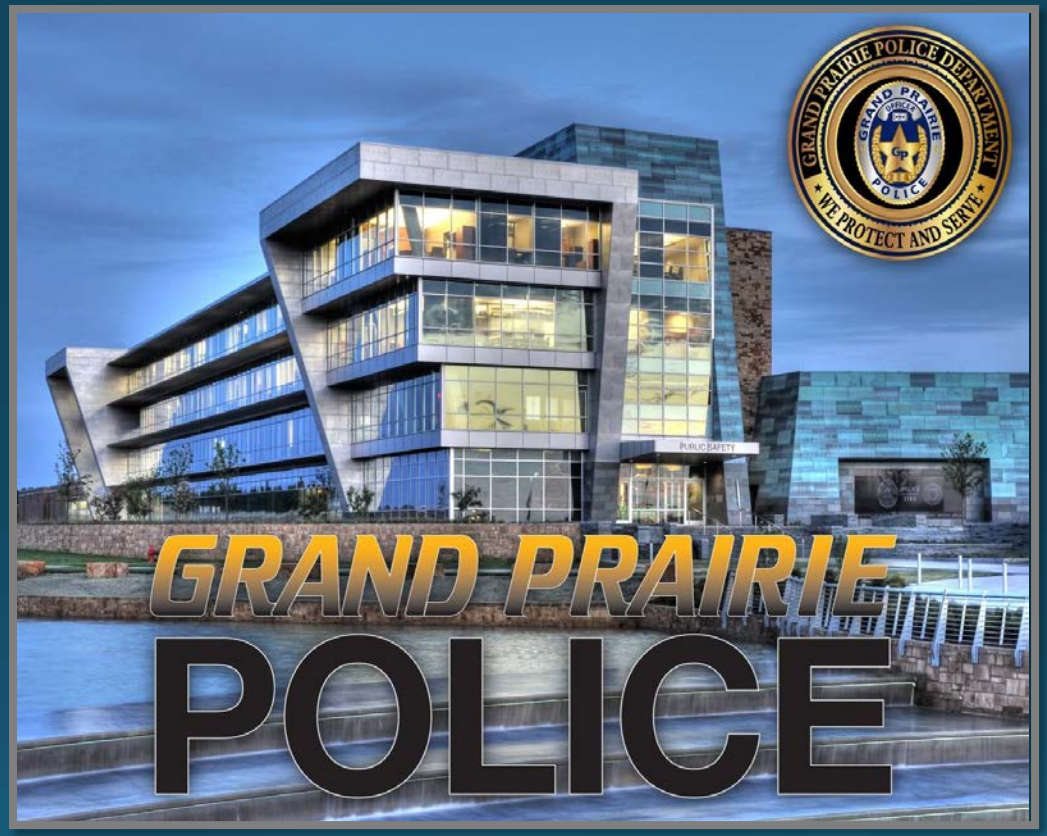
The Role of GIS in Law Enforcement
Crime Reduction Strategies



EVIDENCE BASED POLICING (EBP)

- The “evidence” in **Evidence Based Policing** does not refer to forensic type evidence

- “EBP is not using data to drive decisions, (Data Driven Policing), EBP is ***TESTING*** a practice/method using scientifically rigorous methods to determine if the practice is effective and efficient.” -- Renee Mitchell – co-founder American Society of Evidence Based Policing

- Not All EBP research will include crime, arrest, CFS data

1 Cordner, Gary. “Evidence-Based Policing in 45 Small Bytes.” *National Institute of Justice*, U.S. Department of Justice, May 2020, www.ojp.gov/pdffiles1/nij/254326.pdf.
2 Sherman, L.W. 1998. “Evidence-based policing.” Ideas in American policing. Washington, DC: Police Foundation, 2. https://www.policefoundation.org/publication/evidence-based-policing.

