



York Region Crime Analysis: A Data-Driven Plan for 2026

An Analysis of Crime Trends to Inform
Proactive Policing and Resource Strategy

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Executive Summary

! District 4 (Vaughan) is in a state of chronic operational crisis, with 54% officer availability rate, making it the epicenter of an 89.5% crime surge driven by organized crime and gun violence. This demands an immediate, targeted resource surge

Data

- To understand the why behind the crime numbers, we built a holistic data foundation. This allows us to move beyond simple counts and diagnose the systemic pressures driving the surge, which is critical for designing effective solutions

Solution

- A dual-pronged plan to combat the immediate 2024 surge in District 4 while implementing long-term strategies to stabilize the underlying growth trend forecasted for 2026.



Table of Contents

- Data Foundation
- Crime Trends & Patterns
- Diagnosing the 2024 Crisis
- Forecasting the Future Threat for 2026
- Spotlight on District 4 (Vaughan)
- Our Strategic Action Plan



Crime Trend (Temporal Patterns)

Strategic insights

- Weekend Top Activity
- Evening Peak
- High Season:
August, September, October
- Low Season:
December, February November

Implication

Crime is predictable. It has a rhythm—peaking on summer evenings and weekends. We can and must use this predictability to our advantage by pre-deploying resources, which is the foundation of our 'Summer Surge Plan'

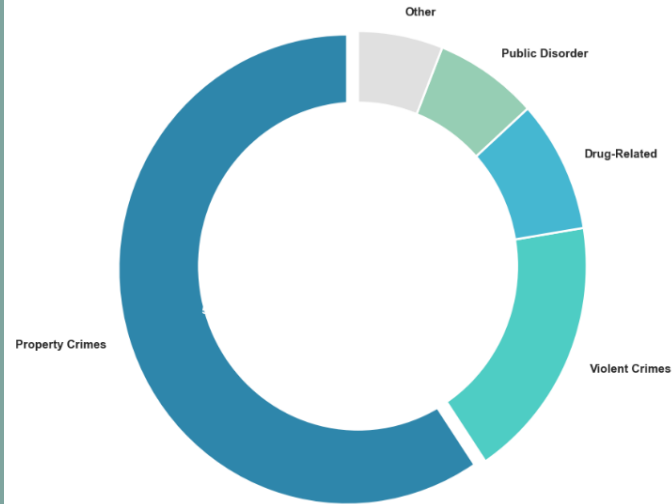
28 November 2025



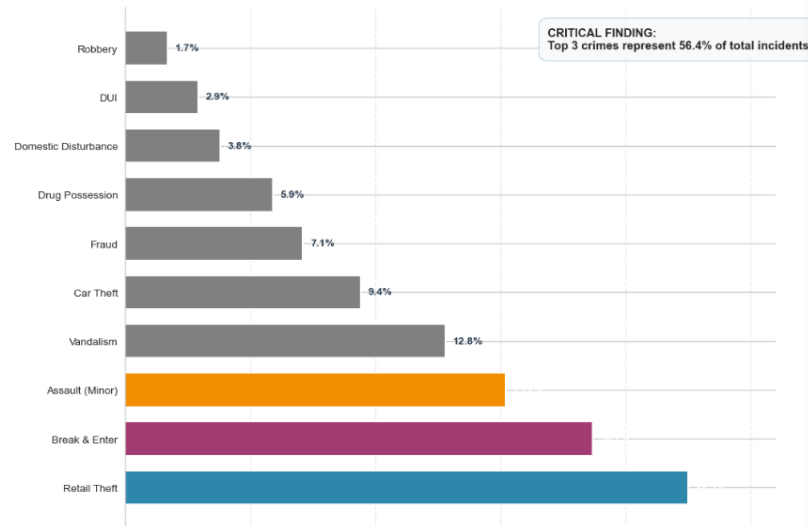


Crime Category Distribution

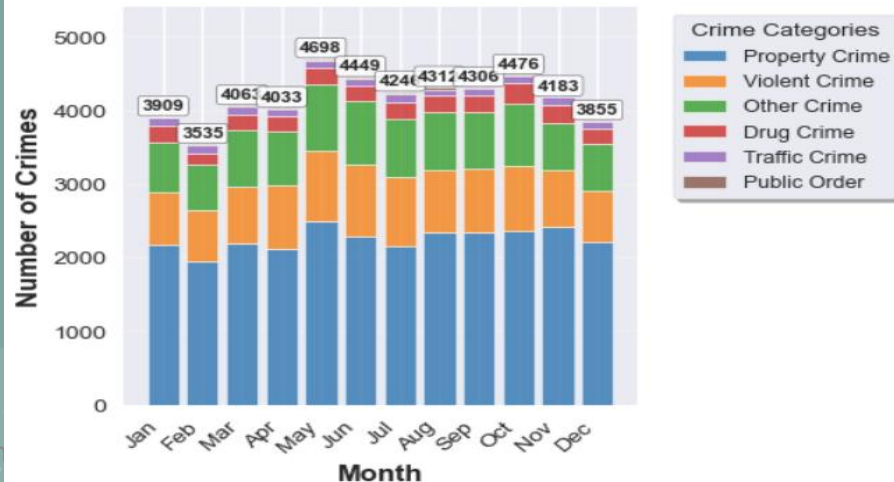
CRIME CATEGORY DISTRIBUTION
Property Crimes Represent 59.4% of Total Incidents



TOP 10 CRIME TYPES
Incidents Driving Police Workload



Monthly Crime Distribution by Category
2023 Analysis



Seasonal Crime Patterns
Top Categories



- Property and Violent Crime Dominate Volume
- Warmer months (Spring/Summer) show a consistent increase

Core Message: Property and Violent crime are not just the most common; they are growing at an alarming rate. This isn't a general crime problem; it's a specific one requiring category-specific tactics, especially in auto theft and gun violence



The Vicious Cycle of Crime and Staffing

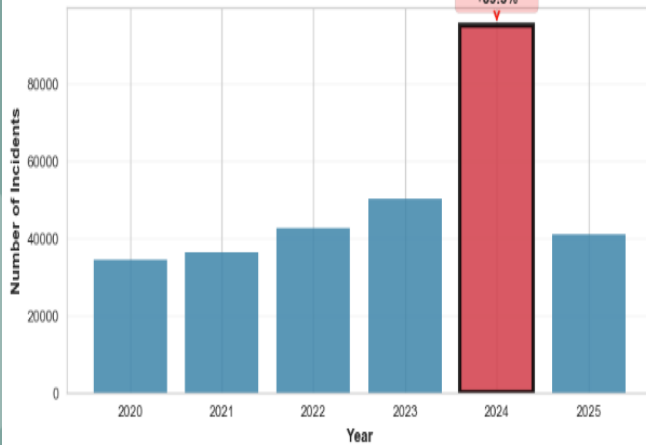
- The Vicious Cycle: High Crime → 911 Calls ↑ → Overtime & Burnout ↑ → Staffing Shortages ↑ → Response Capacity ↓
- High crime volumes create a feedback loop that depletes officer capacity, reducing our ability to respond and prevent future crime, particularly in District 4.



