AUDIT COMMITTEE
AUDIT ANALYTICS TEAM

SEMIANNUAL AUDIT ANALYTICS UPDATE

FEBRUARY 2023

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• Continuous audit and risk analytics update.
• Project updates.
• Audit support.
• Outreach to the audit community and internal training.
Continuous auditing is a method to identify and analyze risks through automated, scheduled analysis of the city’s financial and process data.

Using this approach, we:

• Connect to and analyze information.

• Share results with Auditor’s Office leadership.
Continuous audit and risk analytics
number of records analyzed, July 1–Dec. 31, 2022

TOTAL: 1,346,027 records (26 automated scripts)

Source: Auditor's Office illustration using information from the city's financial system of record, Workday.
CONTINUOUS AUDIT: PURCHASE CARDS

Purchase card composite model

• Aggregates six risk flags to evaluate level of risk associated with transaction.

• Reduced initial population of purchase card transactions from 330,925 to 9,146 transactions with two or more risk flags.
Purchase card average composite risk score, by month

Source: Graphic created by the audit analytics team using data from Workday.
*These metrics are used only for risk assessment purposes and may require additional audit work to validate.
CONTINUOUS AUDIT: TRAVEL CARDS

• 94% of travel card spending categorized as low risk.
• Spending amounts associated with high-risk transactions have increased compared to prior years.
Travel card purchases by month

Source: Graphic created by audit analytics team using data from Workday.
*These metrics are used only for risk assessment purposes and may require additional audit work to validate.
Composite risk model

Aggregates three risk flags:

• Top spender.
• Benford’s law.
• Even-dollar.
Expense report composite risk model

Source: Graphic created by the audit analytics team using data from Workday.
*These metrics are used only for risk assessment purposes and may require additional audit work to validate.
Checks held for pickup

Physical checks written by the city that are waiting to be picked up by the supplier.

- The number of checks increased in the second half of 2022.
- The dollar amount associated with these checks also increased.
Source: Graphic created by the audit analytics team using data from Workday.

*These results are used only for risk assessment purposes and may require additional audit work to validate.
CONTINUOUS AUDIT: PURCHASE ORDERS

Risk analytics

• Unauthorized purchases.
• Duplicate transactions.
• Even-dollar purchases.
• Shipping addresses.
Unauthorized purchases

Purchase order transactions that violate the city’s procurement process by:

• Submitting after-the-fact orders.

• Committing fiscal rule violations for transactions under $10,000.

• Committing code violations for transactions over $10,000.
Unauthorized purchases, by month

Source: Graphic created by the audit analytics team using data from Workday.

*These results are used only for risk assessment purposes and may require additional audit work to validate.
Duplicate transactions

Any pair of transactions with identical purchase amounts and similar supplier names from:

- Purchase orders.
- Purchase cards.
- Travel cards.
Duplicate transactions

The number of potential duplicate transactions has decreased for:

- Purchase order and purchase card transactions.
- Purchase card and travel card transactions.
Even-dollar purchases

Transactions that end in whole numbers in increments of 100.

- Overall, about 10% of transactions qualify as even-dollar transactions.
- The total number of even-dollar transactions decreased in the second half of 2022.
Shipping addresses

The address listed in a purchase order that directs the location of shipments.

- We identified a risk population of shipping addresses that do not correspond with verified city addresses.
- We tested a sample of the risk population to determine the effectiveness of the analytic.
Purchase order shipping locations

Source: Graphic created by the audit analytics team using data from Workday and the city’s real estate website.

*These results are used only for risk assessment purposes and may require additional audit work to validate.
2022 PROJECT UPDATES

• Denver Employees Retirement Plan.
• Technology purchases.
2022 PROJECT UPDATES

Denver Employees Retirement Plan

Objective: Develop analytics to identify the accuracy of contributions and benefit payouts, and to assess compliance with applicable policies.

• Requested by the executive team.
• Planning phase – conducting interviews and research.
Technology purchases risk assessment

**Objective:** Develop risk analytics to identify transactions at risk of being out of compliance with Executive Order No. 18.

- Evaluated success of analytics.
- Provided initial risk assessment to IT audit manager.
Technology purchases risk assessment

• Results of risk assessment kicked off full audit.

• Developed risk score to provide a group of high-risk transactions to the audit team for their testing.

• Provided audit support throughout the audit.
## Audit support, July 1–Dec. 31, 2022

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Homeless encampments

• Sampling methodology.
• Data cleaning and collection.
• Mapping analysis.
Denver police operations

Analyzed:

• Police response times.
• Call time distribution.
• Trends in applicant and employee data.
• Compliance with overtime policies.
Residential trash, recycling, and compost services

- Audit published November 2022.
- Supported finding.
Resident’s service requests to report missed pickups, July 2019 through April 2022

The new trash collection routes the city implemented in January 2022 coincided with a significant increase in residents’ reports of missed service.

Source: Auditor’s Office staff analysis of Denver’s 311 data.
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Audit analytics team overview, July 1–Dec. 31, 2022

Audit support
Provided support for
7 audits

Continuous audit/risk analytics
Ran
26 automated scripts looking at 1,346,027 records

Training/outreach to audit community
Offered 3 training sessions
Presented at 2 conferences
NEXT STEPS

• Complete risk assessment of Denver Employees Retirement Plan.
• Begin next round of analytic projects.
• Continue to cross-train auditors to expand analytics skills.