Crime Reduction Strategy

THE METHOD: "KOPER CURVE" THEORY

POLICE FOUNDATION | Advancing Policing Through Innovation and Science

5 THINGS YOU NEED TO KNOW ABOUT HOT SPOTS POLICING & THE "KOPER CURVE" THEORY

"Hot spots" policing is highly effective, and many police leaders use the term to describe their policing strategy. This is not surprising in that a substantial amount of crime is produced in a few small areas (i.e., streets segments or blocks). In some cases, as much as 50% of calls for service or incidents of crime can be found in less than 5% of places (e.g., blocks) (Weisburd, D., 2015). However, while hot spots policing may positively impact crime, police leaders should consider using the "Koper Curve" Principle to maximize crime reduction and increase community satisfaction and legitimacy. The Koper Curve, emanating from the Minneapolis Hot Spots Policing experiment and tested in Sacramento, suggests that random 10-15 minute patrols at least every two hours in hot spots optimized deterrence.

1 "HOT SPOTS" POLICING IS EFFECTIVE

Research has demonstrated that hot spots policing can be an effective crime reduction strategy. This finding is confirmed in George Mason University's Evidence-Based Policing Matrix and in the U.S. DOJ's CrimeSolutions.gov, a "what works" clearinghouse.

2 WHAT OFFICERS DO IN HOT SPOTS MATTERS

Simply telling officers to patrol hot spots, to increase misdemeanor arrests in those areas or to remain stationary in those areas for prolonged periods of time is costly and impractical. The Koper Curve offers a more practical and efficient approach.

3 PROACTIVE 10-16 MINUTE STOPS IN HOT SPOTS MAXIMIZES DETERRENCE

Intermittent patrol of micro-hot spots (street segments or blocks) of 10-16 minutes at least every two hours extends deterrence. According to Koper (1995), the likelihood of crime or disorder within 30 minutes after a patrol drive through was 15%; for stops of 10-16 minutes, the likelihood was reduced to 4%, causing deterrence to "peak."

4 HOT SPOT VISITS OR STOPS MUST BE RANDOM AND INTERMITTENT

To ensure that the patrols do not become predictable and therefore avoidable, patrols in micro-hot spots should be random and intermittent, as opposed to regularly scheduled, e.g., every two hours. CAD and Automated Vehicle Locators (AVLs) can be used to monitor and deploy patrol in hot spots.

5 THE BENEFITS OF USING KOPER CURVE THEORY GO BEYOND CRIME REDUCTION

In addition to reducing Part I crimes in hot spots, using the Koper Curve Principle to guide deployment and patrol strategy makes better use of officer time. By increasing visibility and positive community engagement within hot spots, agencies are likely to enhance community trust and legitimacy, which may further impact crime reduction and improve satisfaction.

https://www.policefoundation.org/wp-content/uploads/2015/07/PF_FiveThings_HotSpotsPolicing_Handout_Rev6.23.15.pdf

Data Analysis / Retrieval

RETRIEVING DATA FROM CAD/RMS

CAD – Computer Aided Dispatch

RMS – Records Management System

reportal

Data Analysis / Retrieval

CHOOSING TARGET SITES: WHAT DATA?

Calls For Service Data

5-Years of CFS Data

*Total CFS Data = ***971,517 CFS****

Not All CFS (Crime and Social Disorder Only)

[Robbery, Burglary, Drugs, Prostitution etc.]

Total Isolated CFS = ***219,077 CFS***

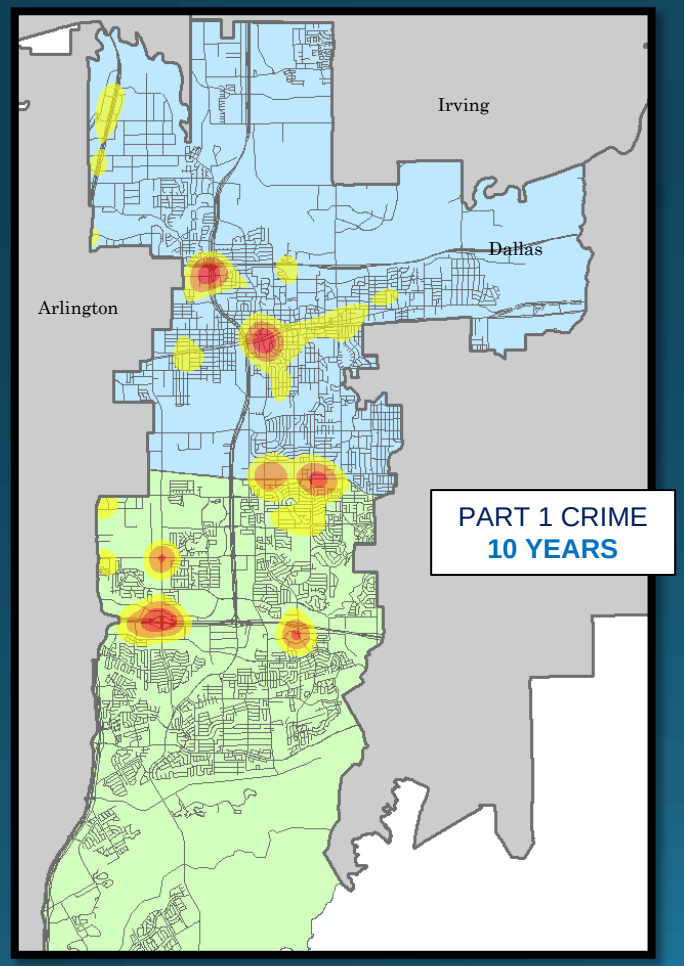
This process removes ***Implicit Bias*** From Data