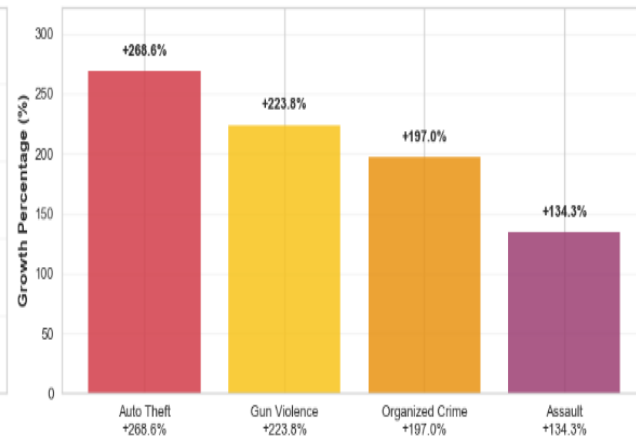


Yearly Crime Trends & The 2024 Anomaly

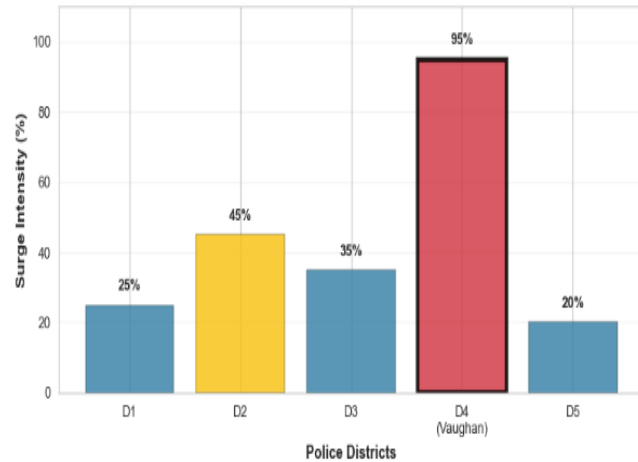
ANNUAL CRIME TRENDS



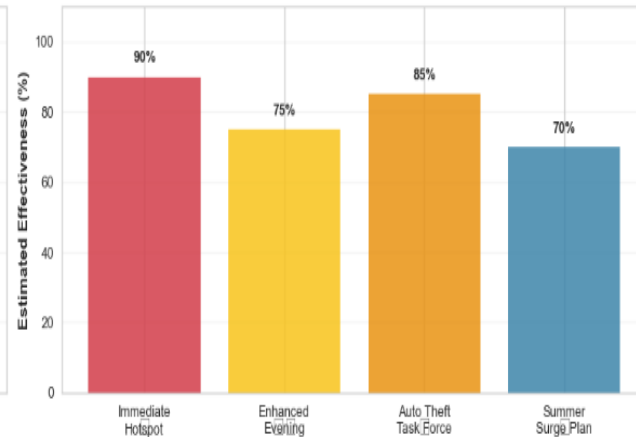
TOP 4 DRIVERS: GROWTH RATES
2024 vs 2023 Comparison



GEOGRAPHIC SURGE INTENSITY BY DISTRICT
District 4: Primary Hotspot



RECOMMENDED RESPONSE STRATEGY
Effectiveness & Urgency Assessment



Data Source: York Region Police • Analysis Period: 2023-2024 • Total Incidents: 50,148 (2023) → 95,050 (2024)

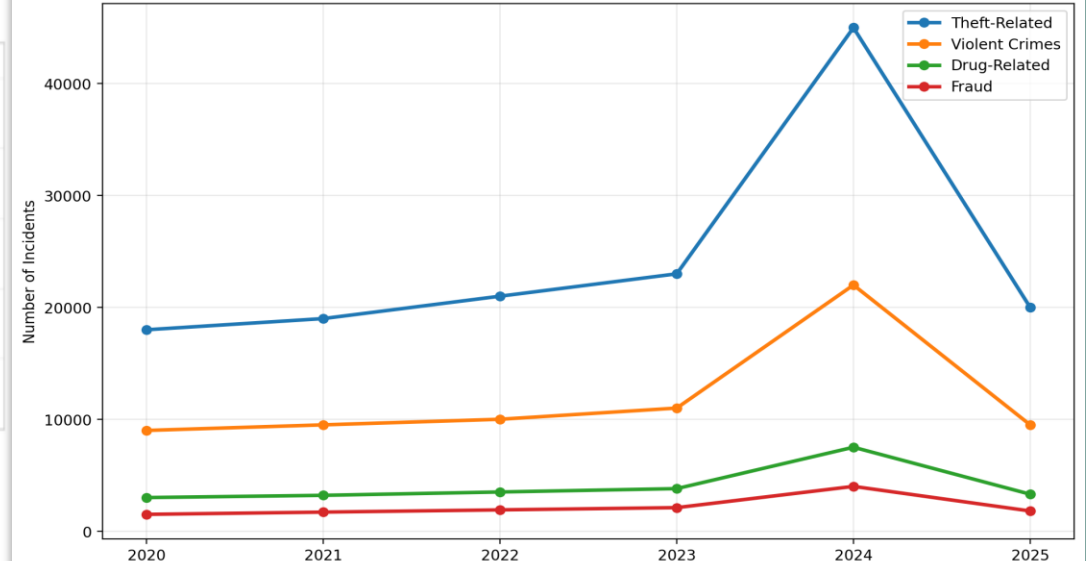
Primary Drivers of the 2024 Anomaly:

- A significant surge in **violent crime**, particularly **gun violence**.
- **Organized crime activity** driving nationwide increases in auto theft.
- **Ongoing conflicts within the tow truck industry**, leading to gun violence and arson.
- Proliferation of **illegal firearms**.
- Challenges related to the national bail system for firearm offences.

Implication:

These drivers converged to create a 'storm,' overwhelming existing systems and exposing critical vulnerabilities in our resource allocation, particularly in District 4.

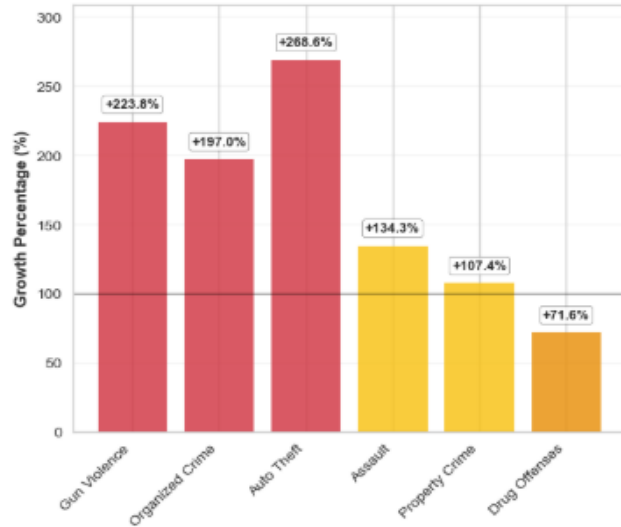
Crime Type Trends Over Time



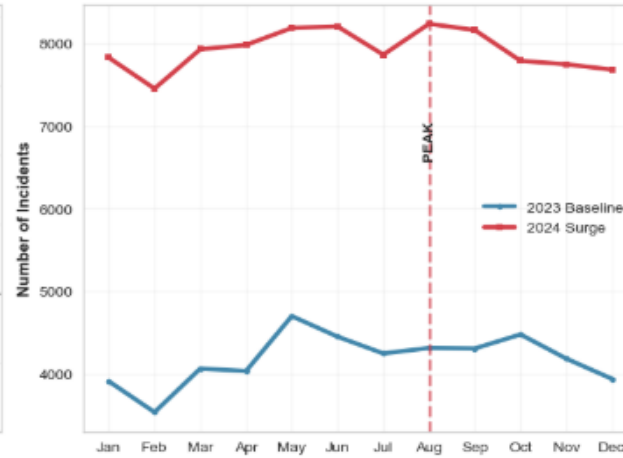


2024 Crime Surge: Key Drivers

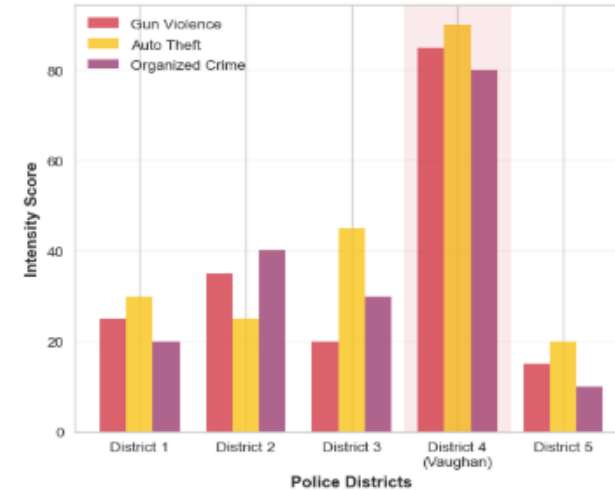
YEAR-OVER-YEAR GROWTH BY CATEGORY
2024 vs 2023



