



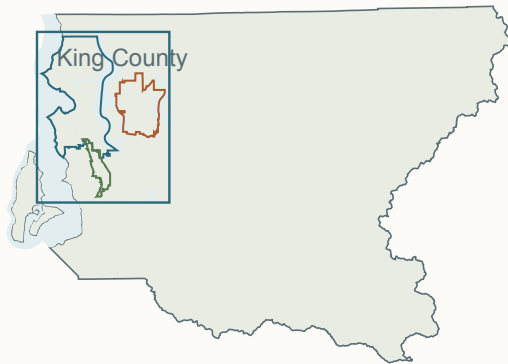
01 / KING COUNTY STUDY / RESEARCH QUESTION

King County crash patterns, residents and workplaces

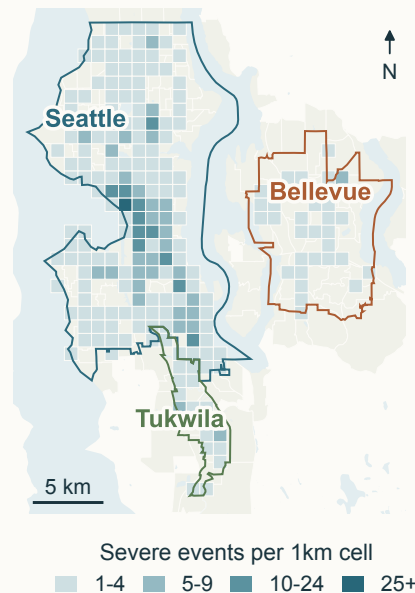
Seattle, Bellevue and Tukwila. Reported crashes, 2020-2024; 2021-2023 increase focus. What do commuting, workplaces, roads and daylight add to the investigation?

King County, Washington

Severe City Street crashes, 2021-2023



Seattle 644 | Bellevue 67 | Tukwila 40
All 751 events retained in 1km cells.



CRISP-DM / ARTIFACTS BEHIND THE FINDINGS

1 Business understanding

Question & three-city scope

2 Data understanding

Features, universes & sources

3 Data preparation

Geographic joins & audits

4 Modeling

Maps, traffic & daylight

5 Evaluation

Counts, MOEs & sensitivity

6 Deployment

Publications & evidence pack

Review feeds back into the question, source selection and data preparation.

ACS 2020-2024: resident context with MOEs. LODS 2023: job activity. Dated traffic and local conditions remain separate measures. Counts and joins are in the evidence pack.



02 / THE 2021-2023 SEVERE-CRASH INCREASE

King County's severe-crash rise was concentrated on city streets.

Fatal or suspected serious injury crash events. Both the net-change comparison and the event timeline on this page cover 2021-2023.

