



AUDIT COMMITTEE



AUDIT ANALYTICS TEAM

SEMIANNUAL AUDIT ANALYTICS UPDATE

FEBRUARY 2025

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AGENDA



- Continuous audit and risk analytics update.
- Audit support.
- Outreach to the audit community and internal training.



BACKGROUND

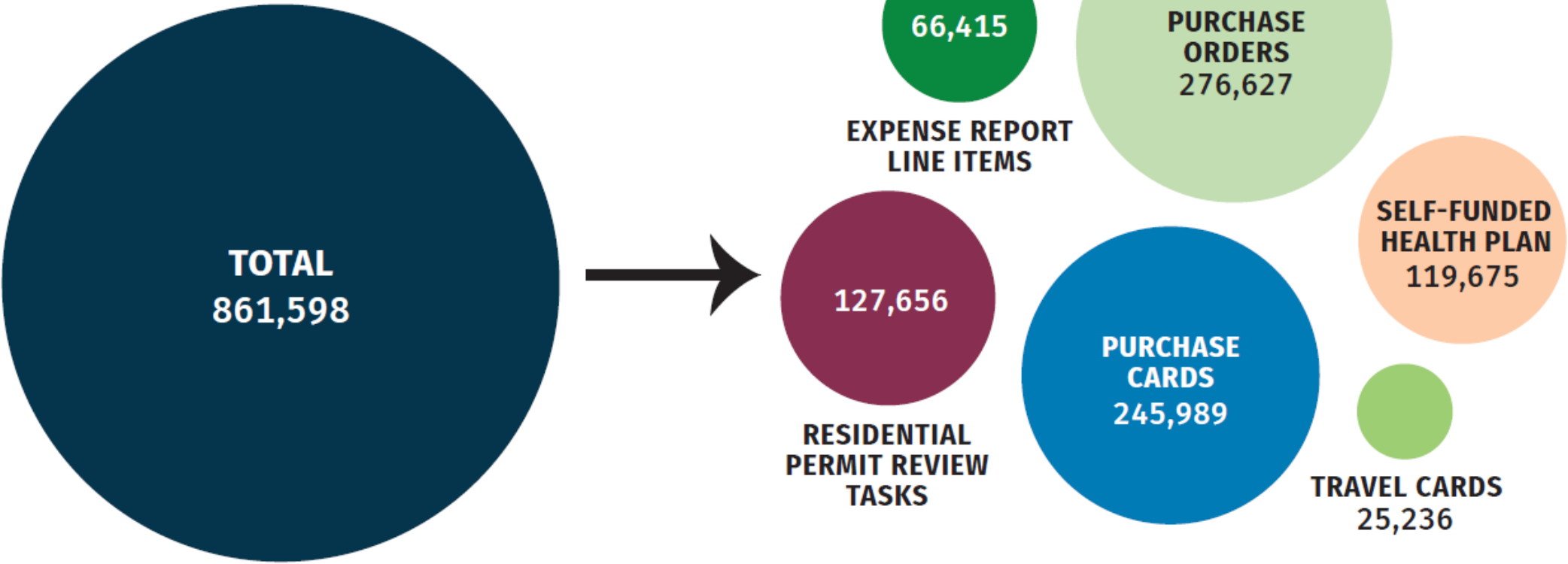
Continuous auditing is a method to identify and analyze risks through automated, scheduled analysis of the city's financial and process data.

Using this approach, we:

- Connect to and analyze information.
- Share results with Auditor's Office leaders.



2024 continuous audit and risk analytics number of records analyzed



Source: Auditor's Office illustration using information from the city's financial system of record, Workday, and the city's permitting system, Accela.