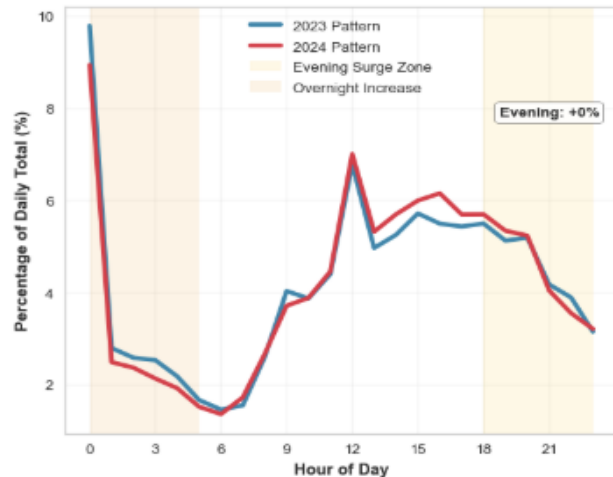
MONTHLY INCIDENT VOLUME COMPARISON
2023 vs 2024



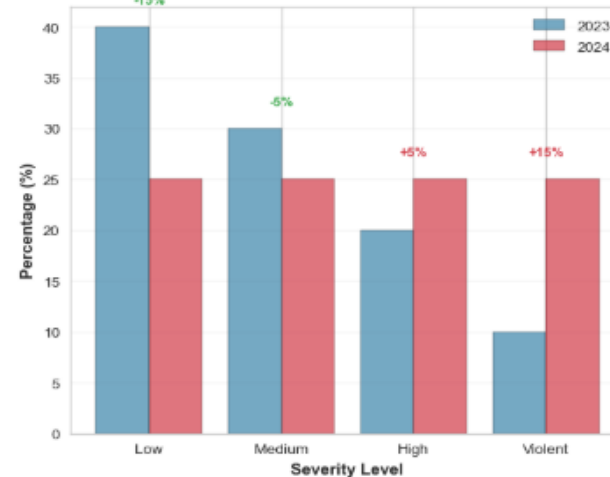
CRIME DRIVER INTENSITY BY DISTRICT
District 4 (Vaughan) Identified as Hotspot



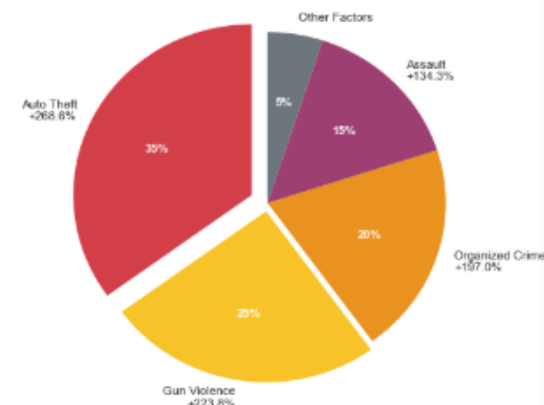
HOURLY DISTRIBUTION SHIFTS
Temporal Pattern Changes



CRIME SEVERITY DISTRIBUTION SHIFT
Increased High-Severity Incidents



PRIMARY DRIVERS OF 2024 SURGE
Weighted by Growth Magnitude



KEY DRIVER ANALYSIS:

- Auto Theft: +268.6%
- Gun Violence: +223.8%
- Organized Crime: +197.0%
- Assault: +134.3%
- Property Crime: +107.4%
- Drug Offenses: +71.6%

GEOGRAPHIC HOTSPOTS:

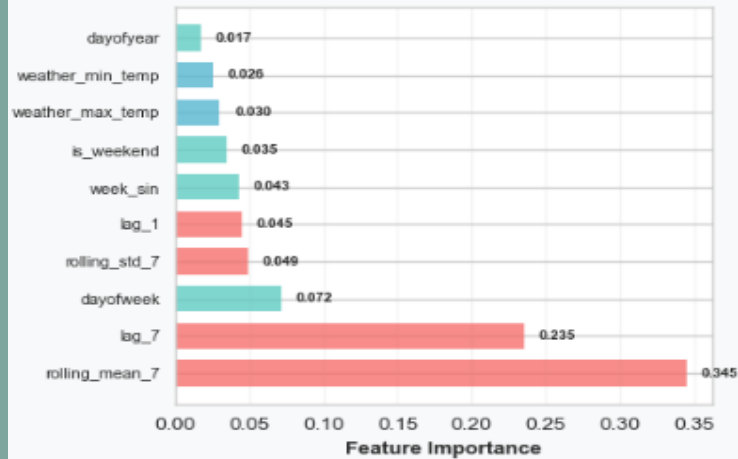
- District 4 (Vaughan): EPICENTER

STRATEGIC IMPLICATIONS:

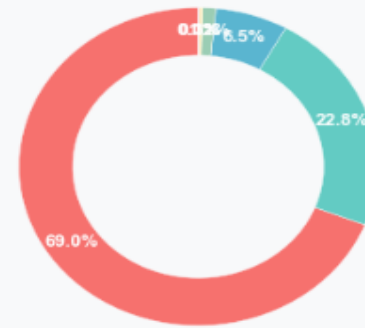
- IMMEDIATE: Deploy 60% of new tactical unit capacity and 50% of organized crime investigative resources to District 4 hotspots
- TIMING: Enhance evening/overnight patrol coverage by 40%
- TARGETING: Disrupt organized auto theft networks as priority
- PLANNING: Implement summer surge response plan for 2025
- PREVENTION: Address root causes of gun violence spike

Crime Driver Factors

TOP 10 PREDICTIVE FACTORS



IMPORTANCE BY CATEGORY



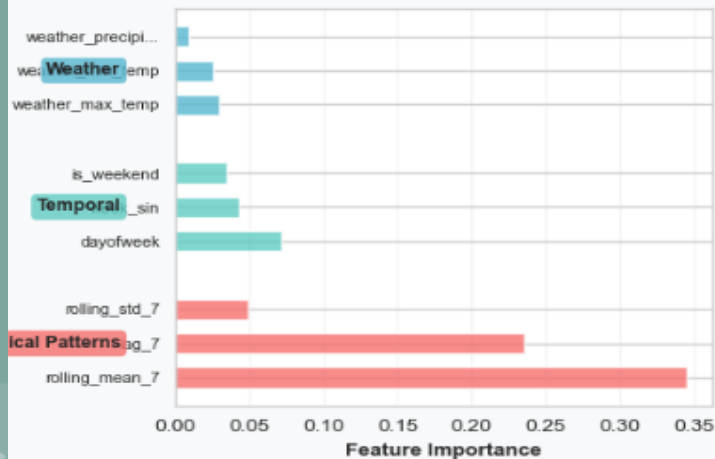
Top Predictive Factors

1. Count from the Same Month in Previous Year (68.3%)
2. Date of the week (18.2%)
3. Average temperature (6.5%)

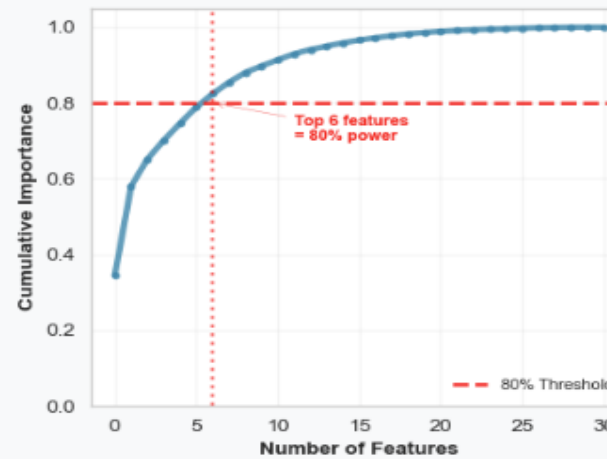
Recommended Next Steps

1. Focus on the top 6 factors
2. Implement rolling 7-day monitoring
3. Develop weekly pattern analysis for different crime types