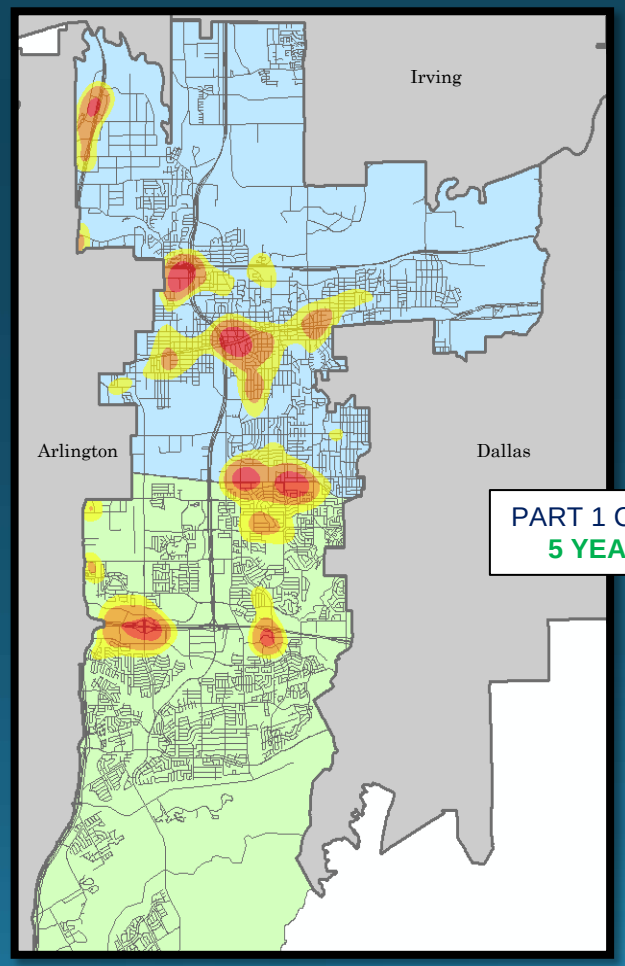
(A form of bias that occurs automatically and unintentionally, that nevertheless affects judgments, decision, behaviors)

