

Street-Level Hotspot Mapping from Municipal Drainage Unclogging Work Orders: Evidence for Risk-Based Prioritization in Guarujá, Brazil (2021–2025)

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INTRODUCTION & AIM

Urban flooding and recurrent stormwater drainage failures are often associated with clogged storm drains and microdrainage constraints.

Municipal urban operations departments routinely register **unclogging work orders**, creating an operational dataset that can be leveraged to **detect recurrence patterns** and support **preventive decision-making**.

AIM

Propose a **practical, low-cost method** to map recurrent drainage hotspots using municipal unclogging work-order records in **Guarujá, Brazil**, covering **Jan 2021 – Dec 2025**.

5 years

JAN 2021 – DEC 2025

1 city

GUARUJÁ – SP, BRAZIL

Admin.

DATA AS SENSOR NETWORK

WHY THIS MATTERS

RECURRENT FLOODING

REACTIVE MAINTENANCE

UNUSED DATA ASSETS

OBJECTIVE RANKING NEEDED

METHOD

Work-order records were transformed into a street-level **hotspot inventory** through a 6-step reproducible pipeline:

1

DATA CONSOLIDATION

Work orders aggregated at street (logradouro) and neighborhood level.

2

ADDRESS SCOPE

House numbers excluded due to historical inconsistencies in address completion.

3

TEXT NORMALIZATION

Lower-casing, accent removal, and abbreviation expansion across street names.

4

STRING-SIMILARITY GROUPING

Equivalent street variants merged into canonical entities to reduce noise.

5

RECURRENCE METRICS

Work-order frequency per street + temporal persistence across months and years.

6

HOTSPOT RANKING

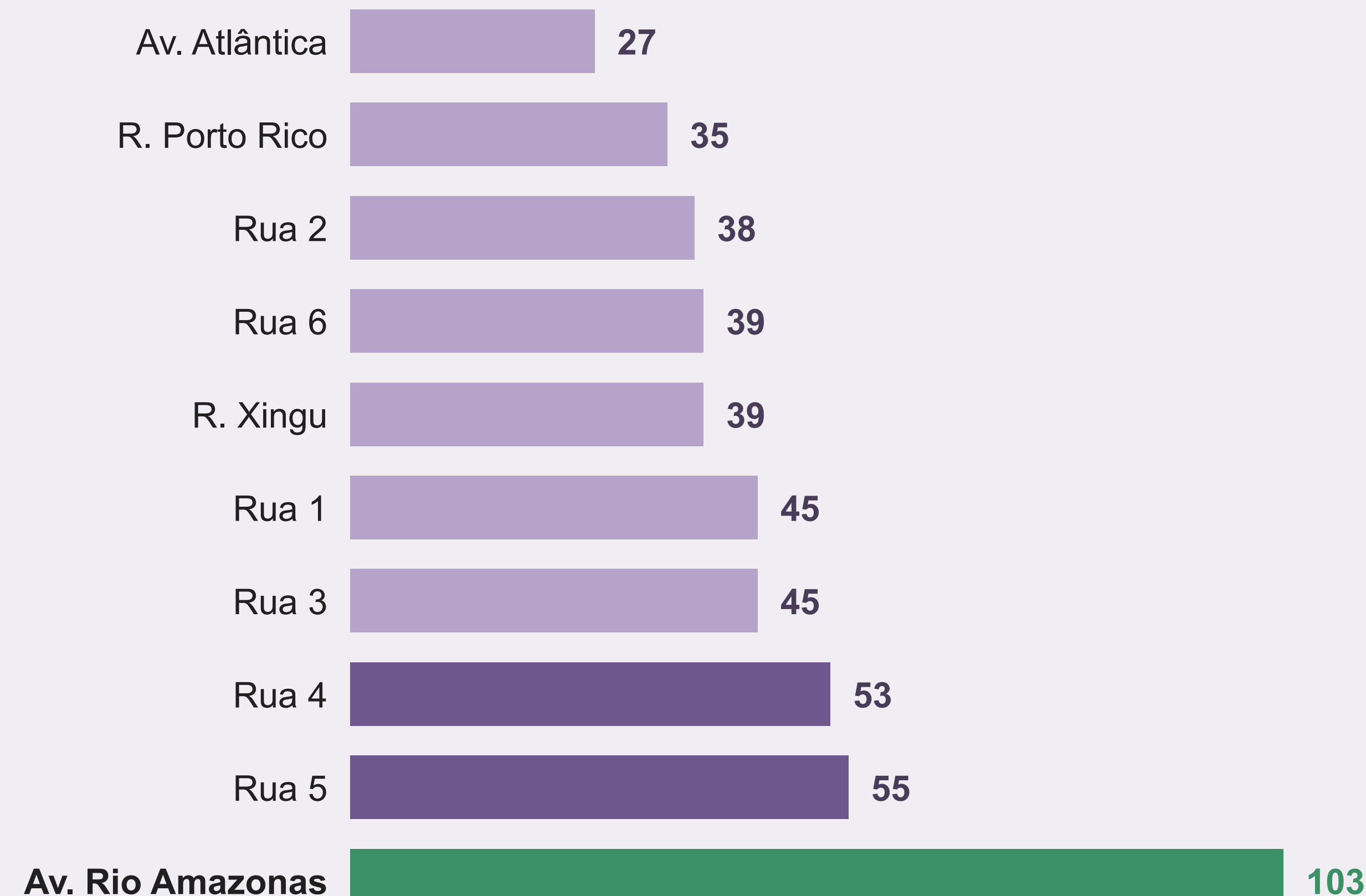
Prioritized street list + neighborhood-level summary distinguishing chronic vs. isolated sites.