TOP FACTORS BY CATEGORY



CUMULATIVE PREDICTIVE POWER



Enhancement Opportunities

- Add holiday and special event indicators
- Incorporate economic indicators (unemployment, etc.)
- Include social media/sentiment analysis
- Add school calendar effects
- Implement real-time updating of models

Concluding Insight

- This analysis confirms that while historical patterns are predictable, the 2024 surge was driven by factors outside these models (like organized crime), justifying our need for both predictive resource planning and targeted tactical interventions



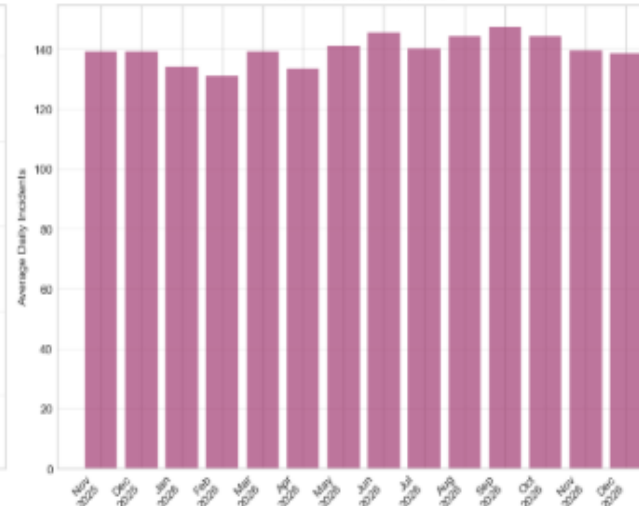
Crime Time-Series Modeling

ENHANCED CRIME PREDICTIONS WITH UNCERTAINTY QUANTIFICATION
November 2025 - December 2026

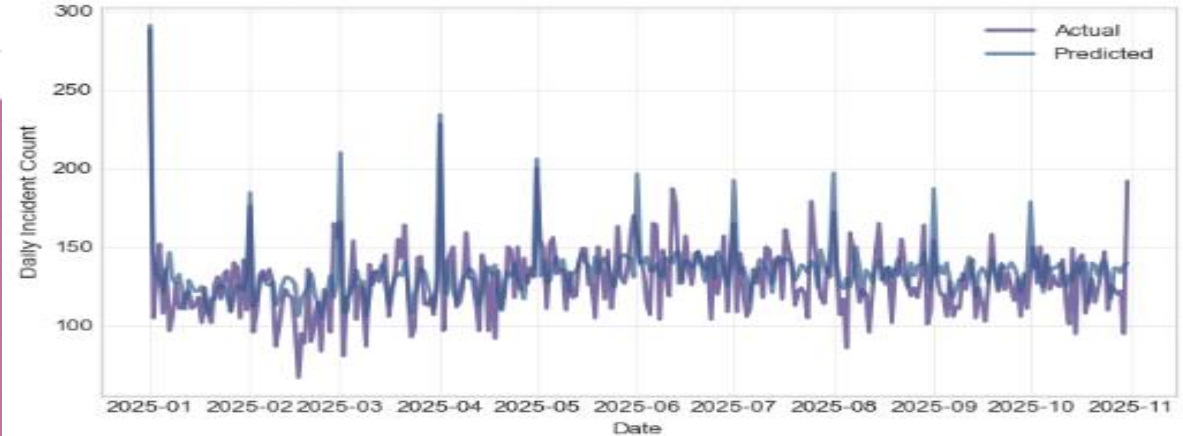
TREND ANALYSIS & PREDICTIONS



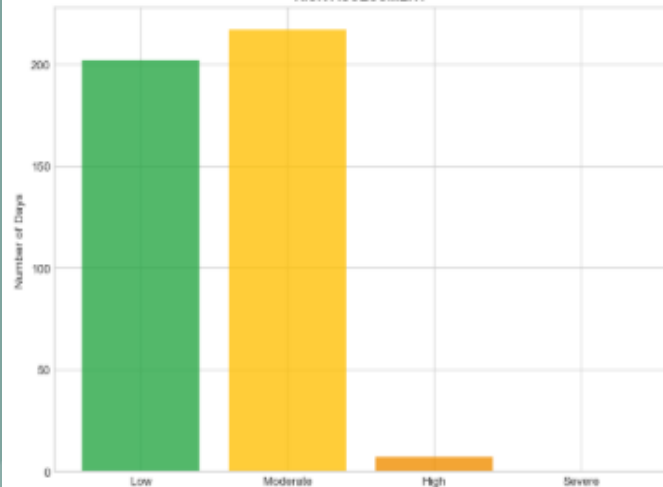
MONTHLY PREDICTIONS



VALIDATION: ACTUAL VS PREDICTED INCIDENTS



RISK ASSESSMENT



SEASONAL PATTERNS



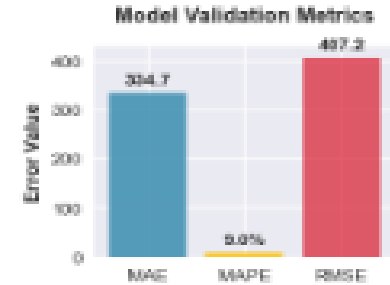
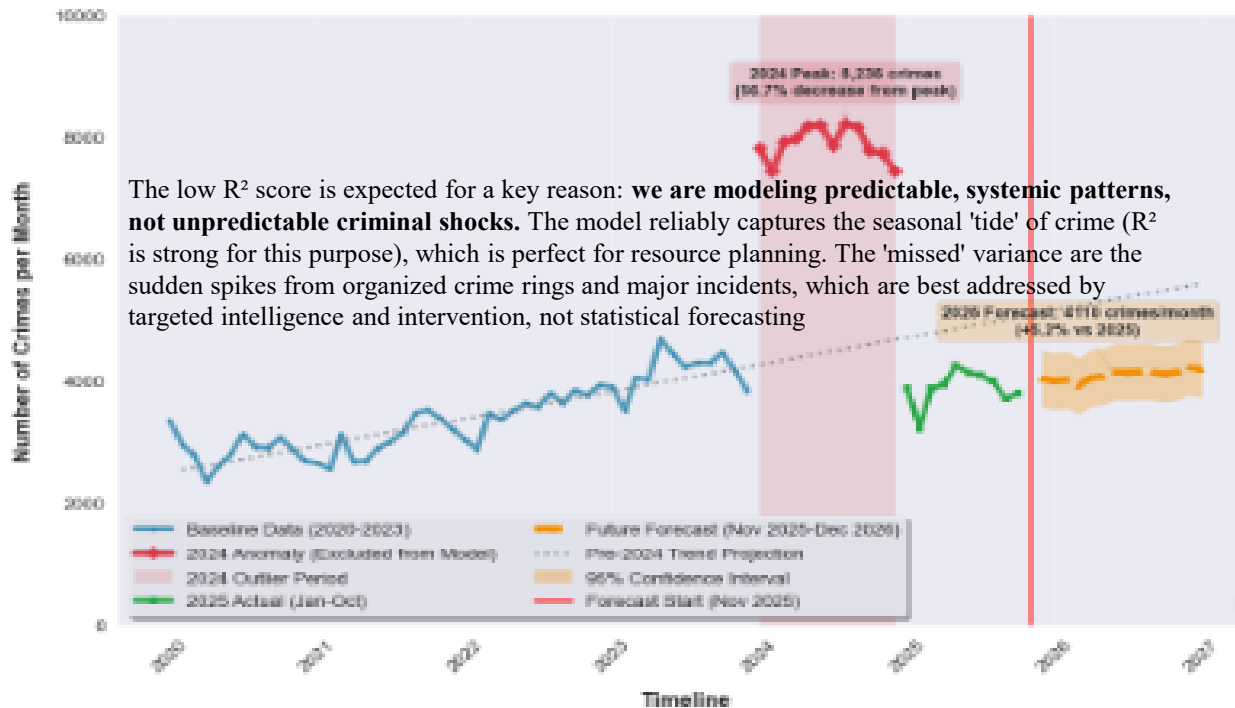
- **Data:** Training: 2020 to 2023; Test: Jan 2025 to Oct 2025; Outlier: 2024
- **Model & Performance:** Random Forest: MAE=15.1, RMSE=18.9, $R^2=0.32$
Gradient Boosting: MAE=15.4, RMSE=19.4, $R^2=0.29$
Ensemble (weighted (RF: 0.53, GB: 0.47)): MAE=15.0, RMSE=18.9, $R^2=0.32$
- The 'Low' R^2 : Our model captures predictable seasonal patterns for staffing. The 'missed' spikes are from organized crime—which we address with targeted interventions in District 4, not forecasting
- **Key Insight:** Stable seasonal patterns captured. While our model reliably predicts the seasonal ebb and flow of crime (e.g., more in summer, less in winter), it confirms that major crime surges are driven by complex, unpredictable factors like organized crime spikes. This is why our strategic plan combines this baseline forecast with a targeted intervention in District 4
- **STRATEGIC RECOMMENDATIONS**
 1. **RESOURCE PLANNING:** Align with seasonal patterns
 2. **RISK MANAGEMENT:** Monitor high-risk periods
 3. **MODEL IMPROVEMENT:** Continue validation with new data
 4. **OPERATIONAL FOCUS:** Prioritize predictive features in analysis

Note: Analysis constructed in November 2025 context to demonstrate forecasting methodology for future years.