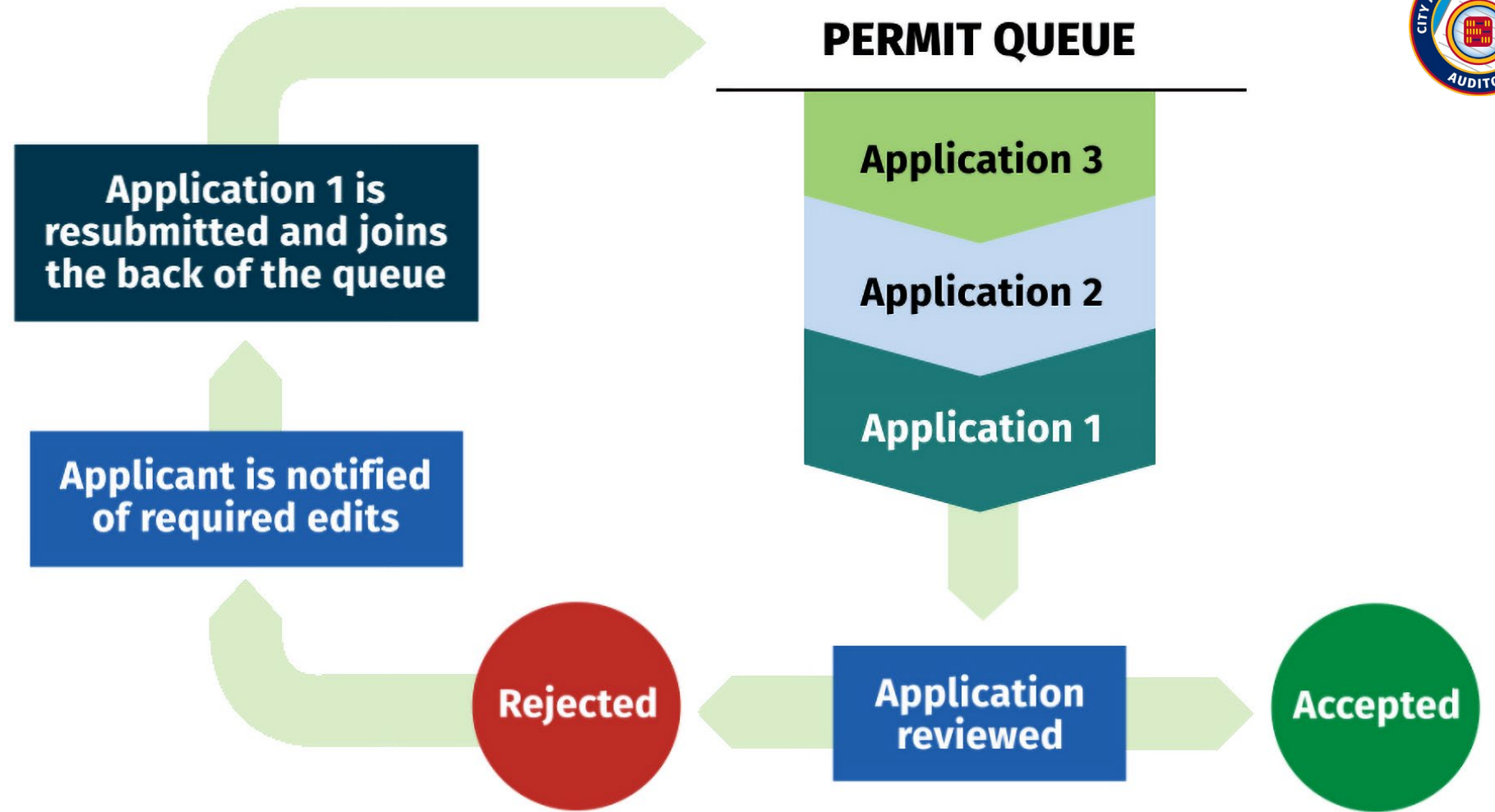
CONTINUOUS AUDIT: RESIDENTIAL PERMIT REVIEW



Residential permit review trends

- We monitor the average number of days it takes city staff to complete their reviews.
- We also monitor the percentage of review tasks completed within Community Planning and Development's internal goals.

Permit process



Application 1 is resubmitted and joins the back of the queue

Applicant is notified of required edits

Rejected

Application reviewed

Accepted

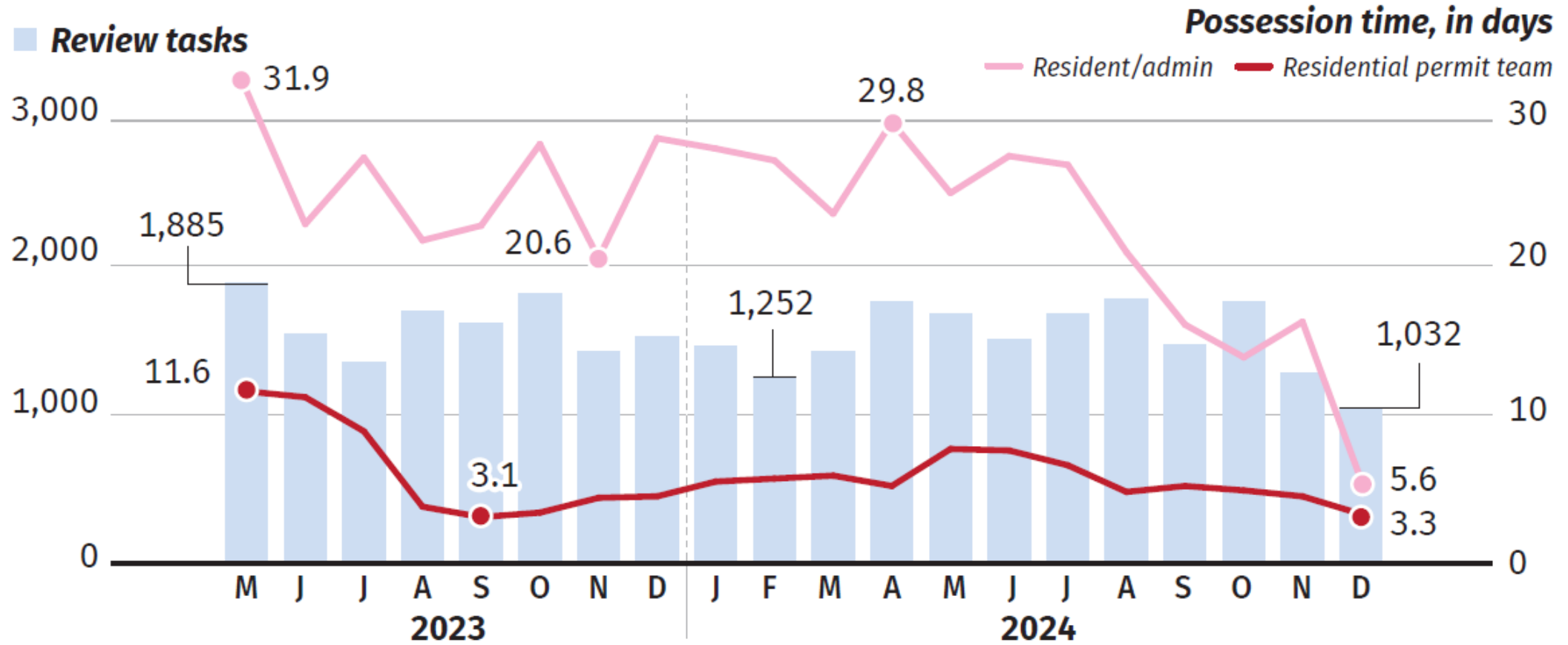
...if application contains a mistake or is incomplete