RESULTS & DISCUSSION

The pipeline produces a **prioritized inventory of streets and neighborhoods** with the highest drainage-failure recurrence, distinguishing **chronic sites** from **isolated episodes**.

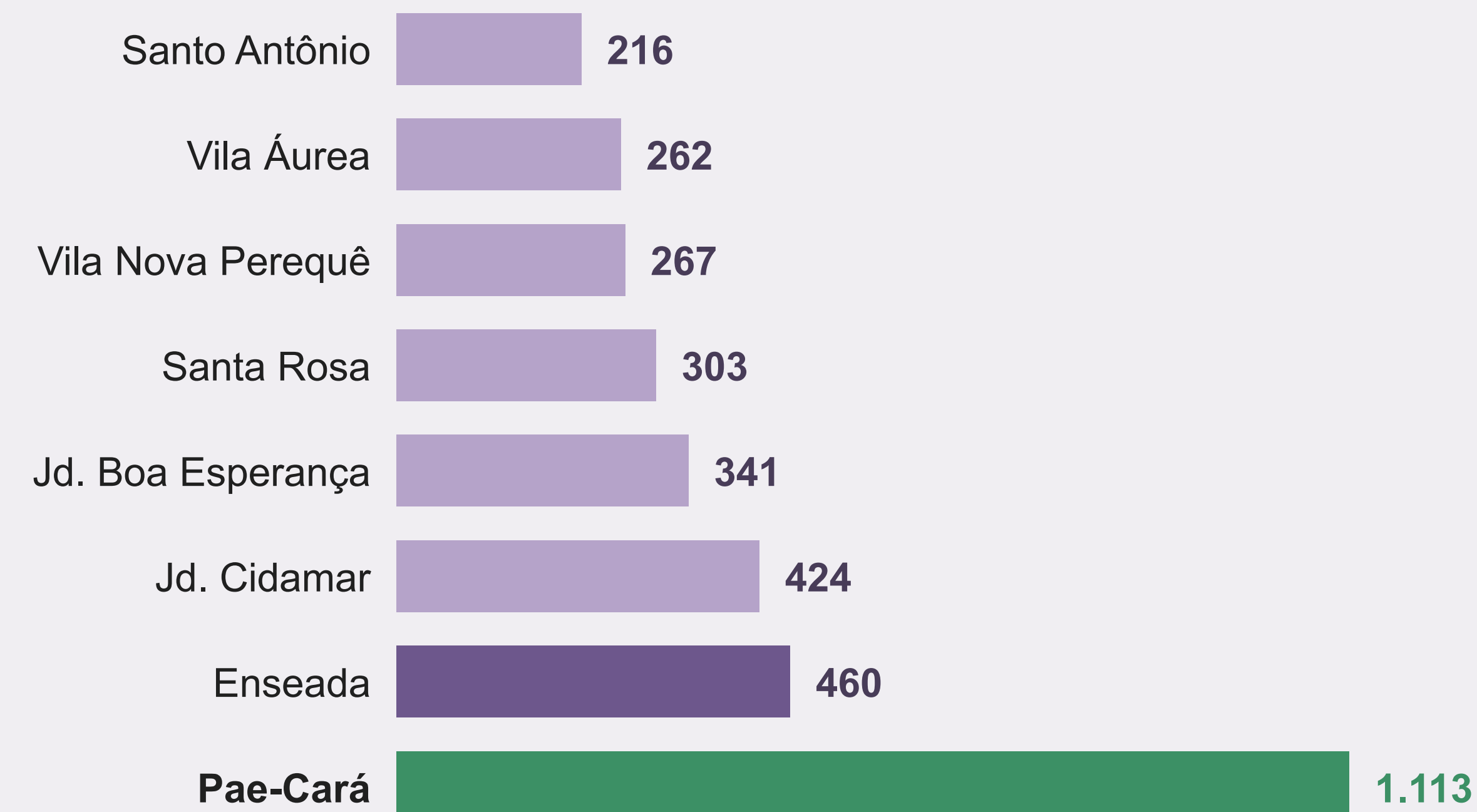
KEY FINDING: the top 50 streets concentrate **18.1%** of all unclogging work orders.

TOP 10 STREET-LEVEL CRITICAL POINTS (recurrence ranking)



Number of unclogging work orders per street (Guarujá SEURB, 2021–2025)

TOP 8 NEIGHBORHOODS BY WORK-ORDER VOLUME



Number of work orders per neighborhood (2021–2025)

CONCLUSION

Municipal work-order records can function as an **administrative "sensor network"** to detect street-level drainage hotspots and inform **evidence-based prioritization** for urban resilience and climate adaptation.

The method is **low-cost, scalable, and transferable** to other cities facing recurring flooding and drainage maintenance burdens.

FUTURE WORK / REFERENCES

FUTURE WORK

- Integrate with **rainfall & flood-report data**.
- Produce **GIS hotspot maps** with temporal layers.
- Validate in **other Brazilian coastal cities**.

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