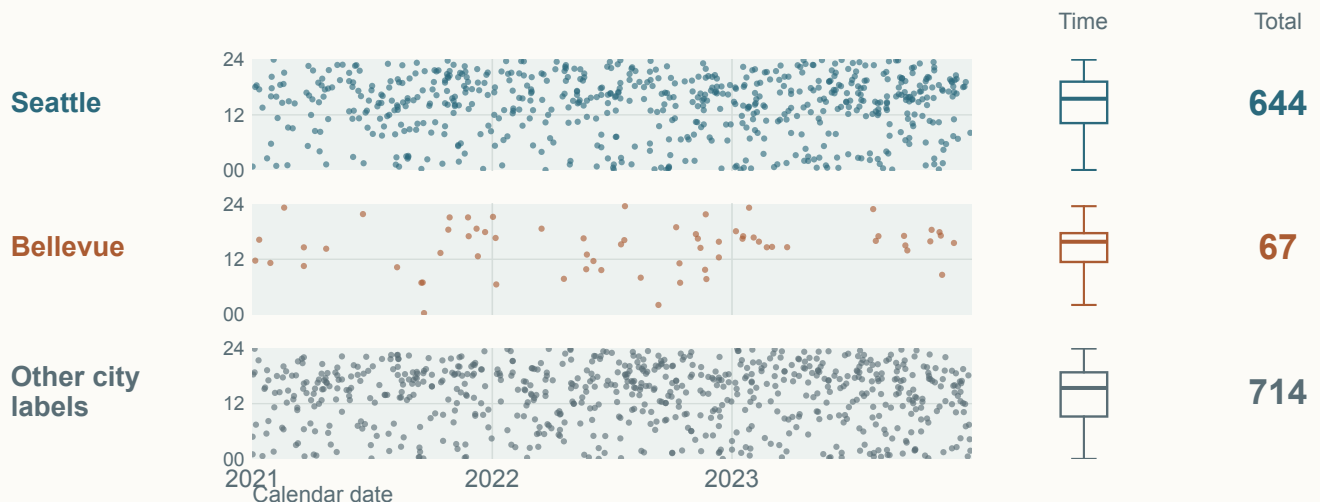
85.7%

of King County's **2021-2023** net increase in severe crashes was in WSDOT's **City Street** category.

Net change from 2021 to 2023: 138 of 161 severe events

Every severe City Street crash, 2021-2023

Dots: date and local time. Boxes: time-of-day distribution.



Box = middle 50%; line = median; whiskers = values within 1.5 x IQR. All events are dots.

Of the **2021-2023** City Street net increase, Seattle contributes **58.0% (80 of 138)**. Bellevue adds **1**; other city labels add **57**.

Dots show all 1,425 severe events in 2021-2023; the card describes net change. Severe = fatal or suspected serious maximum injury per reported crash.

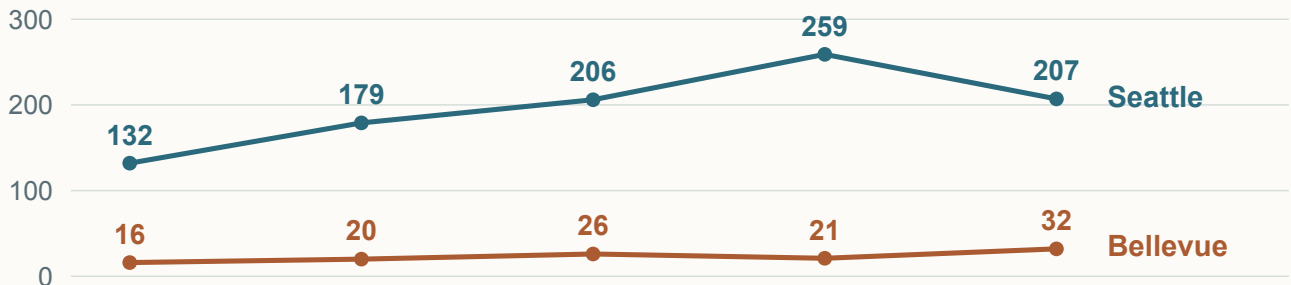


03 / SEVERE CITY STREET CRASHES, 2020-2024

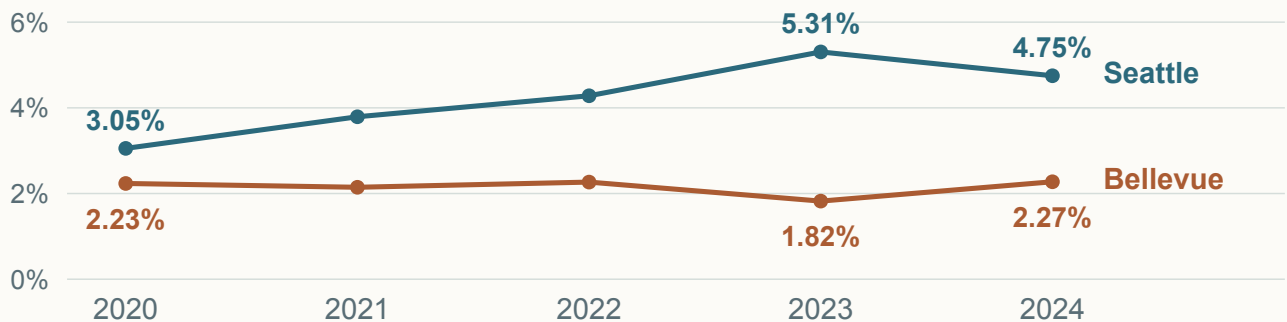
Seattle's severe-crash count fell in 2024; Bellevue's rose.

