AtlasSafe

Road Safety Evidence Report

City of Martinsville

Data Period: 2017-01-01 to 2025-10-29 | Prepared by AtlasGeo Technologies

2,232	5	62	18	12
Total Crashes	Fatalities (K)	KSI (K + A)	Ped Crashes	Bike Crashes

HSIP / SS4A GRANT READY

This report supports VHSIP application and SS4A Safety Action Plan requirements.

Crash analysis, hotspot identification, countermeasures, and benefit-cost estimates were generated by AtlasSafe using VDOT TREDS crash data and FHWA-approved methodologies.

Chapter 1 — Executive Summary

Between 2017 and 2025, City of Martinsville experienced 2,232 crashes resulting in 5 fatalities and 665 injuries (62 KSI — fatal plus serious injury combined). Pedestrians were involved in 18 crashes and bicyclists in 12 crashes. The highest-priority safety location is on CHATHAM HEIGHTS RD, with 26 crashes and an EPDO score of 648.

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Total Crashes	Fatalities	KSI	Ped Crashes	Bike Crashes

Key Findings

1. 2,232 total crashes recorded between 2017–2025.
2. 5 fatal and 57 serious-injury crashes (KSI total: 62) drive the disproportionate safety cost.
3. 30 vulnerable road user crashes — pedestrians and cyclists combined.
4. Top hotspot on CHATHAM HEIGHTS RD has 26 crashes (EPDO 648).
5. CEJST tier: HIGH — 4 of 5 (80%) of the jurisdiction's census tracts are identified as disadvantaged communities under CEJST, with approximately 78% of the population residing in these tracts.
6. Countermeasures and benefit-cost analysis follow FHWA Proven Safety Countermeasures.

RECOMMENDED ACTION
Submit VHSIP application targeting the top 5 high-injury network locations identified in Chapter 4. Priority treatment: see Chapter 5 countermeasure recommendations.

Chapter 2 — Jurisdiction Profile

Field	Value
Jurisdiction	City of Martinsville
VDOT District	2 - Salem
STCOFIPS	51690
VDOT Jurisdiction Code	120
Estimated Population	13,000
Road Miles (approx.)	72
Crash Data Period	2017 — 2025
Total Crashes in Period	2,232
Annual VMT (est.)	195,000,000
Crash Rate per 100M VMT	1,144.6
CEJST Disadvantaged Tracts	4 of 5 (80%)
Congressional District	VA-05
Data Source	Virginia TREDS (VDOT Crash Data)
Analysis Method	DBSCAN Spatial Clustering (PostGIS)
Severity Scale	KABCO: K=Fatal, A=Serious, B=Moderate, C=Minor, O=PDO

Equity & Underserved Community Status

4 of 5 (80%) of the jurisdiction's census tracts are identified as disadvantaged communities under CEJST, with approximately 78% of the population residing in these tracts. The jurisdiction qualifies for SS4A priority consideration under the underserved communities criterion.

Federal Safety Funding Context

VHSIP (Highway Safety Improvement Program)

Federal formula funds for infrastructure safety improvements through 2 - Salem. Requires documented crash history and benefit-cost analysis. Submit applications via the VDOT SMART Portal.

SS4A (Safe Streets and Roads for All)

USDOT discretionary grant program. This jurisdiction has not previously received SS4A planning funds. FY2026 application deadline: May 26, 2026.

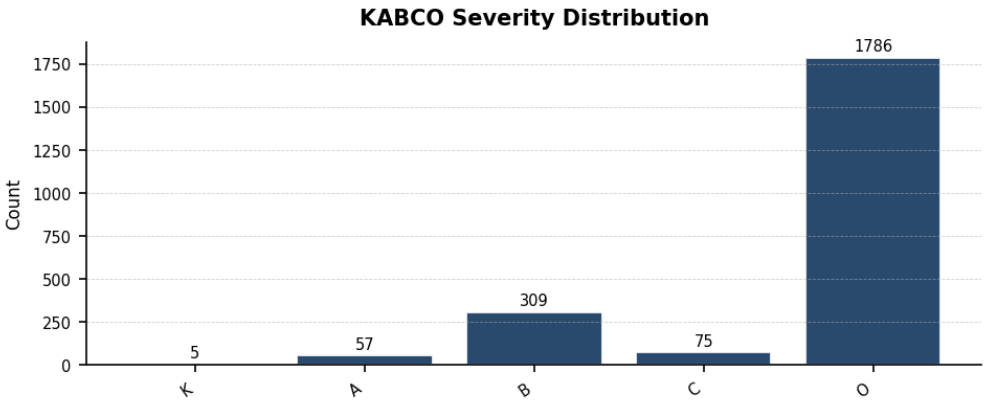
VDOT Systemic Safety Program

State-funded program targeting low-cost, high-return treatments across multiple locations with similar crash patterns.