Only use the CFS that a citizen initiated

Strategic Analysis – Using Kernel Density

Strategic Analysis: Long Term Problems





2018

10 Year Crime Data Project

Side by side Comparison

-10 year

-5 Year

-3 Year

-1 Year

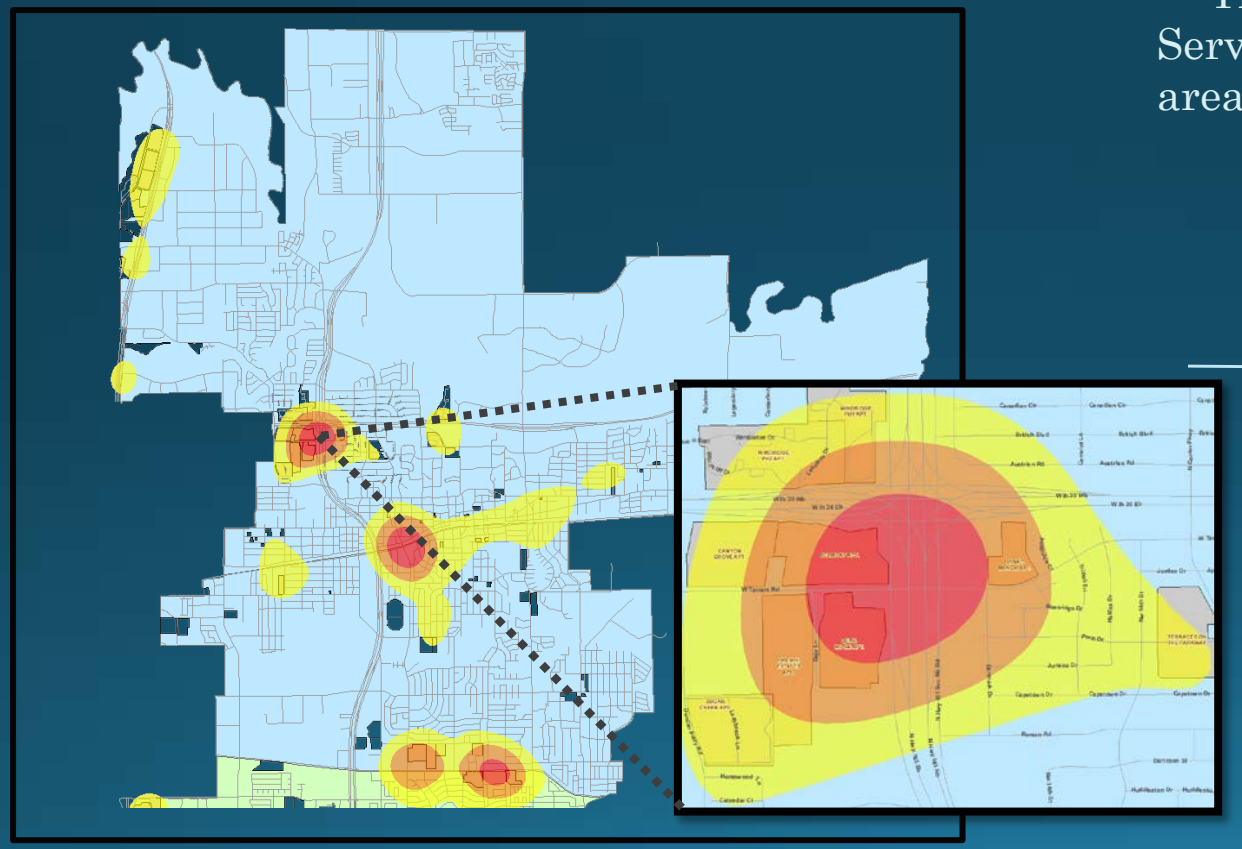
***Crime is not as random as we believe**

Strategic Analysis – Using Kernel Density

Choosing Target Sites

Heat Map or Kernel Density Mapping

This analysis utilizes the Calls For Service point data to show dense spatial areas or clustering to reveal "Hot" areas of the city



This "hot" area does not lend itself to micro-analysis or honing in on a specific target for officers