Note: Plan reviews are pulled from the queue where the oldest plan review is typically processed first.

Source: Denver Auditor's Office.



Average possession time for walkthrough permit applications, by month

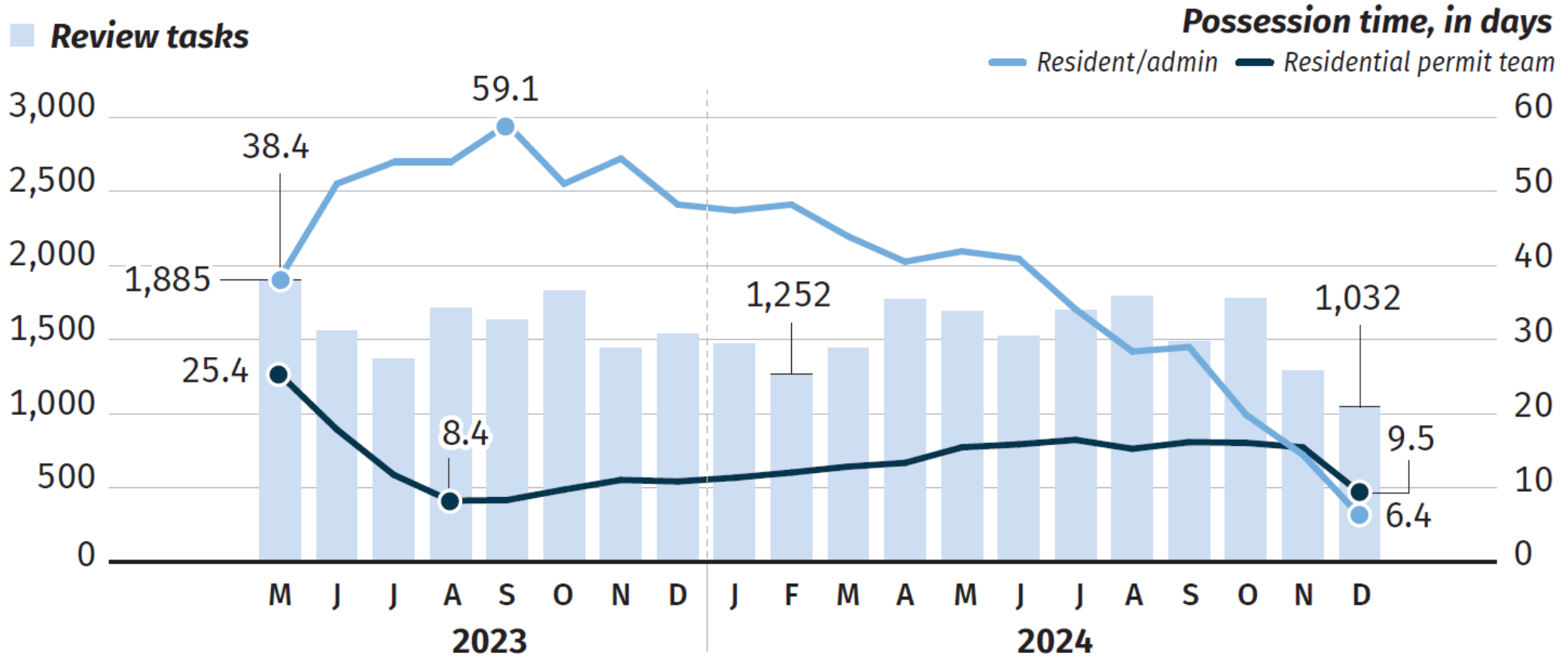


Source: Graphic created by the audit analytics team using data from Accela.