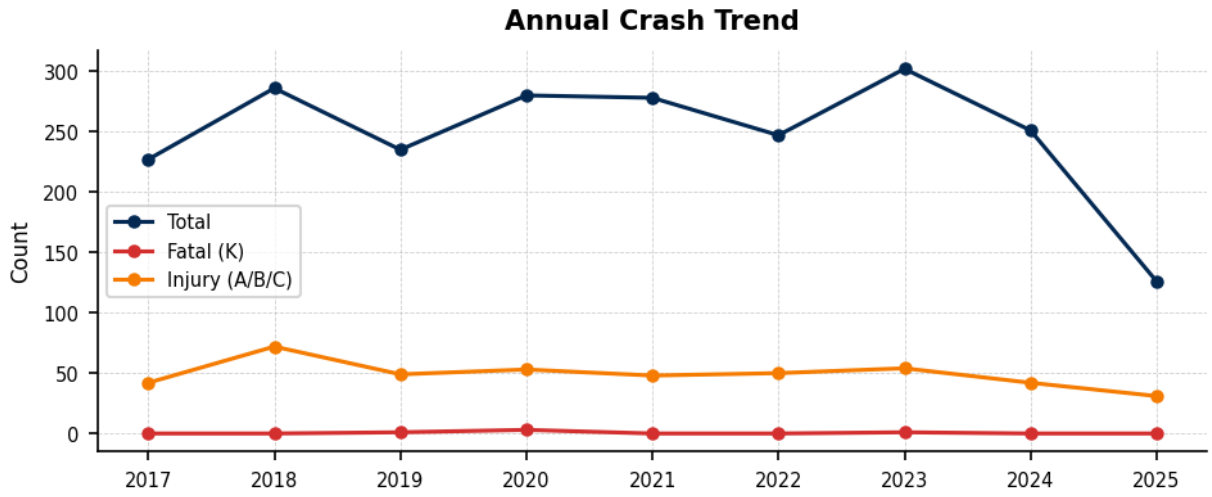
Chapter 3 — Crash Data Analysis

3.1 KABCO Severity Distribution

KABCO	Label	Count	Percent
K	Fatal	5	0.2%
A	Serious Injury	57	2.6%
B	Moderate Injury	309	13.8%
C	Minor Injury	75	3.4%
O	Property Damage Only	1,786	80.0%



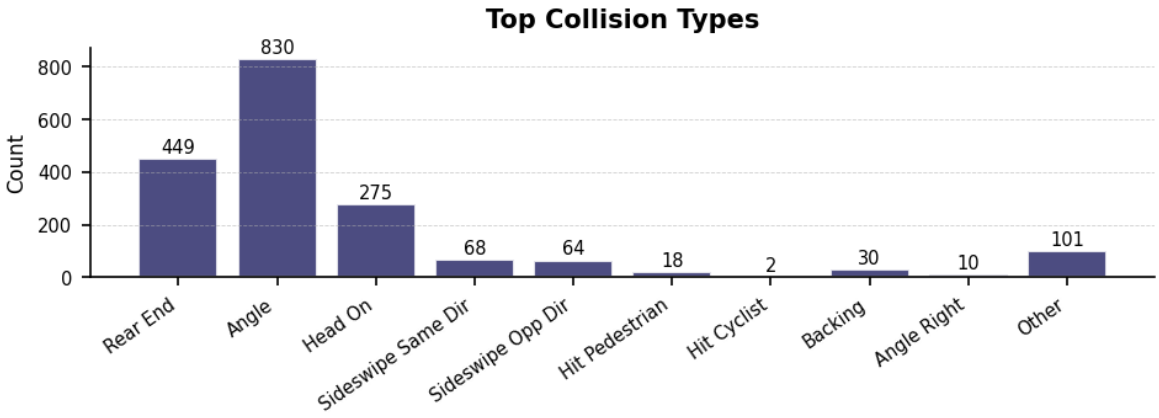
3.2 Year-over-Year Crash Trend



Year	Total	Fatal	Injury	PDO
2017	227	0	42	185
2018	286	0	72	214
2019	235	1	49	185
2020	280	3	53	224
2021	278	0	48	230
2022	247	0	50	197
2023	302	1	54	247
2024	251	0	42	209
2025	126	0	31	95