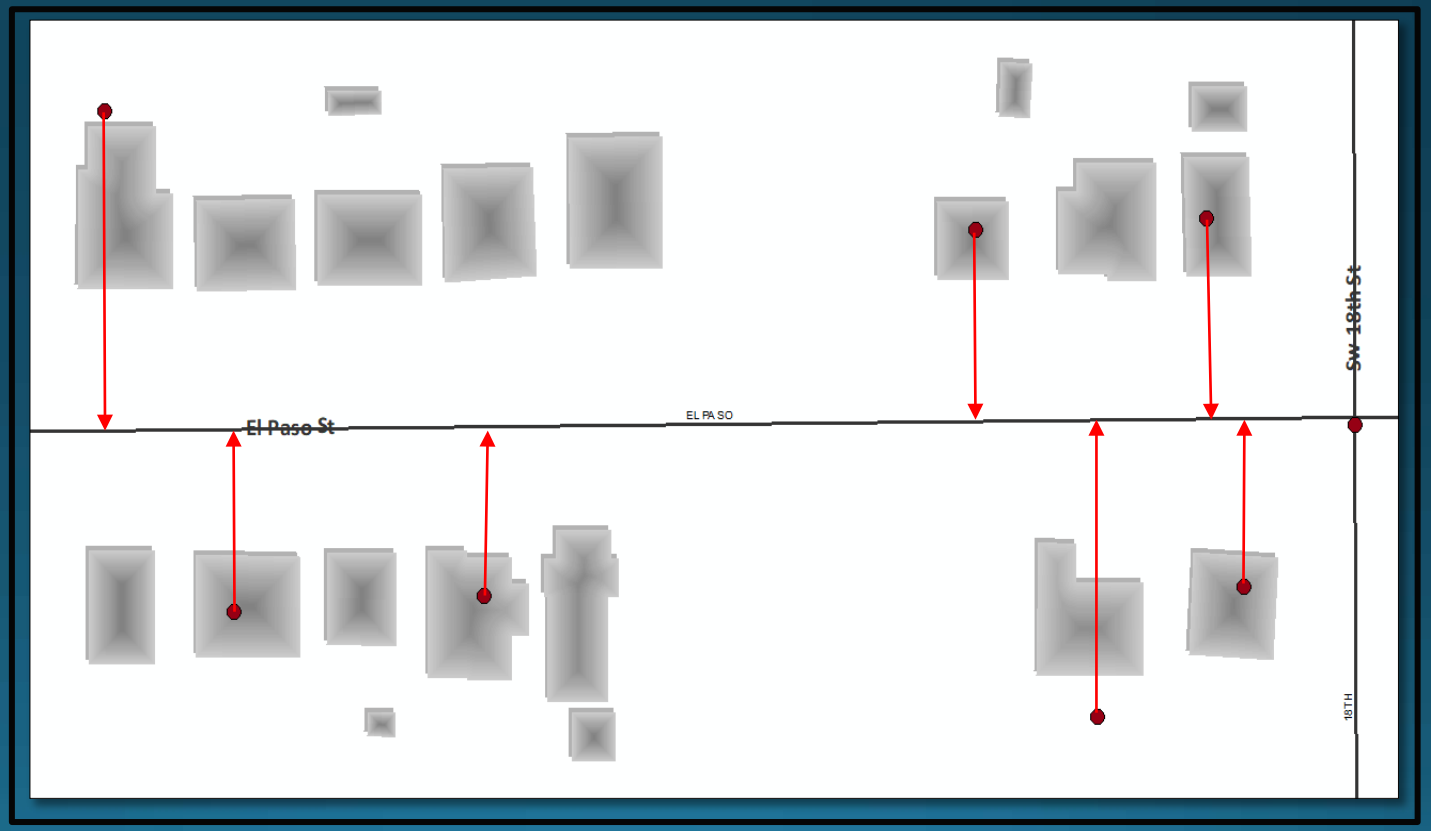
Strategic Analysis – Using Summarize Incident Count (by Street Segment)