Five complete years, using the same WSDOT road category and severity definition.

Fatal + suspected serious crash events



Share of all reported City Street crash events



In 2024, Seattle fell **259 to 207**; Bellevue rose **21 to 32**. Bellevue Q4 severe events rose **6 to 18**, with reported crashes near flat (**386 to 385**).

Source city labels, City Street records. The lower panel is severity among reported crashes, not a measure of per-trip travel risk.

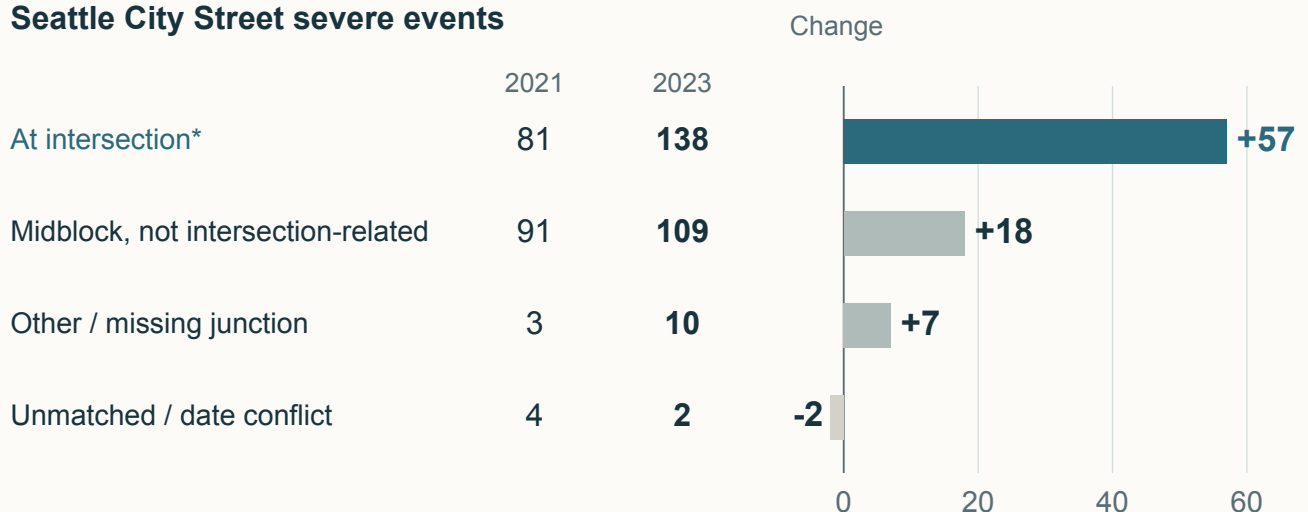


04 / SEATTLE INTERSECTIONS, 2021-2023

Seattle intersection-related severe crashes rose 81 to 138.

WSDOT outcomes enriched with unique report-number and exact-date matches to SDOT.

Seattle City Street severe events



57 of 80

additional severe events fall in the **at-intersection, intersection-related** source category: **81 to 138**.

Focus next on intersection movements and crossing patterns. Angle-coded records rose **19 to 47**; cycle-coded records rose **13 to 34**.

*Exact JUNCTIONTYPE: At Intersection (intersection related). Severe matches: 175/179 in 2021; 257/259 in 2023. All unmatched events remain in the totals.