3.3 Collision Type Breakdown

Collision Type	Count	Percent
Rear End	449	24.3%
Angle	830	44.9%
Head On	275	14.9%
Sideswipe Same Dir	68	3.7%
Sideswipe Opp Dir	64	3.5%
Hit Pedestrian	18	1.0%
Hit Cyclist	2	0.1%
Backing	30	1.6%

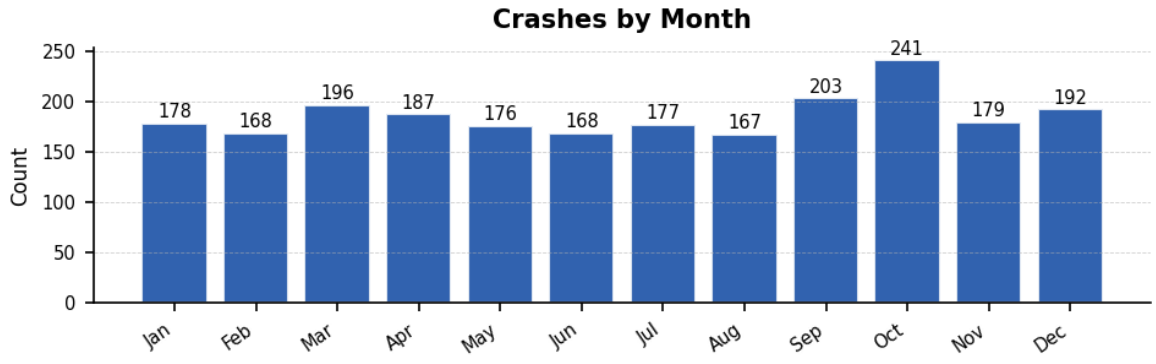


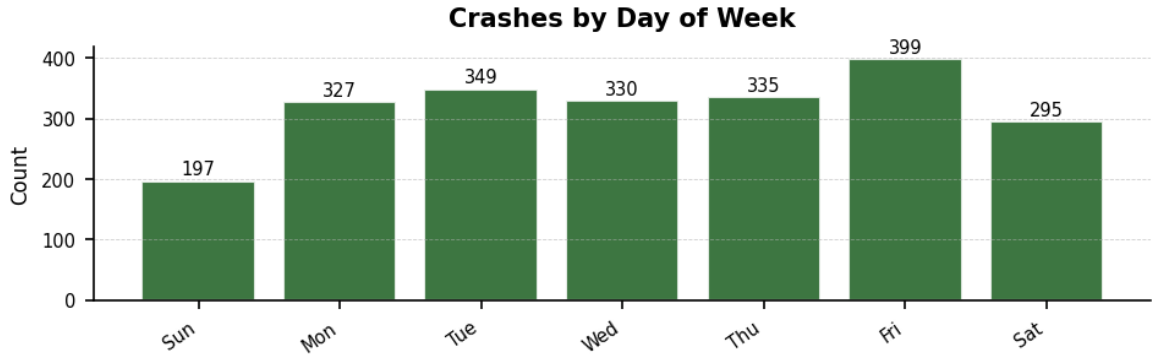
3.4 Vulnerable Road Users (VRU)

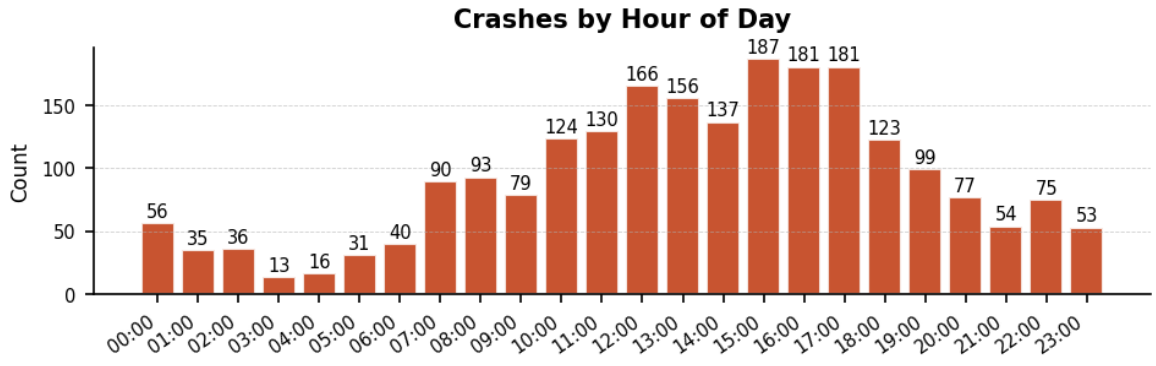
VRU Type	Total Crashes	Fatal	Serious Injury
Pedestrian	18	2	6
Bicycle	12	0	5