Choosing Target Sites

HOT STREET ANALYSIS
Micro Analysis

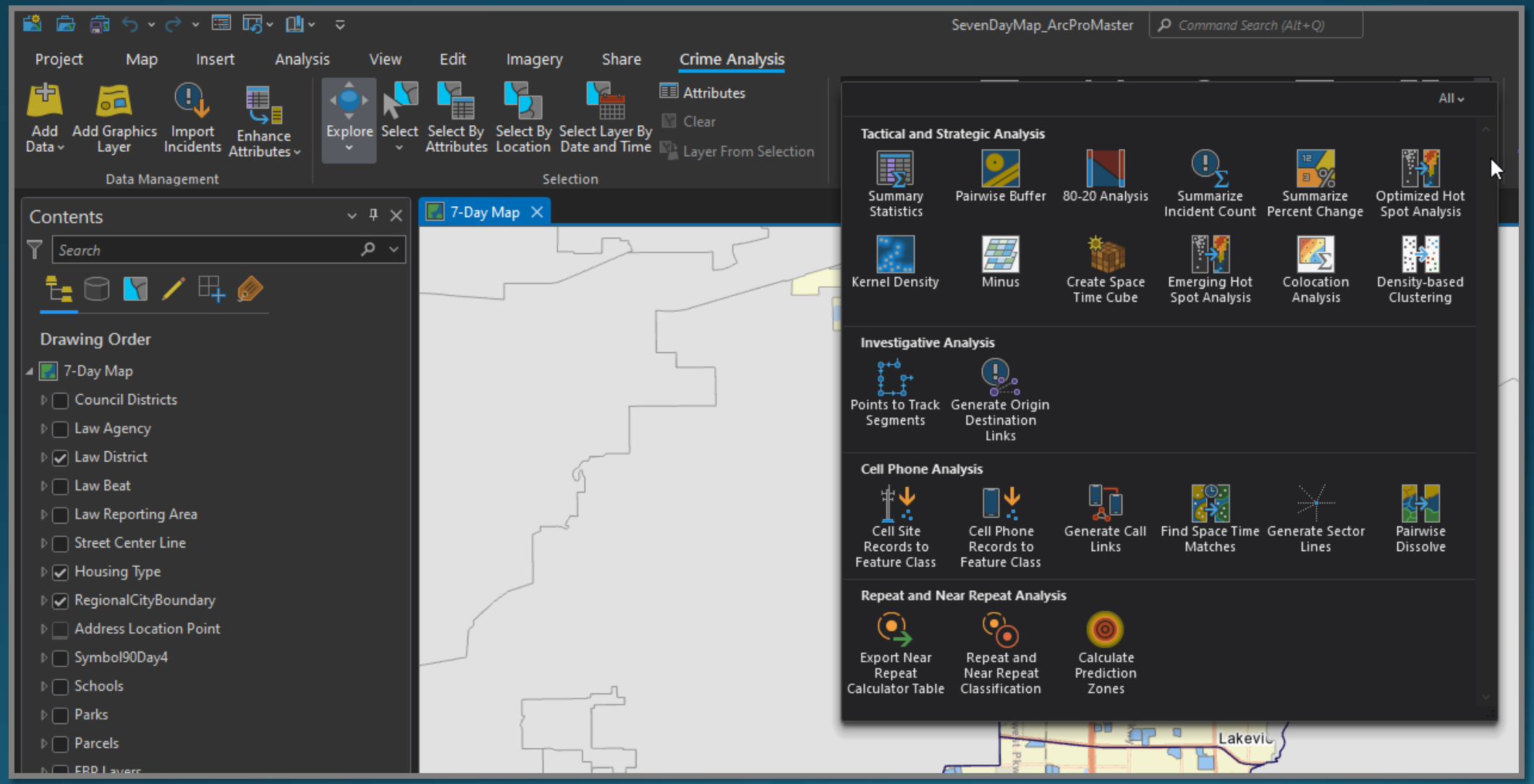
Instead of analyzing our x/y data points for the ***density*** of Calls for Service in a spatial area where data points are on the centroid of the parcel

The data points are geocoded to the street centerline and a ***count*** of data points per street segment is analyzed