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



Average possession time for non-walkthrough permit applications, by month



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

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

CONTINUOUS AUDIT: SELF-FUNDED HEALTH PLAN



Health plan risk analytics

- We analyzed whether city employees are covered as both an employee and a dependent at the same time.
- We flagged dependents over the age of 26 and verified their eligibility.

CONTINUOUS AUDIT: EXPENSE REPORTS



New risk flags for expense reports

- Duplicate reimbursements.
- Issues with support documentation.
- Issues with approvals.

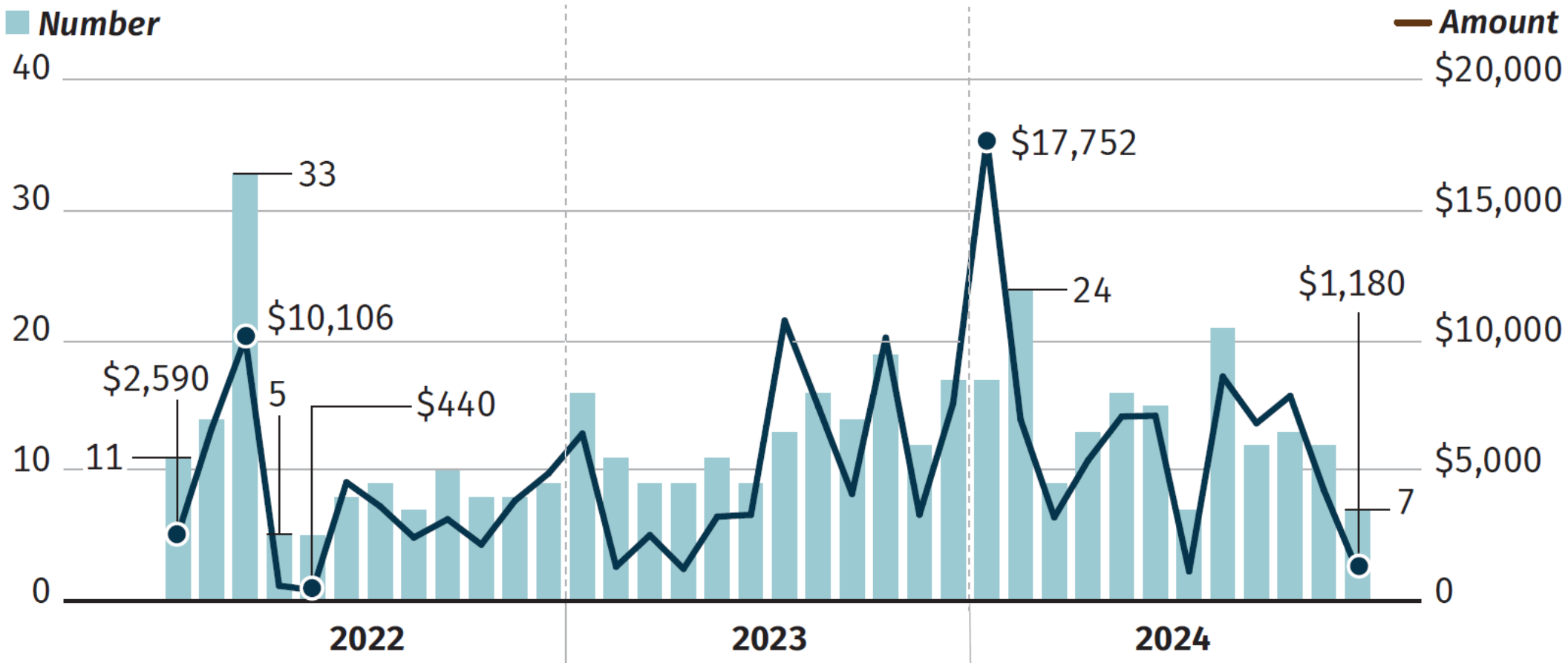
CONTINUOUS AUDIT: EXPENSE REPORTS



- Out of 66,415 expense report lines, we found 449 expense reports with two or more risk flags.
- The most frequently occurring risks are even-dollar transactions, missing approvals, and approvals under one minute.