Bicycle counts differ between data sources: 2 crashes coded as 'Hit Cyclist' vs 12 flagged as Bicycle-involved (10 crash difference, 83.3%).

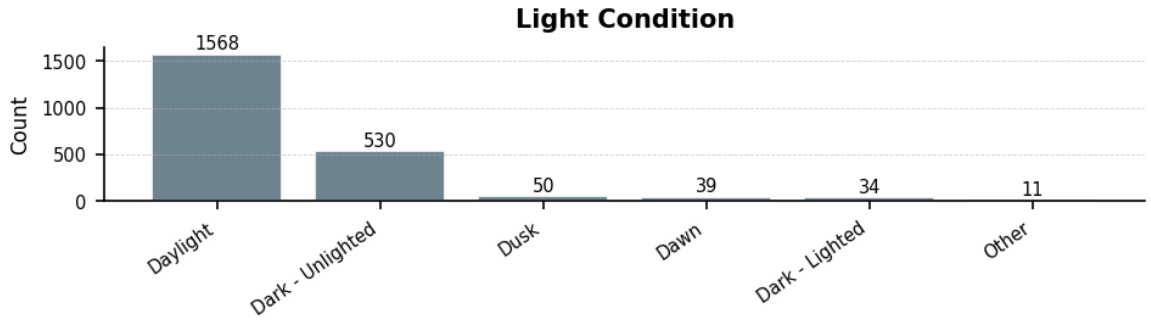
3.5 Temporal Patterns

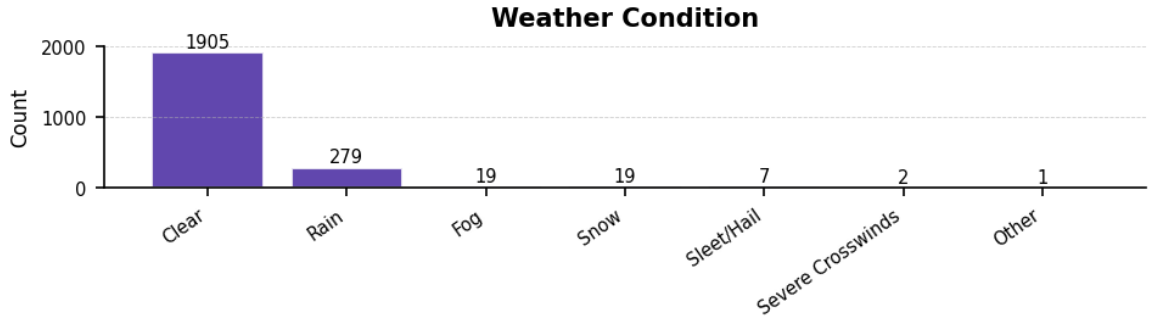


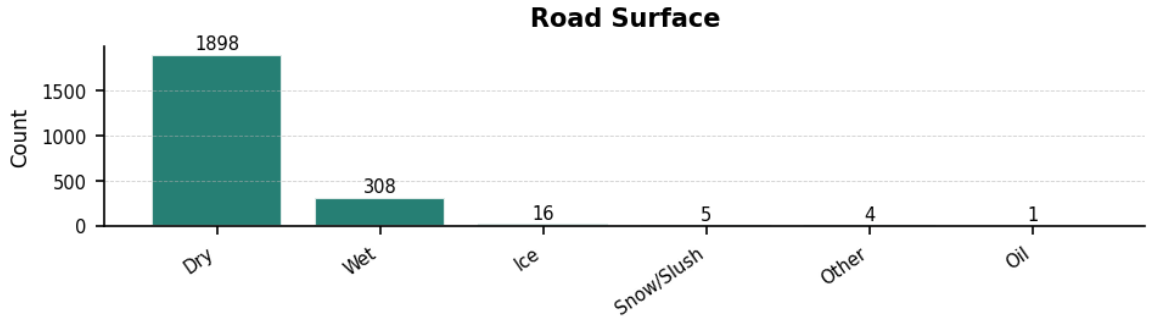




3.6 Environmental Conditions



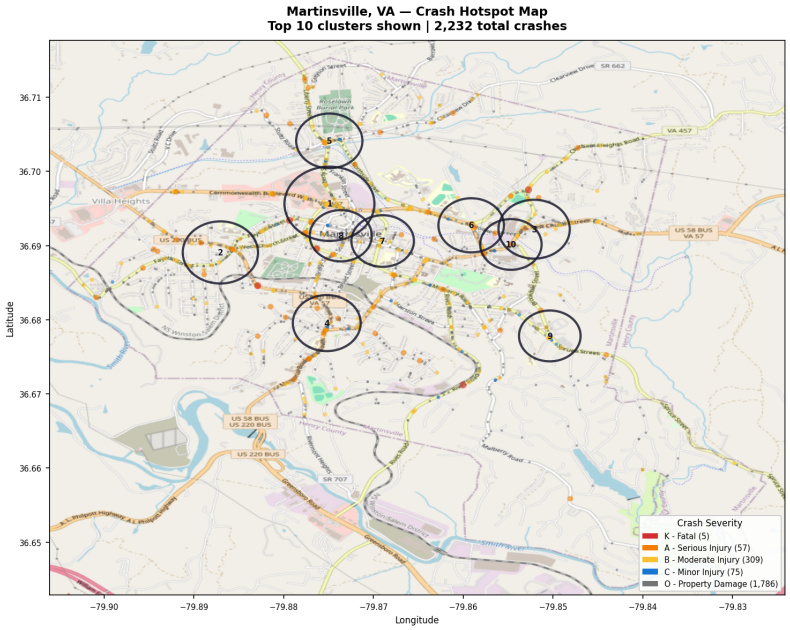




Chapter 4 — Network Screening (High-Injury Network)

The locations below constitute City of Martinsville's High Injury Network (HIN) — the highest-severity crash clusters on locally-maintained roads, identified through spatial network screening. These 10 locations account for 691 crashes and 17 fatal or serious injuries. All locations are ranked by EPDO score per FHWA methodology.

DBSCAN clustering: radius = 100m, minimum crashes per cluster = 5



4.1 Top High-Injury Locations (EPDO Ranked)

EPDO weights: K=540, A=30, B=10, C=5, O=1 (FHWA Equivalent Property Damage Only scoring)

Rank	EPDO	Crashes	Fatal	Serious	Top Route	Lat	Lon
1	648	26	1	1	CHATHAM HEIGHTS RD	36.69713	-79.85311
