the reports with the new codes until after the application upgrade. During the application upgrade, Finance performed the three reconciliations and noted no issues.

RECOMMENDATIONS

None. Information only.
2 – Project Management and Key Risks

BACKGROUND

The City contracted with Ernst & Young LLP (EY) to assist with the CC&B 2.4 system upgrade. The scope of work for EY included assisting with Projection Initiation, Gap Analysis, Data Conversion, Design & Configuration, Testing, Training, Production Cutover, and Post Implementation Support.

We had previously evaluated earlier phases of the project and other risks in CC&B Project Management Review (1160041) and CC&B System Development (1160091). In CC&B System Development, we discussed the following risks:

- **Lack of technical City staff / no training of technical City staff** – technical support of CC&B and other systems provided by the ITS Business Application Services group was limited to one staff member who had not received sufficient training on the new version and it had impacted the quality of EY deliverables and the ability to implement systems.
- **Bill print / document management** – selection of the bill print solution had not been made at the time and posed a risk to project delay.
- **Implementation on unproven Exalogic and Exadata platform** – the City chose to change the underlying database to Exadata and the underlying server to Exalogic. CC&B had never been implemented on these platforms and were not listed as supported platforms at the time the City began the project.
- **Statement of Work (SOW) placed primary responsibility on the City** – the SOW did not require EY to stand up CC&B, implement the web services, or implement most other interfaces or key project items. Rather, EY was to consult and the City was responsible and accountable for doing the work.
- **Unknown EY staff and expertise** – EY’s project proposal listed 13 project members and provided their resumes to demonstrate that they had the necessary experience. However, only 2 of the 13 staff members were actually on the project and there were concerns that staff they provided did not have sufficient qualifications.

During the audit period the application implementation milestones included:

- Phase 3 – Data Conversion Planning and Execution
- Phase 4 – Design and Configuration
- Phase 5 – Integration Testing
- Phase 6 – Training
- Phase 7 – Production Readiness and Cutover

We met with the City project manager, various other business and technical City staff, and EY staff to discuss the risks and any other project concerns. We reviewed all the
Phase 3 through 7 deliverables and sign-offs, payments made to EY, the EY contract and Statement of Work, and EY staff resumes.

RESULTS

Previously identified risks associated with the lack of technical City staff to support CC&B have been mitigated through additional contracted resources during the upgrade and post implementation support. Prior to application support transitioning back to City staff, knowledge transfer plans should be documented and implemented.

During the project implementation, as the City identified gaps in technical resources additional contracted resources were hired or additional resources from EY were utilized. Exalogic system administration training was provided to five City staff. At the close of the project there were three contractors supporting the application. In addition, a management services agreement was established with EY to support the application after go-live for a period of 15 months. In the contract scope of work with EY a knowledge transfer plan was to be established. With EY now supporting the application post go-live through the managed services contract, staff will need to ensure that a knowledge transfer plan is maintained and updated as new information is identified. This will help ensure that upon the end of the managed services contract with EY, the City has sufficient knowledge and staff to support the application.

Outsourcing of bill print was implemented without causing project delays.

Prior to the CC&B upgrade, all water billings were printed by the City. During the upgrade project, the City decided to outsource bill printing, mailing, and archiving/retrieval of an estimated 5.6M bills and letters annually. The City contracted with Pinnacle Data Systems for a 4-year $16.7M contract for bill printing services. The vendor worked with City staff to design a bill that would meet the City’s requirements including intelligent bill messages, logos, graphs, and mailing inserts. During testing, staff performed 16 parallel billings in CC&B 2.1 and 2.4 and two additional billings in CC&B 2.4. Since the application was implemented staff have implemented procedures to validate bill accuracy through random sampling of bills and have reported no issues with bill accuracy. Additionally, staff have reported the vendor to be responsive to all staff questions.

No issues with the underlying Exalogic and Exadata platforms were identified.

The City chose to change the underlying database to Exadata and the underlying server to Exalogic. At the time the project began, CC&B had never been implemented on these platforms (which were not listed as supported platforms). Prior to going live, the CC&B 2.1 database was upgraded to the Exadata platform and during testing and configuration the development and test environments for CC&B 2.4 were implemented on the Exalogic platform with no issues identified.
Project phases 3 through 7 deliverables were submitted and approved by City staff.
The final key phases of the project included the Data Conversion Planning & Execution, Design & Configuration, and Integration Testing. These phases were primarily led by EY, with the City having an active role in reviewing, approving, and testing the designs and configurations. We verified all deliverables due were received and approved by City Staff. The City has electronically archived these documents for future reference.

Use of a Quality Control Analyst during the CC&B project implementation provided the project team an independent resource to identify project risks and mitigation recommendations for the project.
During the CC&B project implementation an external Quality Control Analyst (QA) was contracted to provide an independent monitoring of the project team and project progress. Through an initial assessment and on-going weekly assessment reports the QA was able to identify project risks, advise risk mitigation recommendations, and report on lessons learned throughout the project. As needed, the QA provided regular updates to the executive team, City management, and City Audit.

RECOMMENDATIONS

None. Information only.