Expense reports, with two or more risk flags, by month



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

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CONTINUOUS AUDIT: TECHNOLOGY PURCHASES

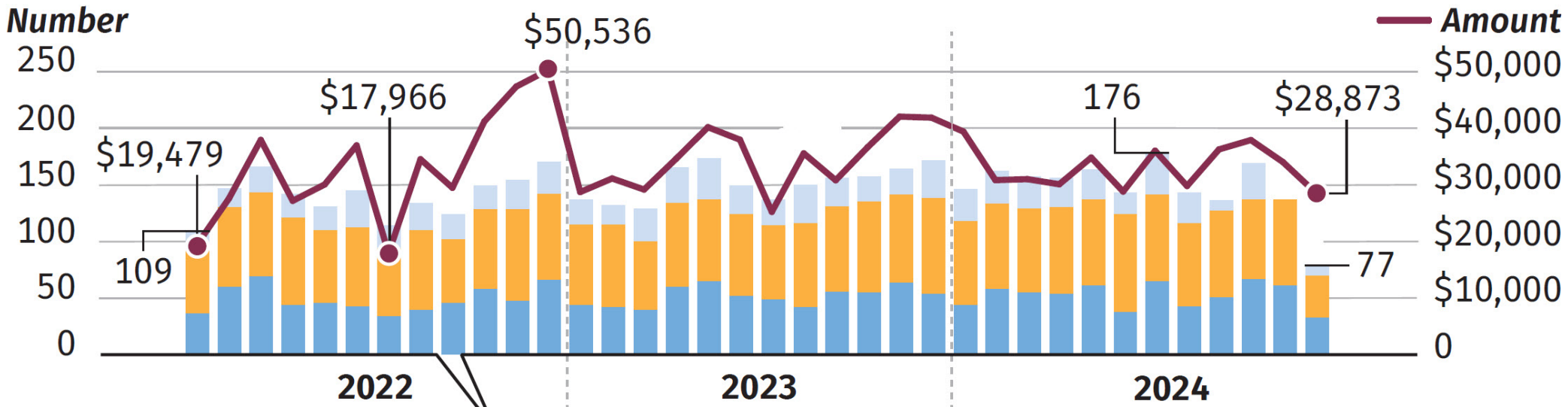


- We identified high-risk purchase card transactions using a combination of five risk flags.
- We analyzed all purchase card transactions from January 2022 through December 2024.