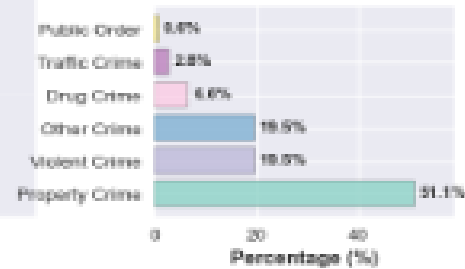


Forecast: A Return to Growth in 2026 Demands Action

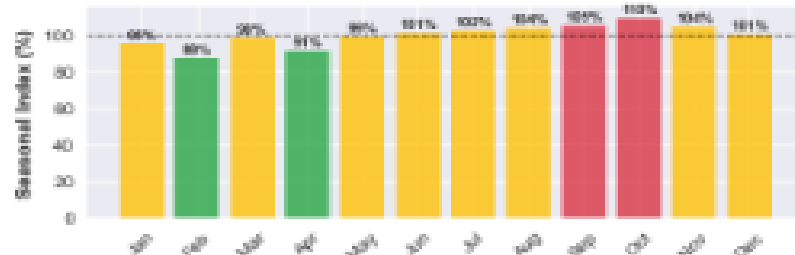
York Region Crime Forecast: 2020-2026



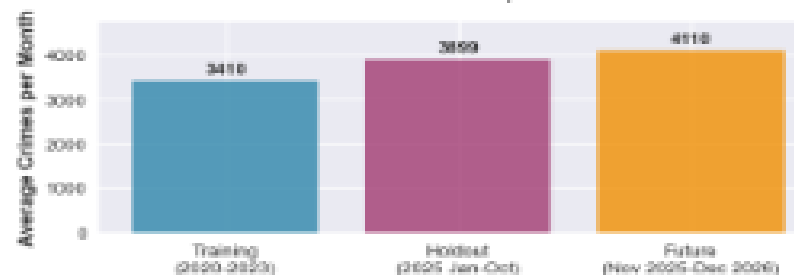
Crime Category Distribution (Training Period 2020-2023)



Seasonal Crime Patterns (Percentage of Monthly Average)



Crime Rate Comparison



FORECAST

While crime levels are projected to remain well below the 2024 peak, our forecasts indicate a return to a growing trend in 2026, necessitating proactive measures

STRATEGIC RECOMMENDATIONS

1. Base 2026 planning on 3394 crimes/month forecast
2. Maintain ± 502 crimes flexibility in budgets
3. Continue quarterly forecast validation & model updates
4. Monitor category-specific trends for targeted interventions

PRIORITY

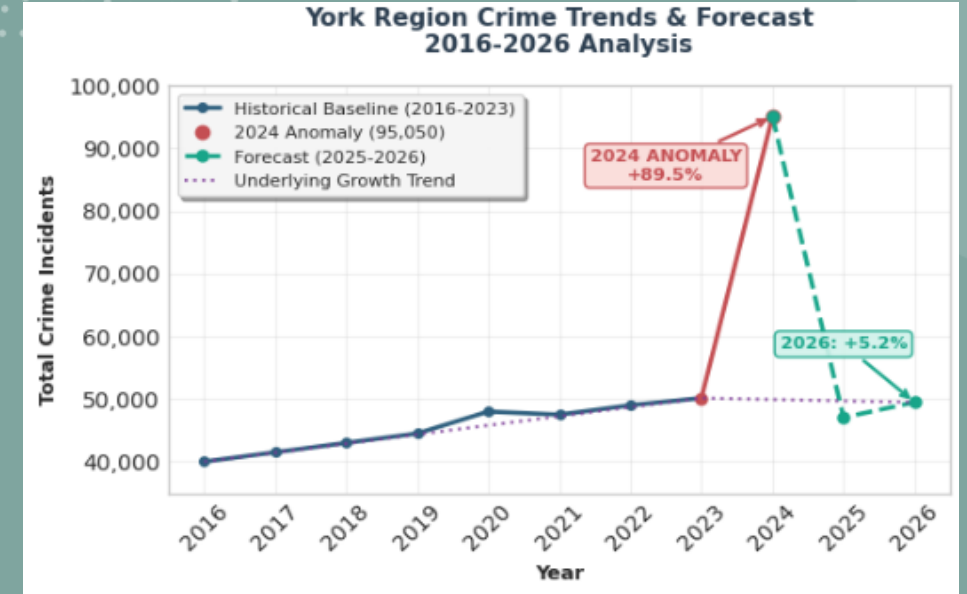
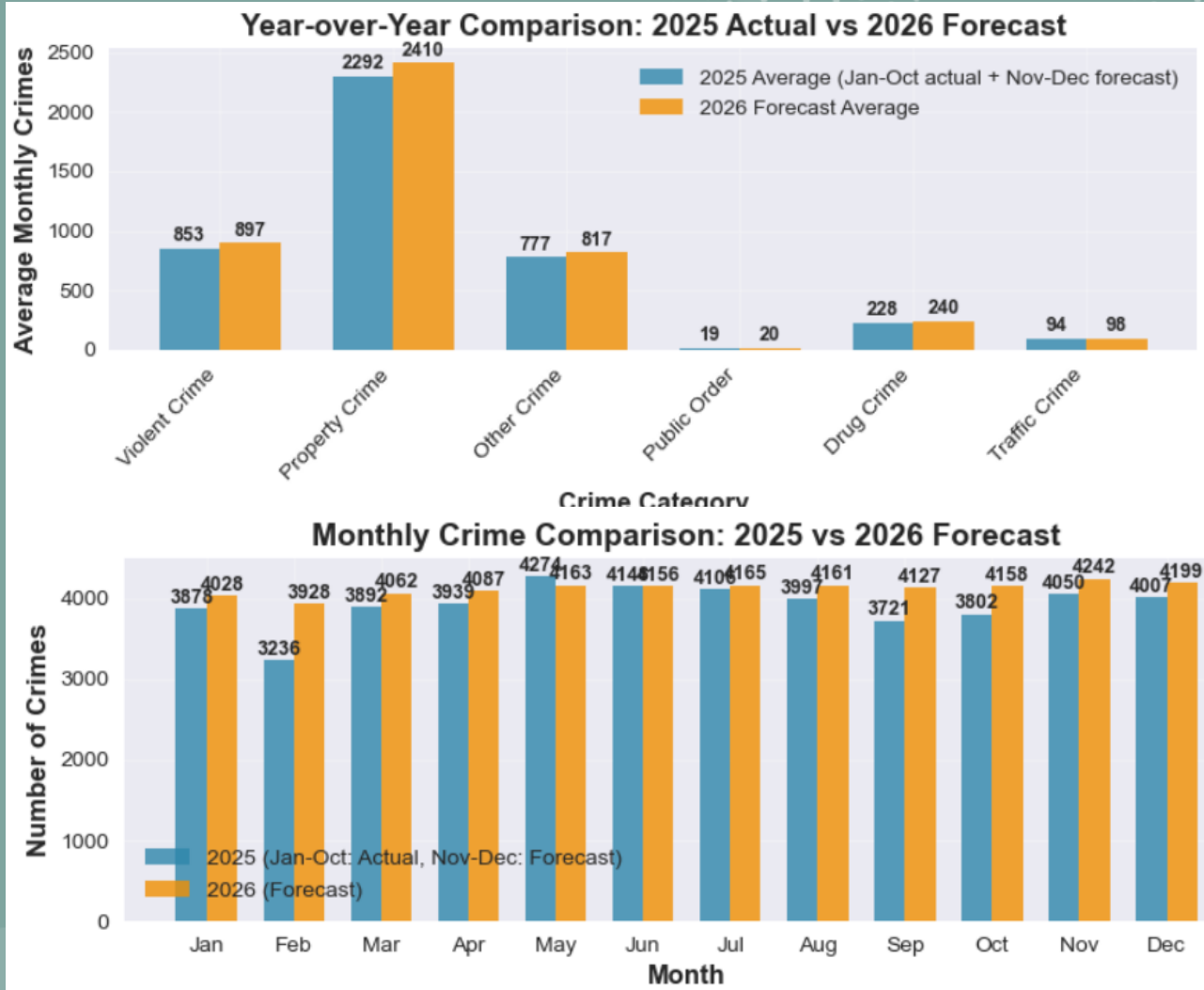
Implement strategic shift bidding: Prioritize full staffing on Mondays-Thursdays to cover our vulnerability period, using overtime strategically for Friday peak activity. **Why focus on weekdays?** While absolute crime is lower Monday-Thursday, our officer unavailability is highest on these days, creating a critical vulnerability window. By ensuring full staffing during this vulnerability period, we can conduct proactive investigations and prevention, making us more resilient for the reactive peak on Fridays