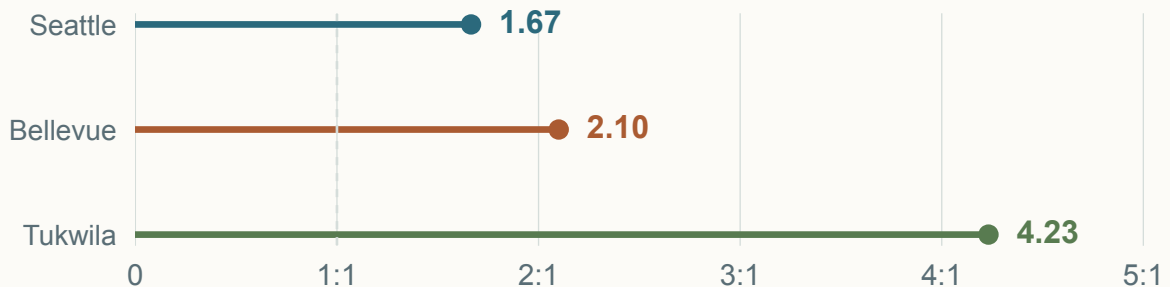
05 / TUKWILA'S PRIMARY-JOB BALANCE

42,504 primary jobs in Tukwila; 10,044 held by Tukwila residents.

Workplace-to-resident primary jobs: 4.23 to 1. Census LODES 2023, with ACS 2020-2024 resident and commuting estimates.

Primary jobs at workplaces / primary jobs held by residents

LODES 2023 | same primary-job definition on both sides



ACS 2020-2024	Seattle	Bellevue	Tukwila
Residents	754,195 ±72	151,847 ±87	21,451 ±47
Mean commute, minutes	26.0 ±0.3	23.6 ±0.6	24.6 ±1.2
Worked from home	34.8% ±0.7	35.6% ±1.4	12.8% ±3.6
Drove alone to work	36.7% ±0.6	45.6% ±1.7	66.2% ±3.4

±90% MOE; share MOEs in percentage points. Commute mean excludes home workers.

98.2% (41,756 of 42,504) of Tukwila's workplace primary jobs link to homes outside the city. That gives the investigation a clearer view of its role as an employment destination.

LODES describes covered primary-job home/work relationships, including disclosure protection. It does not count daily arrivals or through traffic. ACS is a five-year estimate; ± is the 90% MOE.



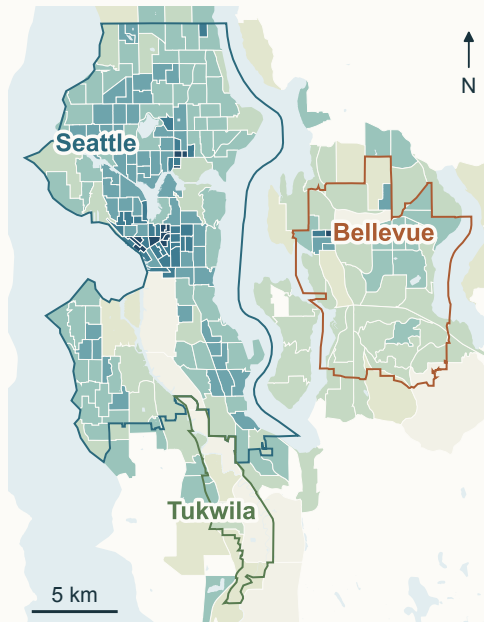
06 / TWO VIEWS OF THE SAME PLACES

Tukwila's job density is close to Bellevue's; resident density is lower.

Per land km²: Tukwila 902 residents / 1,787 primary jobs; Bellevue 1,752 residents / 1,727 primary jobs. City-level values.

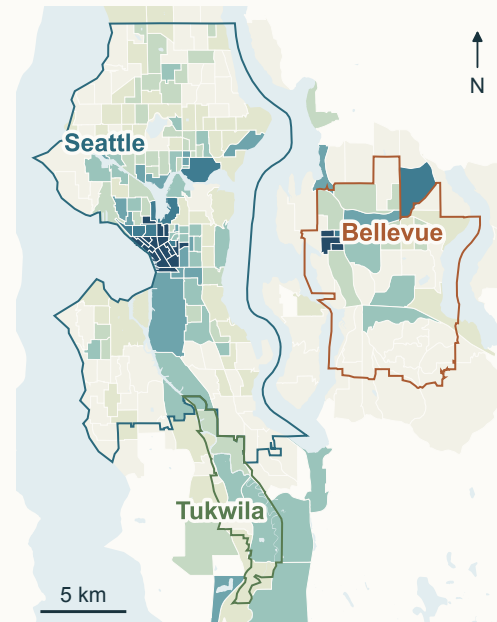
Resident density

ACS 2020-2024 | people / land km²



Workplace job density

LODES 2023 | primary jobs / land km²



<500 500-<1k 1-<2k 2-<4k 4-<8k 8-<16k 16k+

Whole-tract values and land area; 2024 TIGER geometry. City outlines are reference only.