Risky transactions for citywide technology purchases, by month

RISKY TRANSACTIONS ■ Independent ■ Subscription ■ Other



CONTINUOUS AUDIT: PURCHASE CARDS

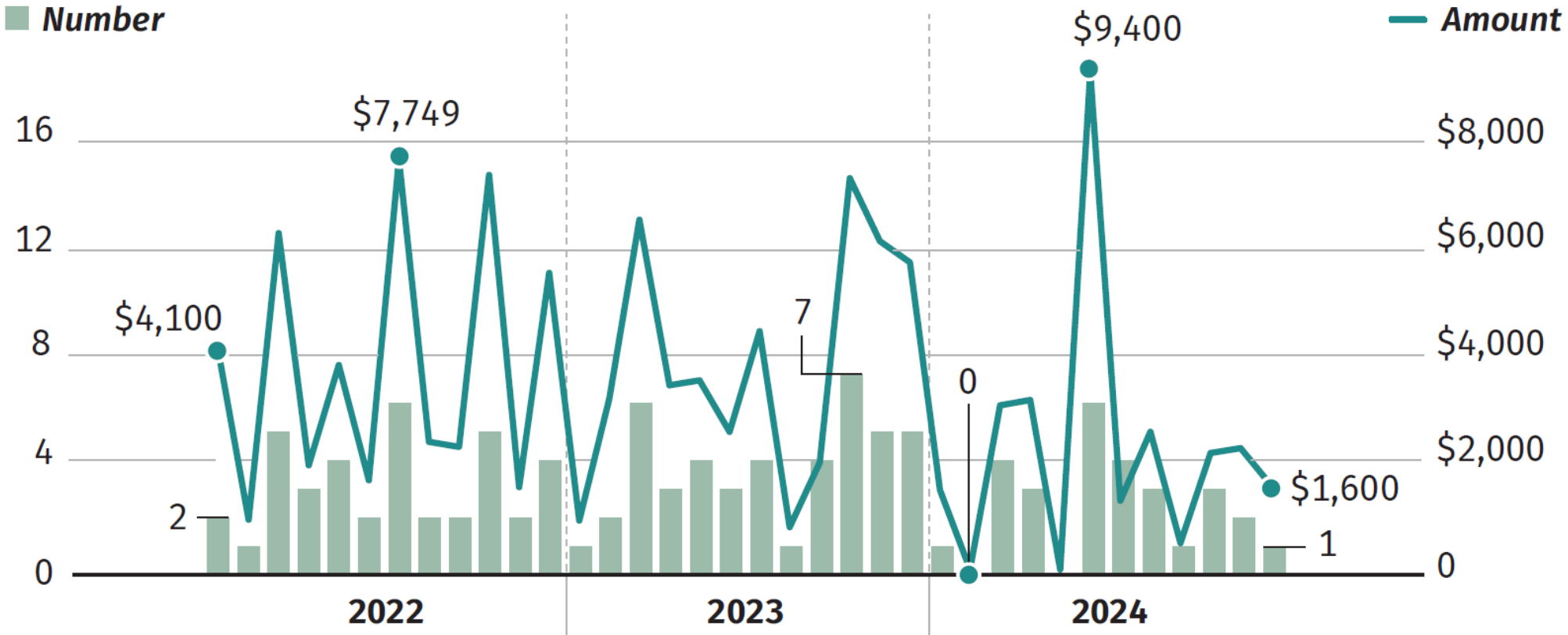


Purchase card composite model

- We flag purchases tied to pass-through vendors, even-dollar amounts, split transactions, recurring transactions, and purchases without supporting documentation.
- Of the 245,989 transactions, only 111 (or 0.05%) had three or more risk flags.



Purchase card transactions with three or more risk flags, 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: PURCHASE CARDS



Etsy analytic

- Looks at whether the city received sales tax refunds for Etsy transactions.
- Out of the 40 total transactions, we flagged three from the last six months for further review.

CONTINUOUS AUDIT: TRAVEL CARDS

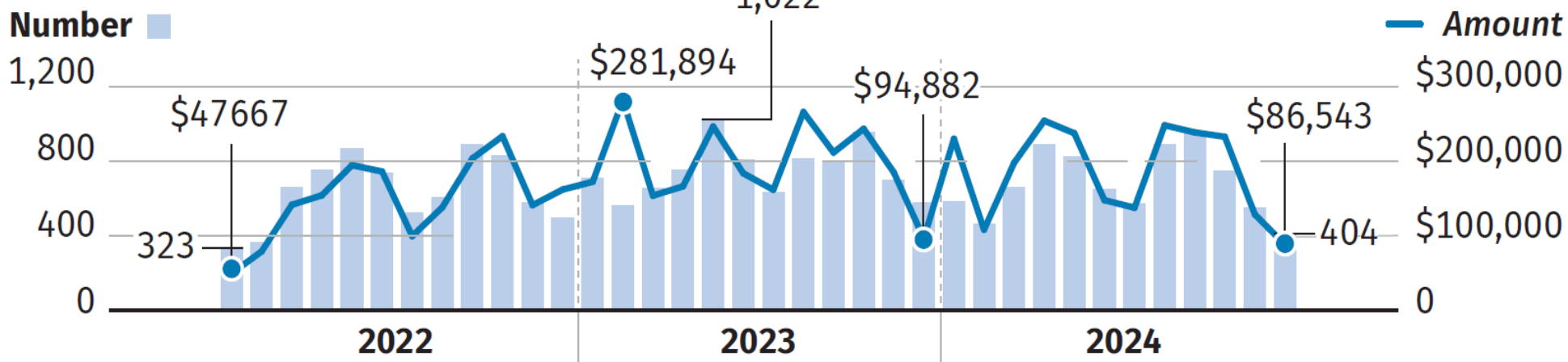


- 99% of travel card transactions are categorized as low risk.
- The number of transactions categorized as medium or high risk has stayed consistently low over the past three years.

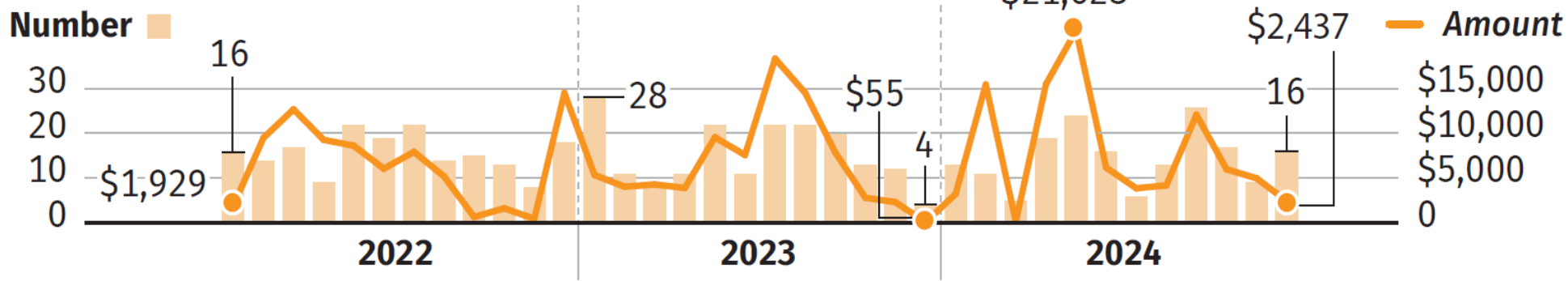


Travel card purchases, by month

LOW RISK



MEDIUM AND HIGH RISK



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

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CONTINUOUS AUDIT: TRAVEL CARDS