2	600	10	1	1	MEMORIAL BLVD	36.68472	-79.88310
3	596	17	1	0	MARKET ST	36.68968	-79.87645
4	561	9	1	0	FAYETTE ST	36.69358	-79.87900
5	470	201	0	0	COMMONWEALTH BLVD	36.69564	-79.87490
6	396	119	0	4	MEMORIAL BLVD	36.68908	-79.88704
7	260	78	0	4	MEMORIAL BLVD	36.67955	-79.87520
8	241	97	0	1	CHURCH ST	36.69222	-79.85210
9	195	69	0	1	CLEARVIEW DRIVE	36.70413	-79.87491
10	179	65	0	1	COMMONWEALTH BLVD	36.69274	-79.85911

Chapter 5 — Recommended Safety Countermeasures

Countermeasures selected from FHWA Proven Safety Countermeasures and VDOT VHSIP pre-approved treatment list.
CMF = Crash Modification Factor (e.g. 0.55 = expected 45% crash reduction at treated location)

Hotspot #1 — CHATHAM HEIGHTS RD (26 crashes, 0 ped, 0 bike, 0 night)

Road Safety Audit (CMF = 0.850)
Cost range: $15,000 – $35,000 | FHWA ref: FHWA-SA-14-004

Hotspot #2 — MEMORIAL BLVD (10 crashes, 0 ped, 0 bike, 0 night)

High-Friction Surface Treatment (HFST) (CMF = 0.520)
Cost range: $40,000 – $120,000 | FHWA ref: FHWA-SA-15-038
Reduces wet-weather and speed-related crashes. VDOT pre-approved.