Road types matter here too: **1,024 of Tukwila's 1,464 reported crashes in 2023 (69.9%)** were coded State Route. One I-5 section carried an estimated **239,000 vehicles/day**.

Maps: whole-tract context, not city-allocated tract counts. Residents: ACS 2020-2024; jobs: LODES 2023. State Route includes all reported severity levels. AADT is per section, not unique travelers.

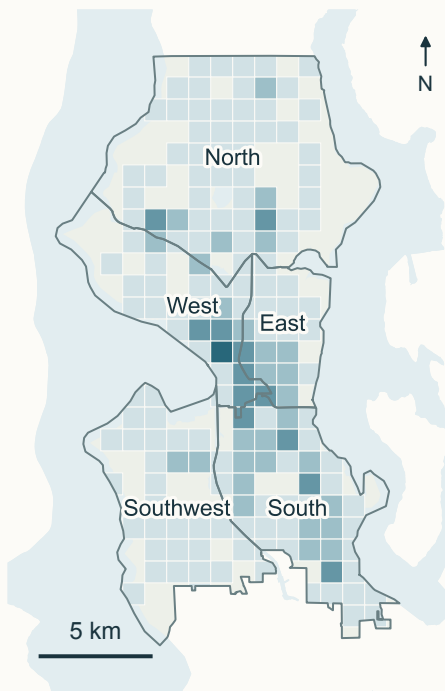


07 / CRASH LOCATIONS, 2021-2023

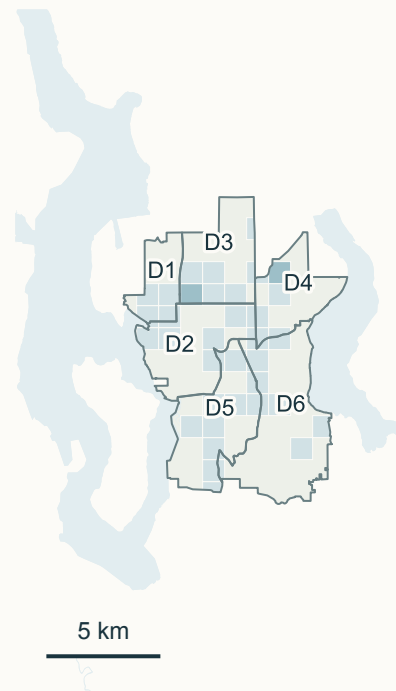
Severe crashes by Seattle precinct and Bellevue police district.

A common 1km grid and map scale; published policing areas provide local reference.

Seattle | 643 mapped events



Bellevue | 67 mapped events



Severe events per 1km cell | 2021-2023

1-4	5-9	10-24	25+
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643 Seattle and **67 Bellevue** severe events map to their published reference areas. One additional Seattle event remains in the time-series totals.

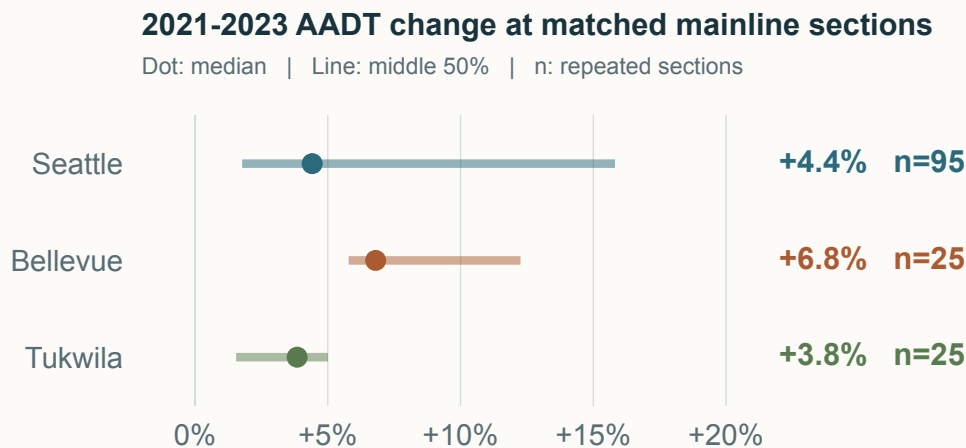
Events: 2021-2023. Boundaries: published reference geography retrieved 20 Oct 2026. Bellevue historical effective dates are not established; this is not a deployment map.