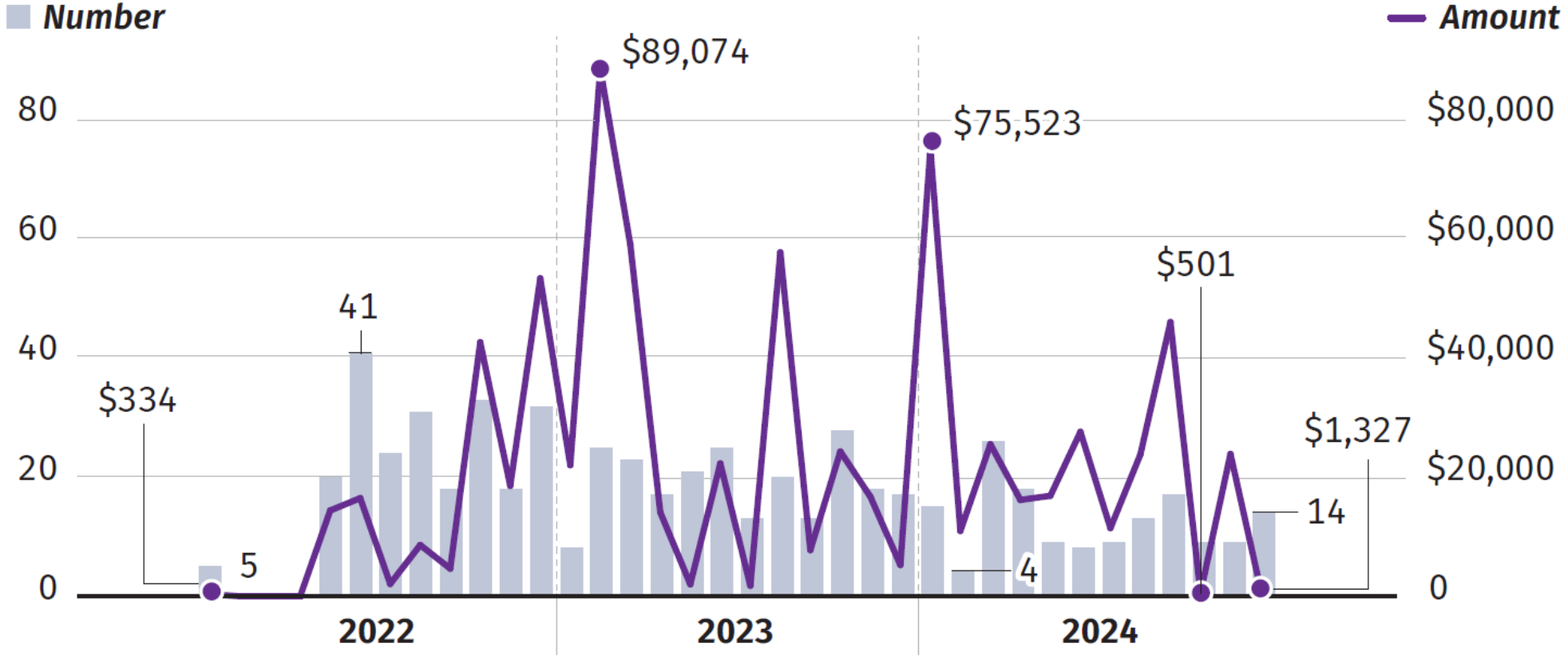


Flight upgrades and in-flight purchases

- Flags travel card purchases potentially related to flight upgrades and in-flight purchases.
- Of the 25,714 travel card transactions, we flagged 601 (or 2.3%).



Travel card in-flight purchases and potential flight upgrades, by month



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

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CONTINUOUS AUDIT: PURCHASE ORDERS



Risk analytics

- Unauthorized purchases.
- Shipping addresses.

CONTINUOUS AUDIT: PURCHASE ORDERS

continued



- All 1,302 unauthorized purchases (100%) had supporting documentation.
- 123 (or 10%) lacked the required justification form.
- We also looked at patterns across city agencies and employees.