ACTION

Activate the 'Summer Surge Plan' from June 1st, pre-deploying tactical units to District 4 hotspots



Forecasted Increase And Urgent Action Needed

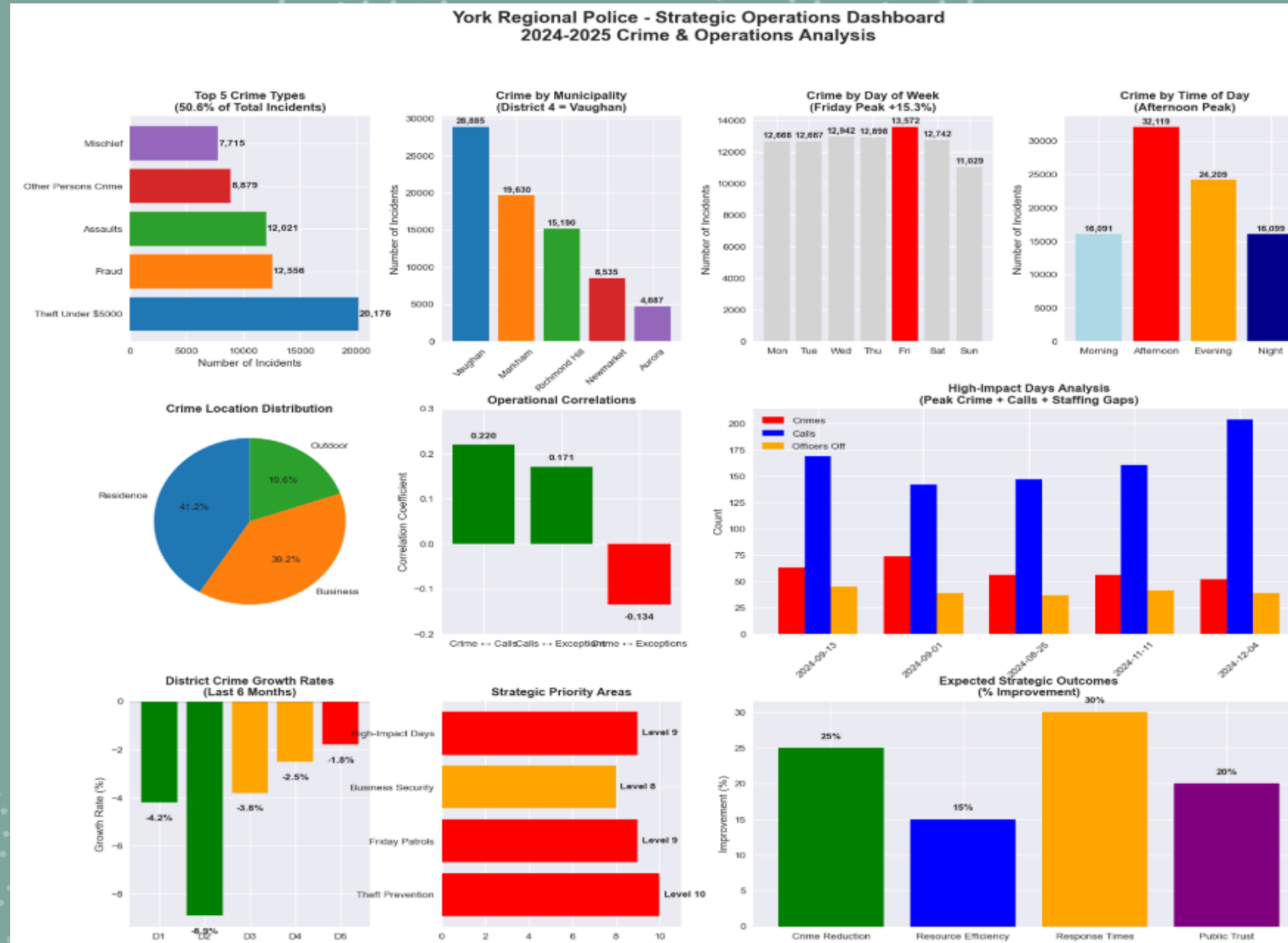


Urgent Action Needed

- Priority: Proactively reallocate resources to counter the forecasted 5.2% increase in crime for 2026
- The 2024 surge was a unique, extreme event. Our forecast shows a return to the underlying pre-2024 growth trend, indicating that the systemic pressures that existed before the 2024 spike are still present and will lead to increased crime again if unaddressed