08 / DATED HIGHWAY AND LOCAL TRAFFIC

Matched highway volumes rose in all three cities, 2021-2023.

Median AADT change: Seattle +4.4%; Bellevue +6.8%; Tukwila +3.8%. Annual archives use the recorded reporting year.



Shared highway basis: 95 Seattle, 25 Bellevue and 25 Tukwila repeated mainline sections. Exact route-and-mile keys, unique matches and geometry within 5m keep the sample auditable.

Local street evidence: Seattle's 126 repeated 2021-2023 studies have median AADT change **+5.4%**. Bellevue's three 2023-2024 repeats range from **-15.6% to +7.0%**. Their periods and coverage remain explicit.

Highway AADT and municipal AADT/AAWT describe different road samples. These are unweighted section/site changes; they do not estimate all-road citywide traffic growth or exposure-adjusted crash risk.

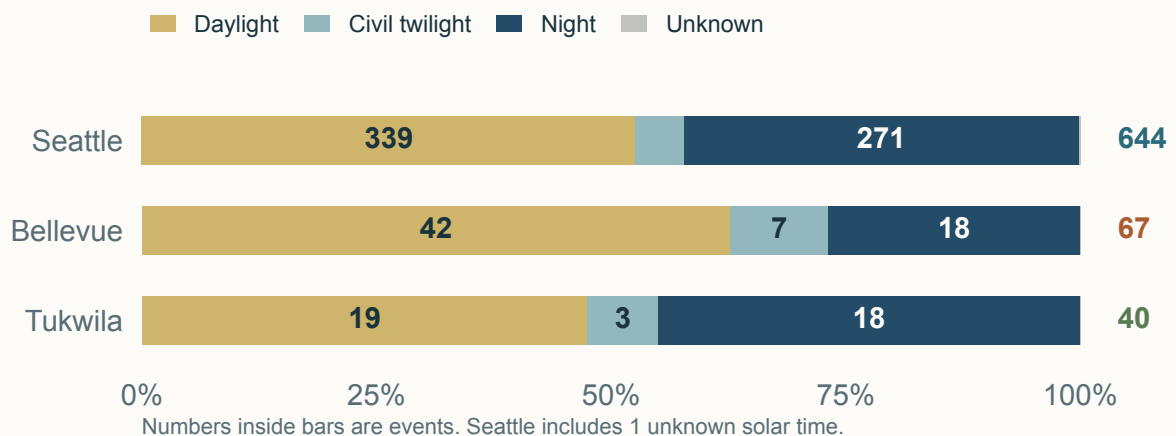


09 / DATE, LOCATION AND LIGHT AT CRASH TIME

Modeled nighttime shares: 42% Seattle, 27% Bellevue, 45% Tukwila.

2021-2023 City Street severe events. Solar phase uses each event's date, local time, coordinates and the daylight-saving calendar.

Sunlight modeled from each crash's date, local time and location



271 / 644

Seattle: 42.1%

18 / 67

Bellevue: 26.9%

18 / 40

Tukwila: 45.0%

Seattle's observed lighting adds a practical lead: **235 of those 271** modeled-night severe events were reported with **street lights on**. Crossing visibility, turning movements and road layout deserve a closer look.

NOAA approximate solar model; 1 Seattle severe event has unknown solar time. Clock-window shares (18:00-05:59) are 47.4% Seattle / 25.4% Bellevue. Actual lighting, weather and patrol duty hours remain separate measurements.