Hotspot #3 — MARKET ST (17 crashes, 2 ped, 0 bike, 0 night)

Pedestrian Hybrid Beacon (PHB) (CMF = 0.550)
Cost range: $75,000 – $120,000 | FHWA ref: FHWA-SA-12-003
Reduces pedestrian crashes at marked crossings. VDOT pre-approved.

Hotspot #4 — FAYETTE ST (9 crashes, 1 ped, 0 bike, 0 night)

HAWK Pedestrian Signal (CMF = 0.560)
Cost range: $80,000 – $150,000 | FHWA ref: FHWA-SA-09-028

Hotspot #5 — COMMONWEALTH BLVD (201 crashes, 0 ped, 0 bike, 0 night)

Intersection Lighting (CMF = 0.470)
Cost range: $30,000 – $80,000 | FHWA ref: FHWA-SA-11-009
Targeted intersection lighting. Higher CMF than general roadway lighting.

Chapter 6 — Benefit-Cost Analysis

Methodology

BCR = (Annual Crash Cost × CMF Reduction × Design Life) / Countermeasure Cost. Crash costs from VDOT FY2024 unit cost memo. Design life = 10 years. Treatment influence area = 25% of cluster crashes (FHWA guidance). BCR values are capped at 50.0 to reflect realistic project-level returns. CMF values from FHWA Crash Modification Factors Clearinghouse.

Total Crash Costs in Study Period

Metric	Value
Crashes with Cost Estimate	2,232
Total Economic Cost	$106,150,200
Total Comprehensive Cost	$195,409,200
Avg Economic Cost per Crash	$47,558

Preliminary BCR by Hotspot Location

BCR > 1.0 = positive return. VDOT typically requires BCR ≥ 1.5 for VHSIP eligibility.

Rank	Location	Crashes	Treatment	CMF	Cost Est.	BCR (10yr)
1	CHATHAM HEIGHTS RD	26	Road Safety Audit	0.850	$25,000	28.0
2	MEMORIAL BLVD	10	High-Friction Surface Treatm	0.520	$80,000	25.3
3	MARKET ST	17	Pedestrian Hybrid Beacon (PH	0.550	$97,500	19.7
4	FAYETTE ST	9	HAWK Pedestrian Signal	0.560	$115,000	15.4
5	COMMONWEALTH BLVD	201	Intersection Lighting	0.470	$55,000	50.0

Note: BCR estimates are preliminary and capped at 50.0 to reflect realistic project-level returns. High cluster crash counts reflect corridor-wide patterns; treatment influence area is estimated at 25% of cluster per FHWA guidance. Final BCR requires field verification and contractor cost quotes. Costs based on VDOT FY2024 standard cost estimates.

Chapter 7 — Next Steps and Funding Pathway

Step 1: Submit VHSIP Application
Complete the Virginia Highway Safety Improvement Program application via the VDOT SMART Portal. Attach this report as supporting documentation. Coordinate with the 2 - Salem Safety Office for current deadlines and project scoping assistance.

Step 2: Apply for SS4A Planning or Implementation Grant
FY2026 SS4A application deadline: May 26, 2026. This report provides the crash data analysis required for the application. CEJST tier: HIGH. The jurisdiction qualifies for SS4A priority consideration under the underserved communities criterion.

Step 3: Engage VDOT District Safety Office
Contact the 2 - Salem Safety Engineer to review findings and confirm project eligibility. VDOT staff can assist with SMART Portal submission and project scoping.

Step 4: Schedule Quarterly Data Refresh
AtlasSafe will automatically update crash data as new VDOT TREDS releases become available. A revised evidence report will be generated each quarter to track progress and identify emerging hotspots.

Step 5: Community Engagement (SS4A Requirement)
For SS4A applications, jurisdictions must conduct public engagement to identify community safety concerns. This report provides the data foundation; community engagement sessions should reference the hotspot locations identified in Chapter 4.

About AtlasSafe
AtlasSafe is a road safety analytics platform by AtlasGeo Technologies. Crash data is sourced from Virginia TREDS (VDOT). Analysis uses DBSCAN spatial clustering (PostGIS), FHWA EPDO weighting, and VDOT 2024 crash cost estimates. For questions: support@atlasgeo.ai