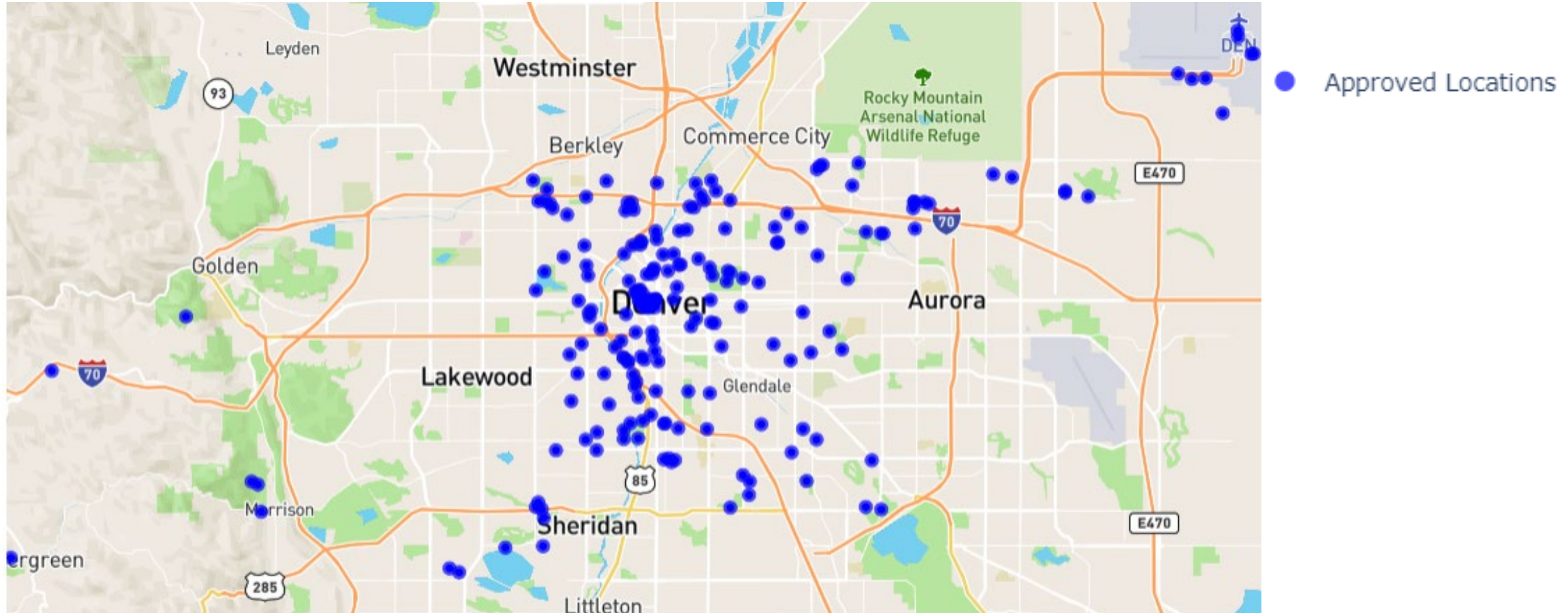


Shipping addresses

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

- We flag shipping addresses that do not correspond with verified city addresses or vendors.
- We flag shipping addresses that correspond with city employee residences.

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.

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ANALYTICS PROJECT UPDATES

Text extraction and automation

- Developed code that reads text files, extracts key information, and analyzes for risk.
- Applied the code to four case studies.



ANALYTICS PROJECT UPDATES

Example of text extraction

Payment information

Item(s) Subtotal:	\$14.20
Shipping & Handling:	\$0.00
Promotion applied:	-\$0.14

Total before tax:	\$14.06
Estimated Tax:	\$0.00

Grand Total:	\$14.06





ANALYTICS PROJECT UPDATES

Example of text extraction

	A	B	C
1	Purchase card ID	Estimated tax	Grand total
2	PC-1234	\$0.00	\$14.06
3	PC-2345	\$2.13	\$17.25



ANALYTICS PROJECT UPDATES

Case study: airfare expense reports

- Flags expense reports where an employee was reimbursed for an airfare upgrade or add-on.
- On a sample of 100 airfare expense reports, our method achieved 97% accuracy.



2024 audit assistance

	Data analysis	Sampling
DENVER MUSEUM OF NATURE AND SCIENCE	×	×
COLORADO YOUTH DETENTION CONTINUUM PROGRAM GRANT COMPLIANCE	×	×
CITY SHELTERS	×	×
FLEET MANAGEMENT	×	
EMERGENCY MEDICAL RESPONSE TIME	×	
EMPLOYEE SEPARATION	×	×
CITYWIDE TECHNOLOGY PURCHASES FOLLOW-UP	×	×
CIVIL SERVICE COMMISSION HIRING PROCESS (<i>in-progress</i>)	×	
ORGANIZATIONAL CULTURE (<i>in-progress</i>)	×	×
NATIONAL WESTERN CENTER CONSTRUCTION AUDIT (<i>in-progress</i>)	×	



TRAININGS

Internal:

- Data reliability — March 2024.
- Statistical analysis — June 2024.
- Data analysis — September 2024.
- Using python for audit work (three sessions) — October 2024.



External:

- Developing analytics to assess permit review data.
- Assessing data reliability using Microsoft Excel and Python, a computer programming language.
- Data methodologies for affordable housing and encampment audits.



NEXT STEPS

- Finalize text extraction and automation project.
- Begin Workday timekeeping continuous audit project.
- Provide internal training on data reliability.
- Perform audit support for in-progress audits.



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