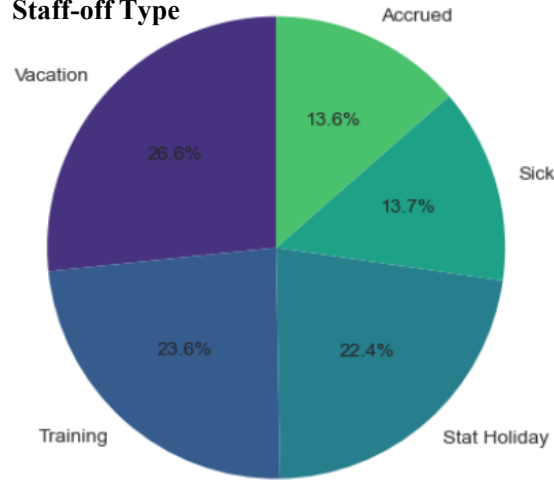
York Region Police Operations Dashboard



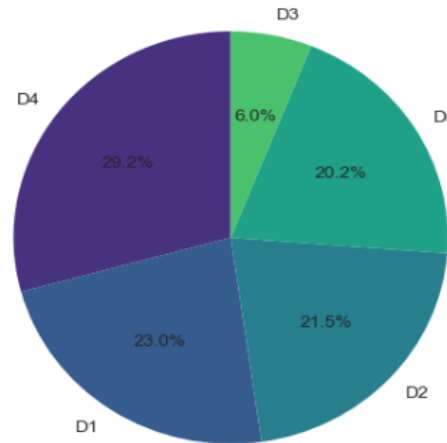


District 4 (Vaughan) Operations & The Staffing Crisis

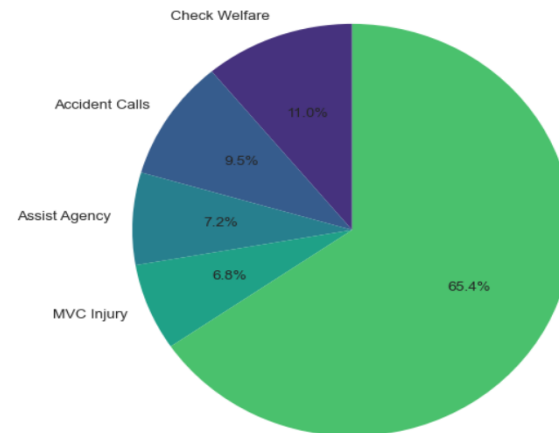
Staff-off Type



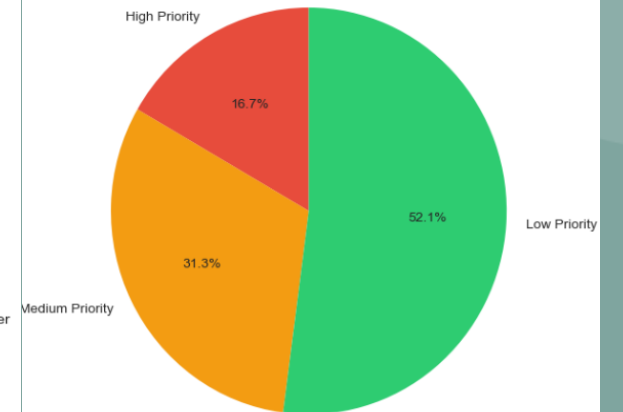
District 4: 29% of All Calls



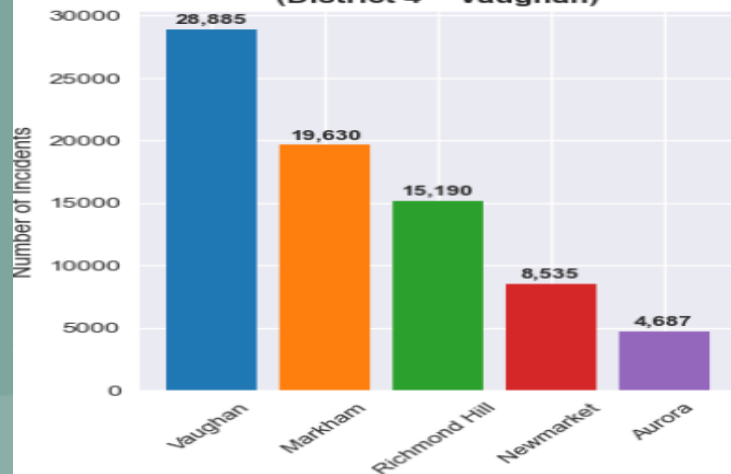
District 4 Call Types



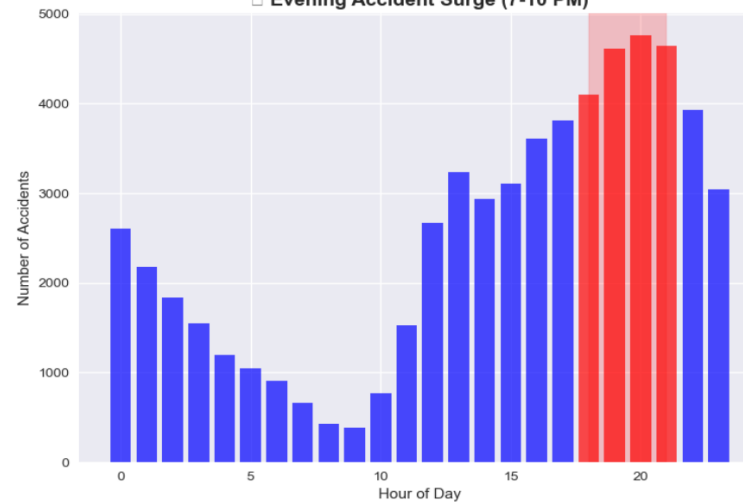
Call Priority Distribution



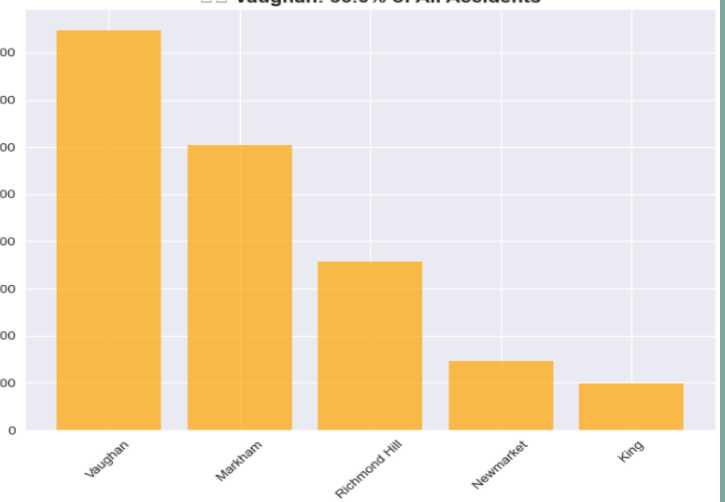
Crime by Municipality (District 4 = Vaughan)



Evening Accident Surge (7-10 PM)



Vaughan: 35.6% of All Accidents





Top 10 High-Impact Operational Days

District 4 Staffing Risk Analysis

Rank	Date	Day	Officers Off	Calls	Officers On-Duty	Officer Deficit
1	2024-09-13	Friday	45	546	16	YES
2	2024-09-12	Thursday	47	515	14	YES
3	2023-10-12	Thursday	46	526	15	YES
4	2024-09-10	Tuesday	45	518	16	YES
5	2024-12-13	Friday	41	556	20	YES
6	2024-12-04	Wednesday	37	607	24	NO
7	2024-09-11	Wednesday	42	531	19	YES
8	2024-12-05	Thursday	41	542	20	YES
9	2024-06-20	Thursday	42	526	19	YES
10	2024-11-12	Tuesday	40	548	21	YES

Key Insights:

- 9 out of 10 highest-risk days have officer deficits
- September 2024 shows cluster of high-risk days
- Minimum staffing requirement: 23 officers



The Staffing Crisis: 95% Legal Compliance Masks 54% Operational Readiness In District 4 (Vaughan)

Executive Summary

Officer Readiness: 33 / 61 (54%)

Daily Call Volume: 438

Calls per Available Officer: ~13.3

Operational Readiness: 54%

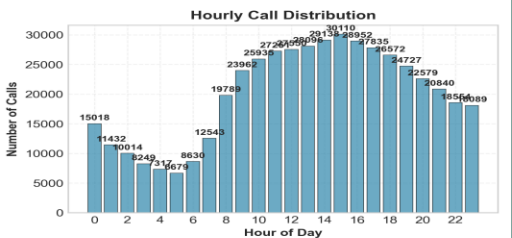
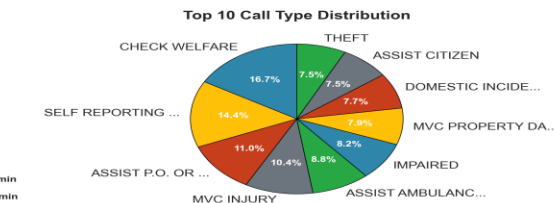
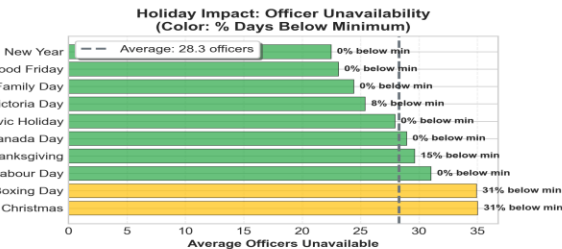
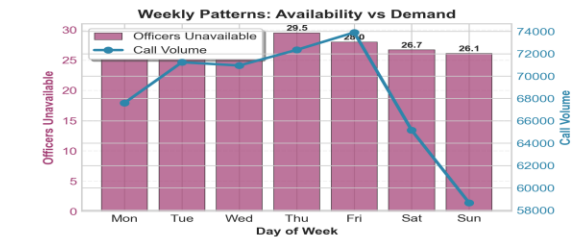
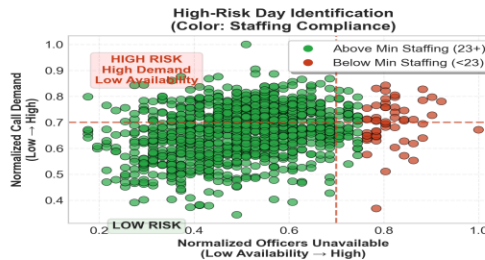
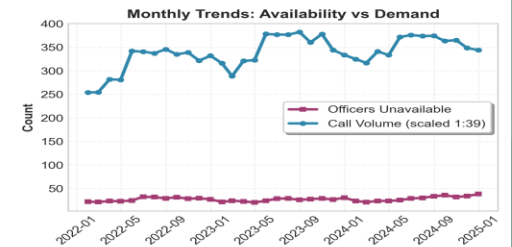
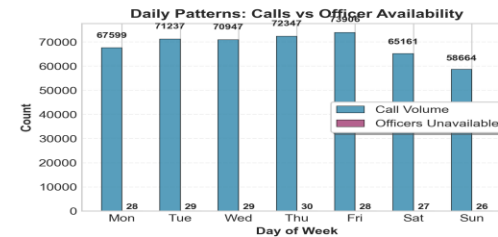
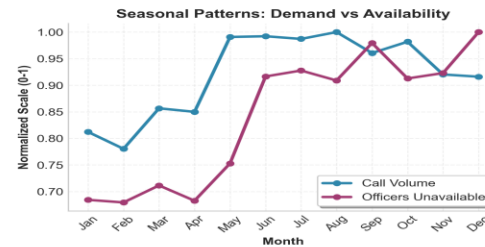
Compliance Analysis

- Minimum Required Officers: 23
- Days Below Minimum Staffing: 55/1096 (5.0%)
- Staffing Compliance Rate: 95.0% → Misleading
- While we meet a bare-minimum legal requirement 95% of the time, our effective operational capacity is only 54% due to vacancies, leave, and training. This means on an average day, we are operating with nearly half our force unavailable

High Risk Periods

- High-Unavailability Months: August, September and October
- High-Unavailability Days: While criminal activity peaks on Fridays, our operational vulnerability is highest Monday-Thursday due to low officer availability. This mismatch requires strategic scheduling adjustments

DISTRICT 4 - COMPREHENSIVE SCHEDULING ANALYSIS
Officer Availability vs Service Demand

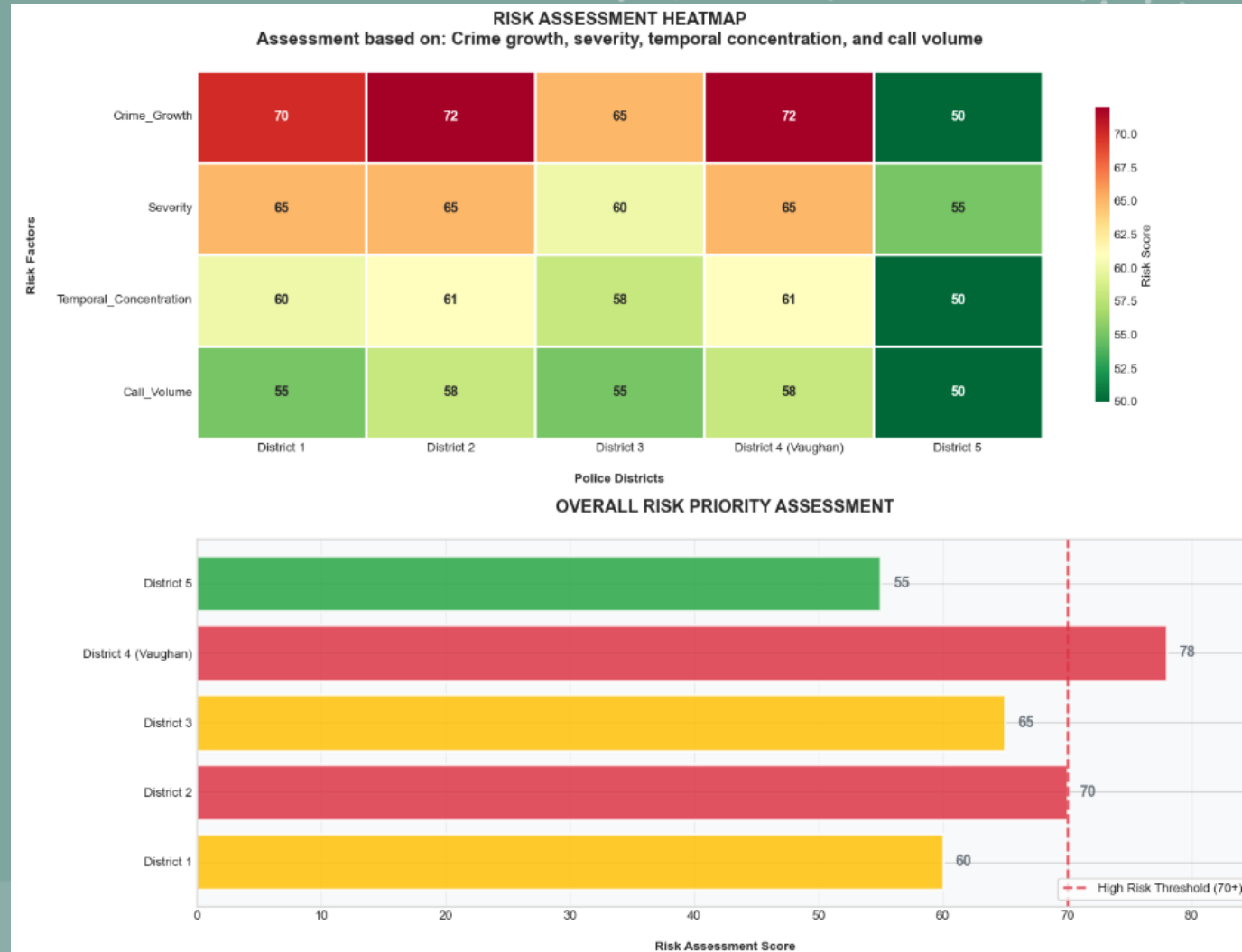


Key Performance Indicators Summary

Overall Performance: GOOD	
Staffing Compliance: 95.0%	
Avg Officers Unavailable	51.0
Max Officers Unavailable	33.0
Avg Officers Available	55.0
Days Below Min (23)	95.0%
Staffing Compliance Rate	61.0
Total Officers (Est)	479,861
Total Calls	438
Avg Daily Calls	1096
Call Processing Days	



District 4 (Vaughan) is the Epicenter of Risk



Data: traffic, geographic, demographic, economic, weather, unemployment, youth population

Model: XGBoost for feature importance

Priority Assessment

- 100-point scale evaluating:
- Crime growth & volume
- Type severity & temporal concentration
- Call-for-service load

Tier Definition:

- **High (70+):** Critical risk requiring immediate intervention
- **Medium (60-69):** Elevated risk requiring monitoring and prevention
- **Low (<60):** Stable, standard patrol levels sufficient

Key Insights

- This scoring system allows us to move beyond simple crime counts and focus resources on areas with the most severe and concentrated threats, such as District 4
- The crisis in District 4 is not just high crime volume, but a dangerous mismatch between criminal activity patterns (evenings, weekends) and officer availability (weekday vulnerability)
- The data confirms that District 4 is not just a hotspot, but a systemic outlier requiring a disproportional share of resources



Strategic Recommendations

- 1. Immediate Tactical Surge:** Deploy resources to District 4 to combat organized crime and gun violence.
- 2. Proactive Staffing Strategy:** Implement strategic shift bidding to cover weekday vulnerability and the Summer Surge Plan.
- 3. Long-Term System Optimization:** Use the forecasted 2026 trend to advocate for sustained investment in prevention and data monitoring.



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- **Contact:** Email: fuxi.ma@outlook.com