Tools For Hot Street Analysis

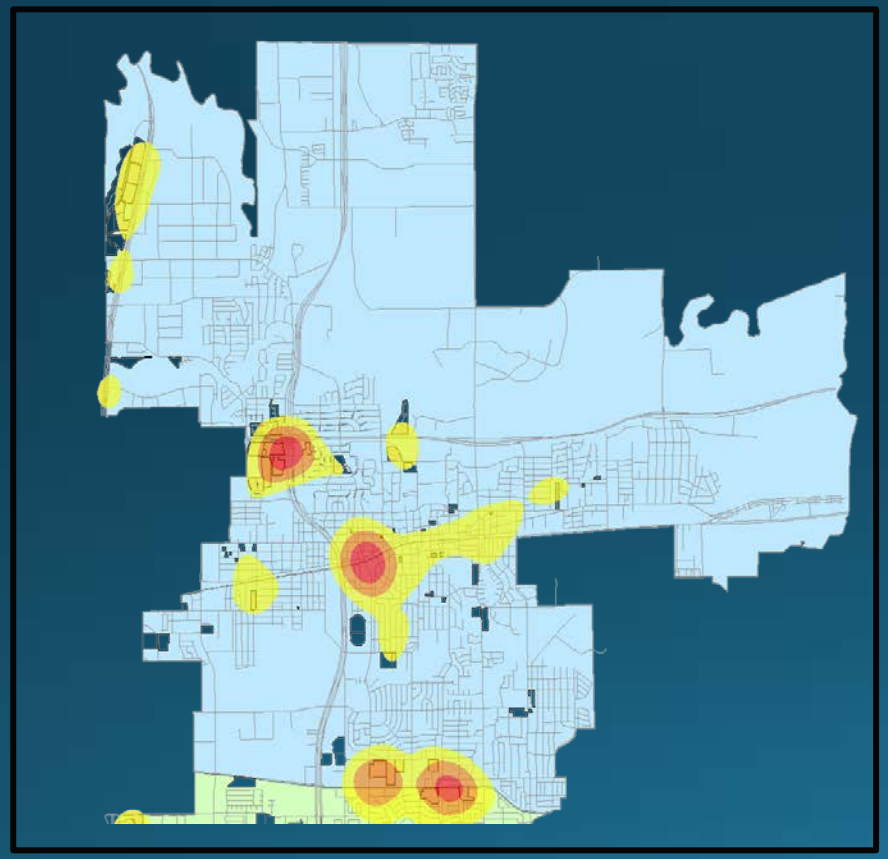
UTILIZING THE CRIME ANALYSIS TOOLBAR ADD-IN

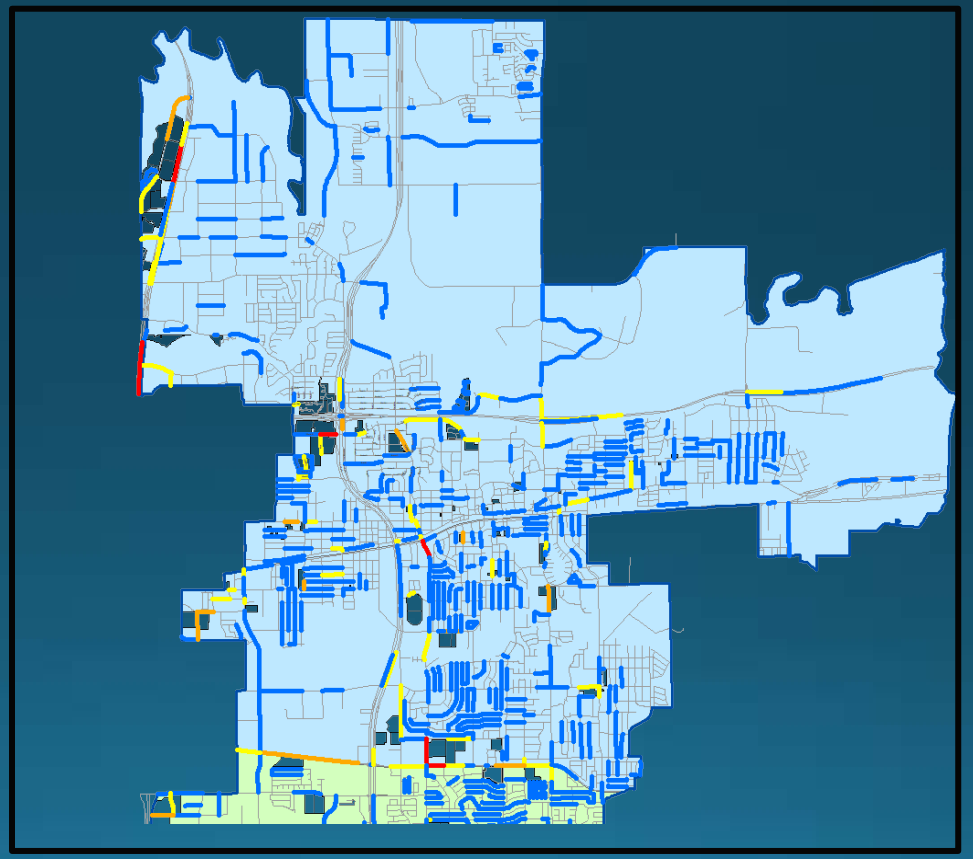


Kernel Density vs. Hot Streets

Choosing Target Sites

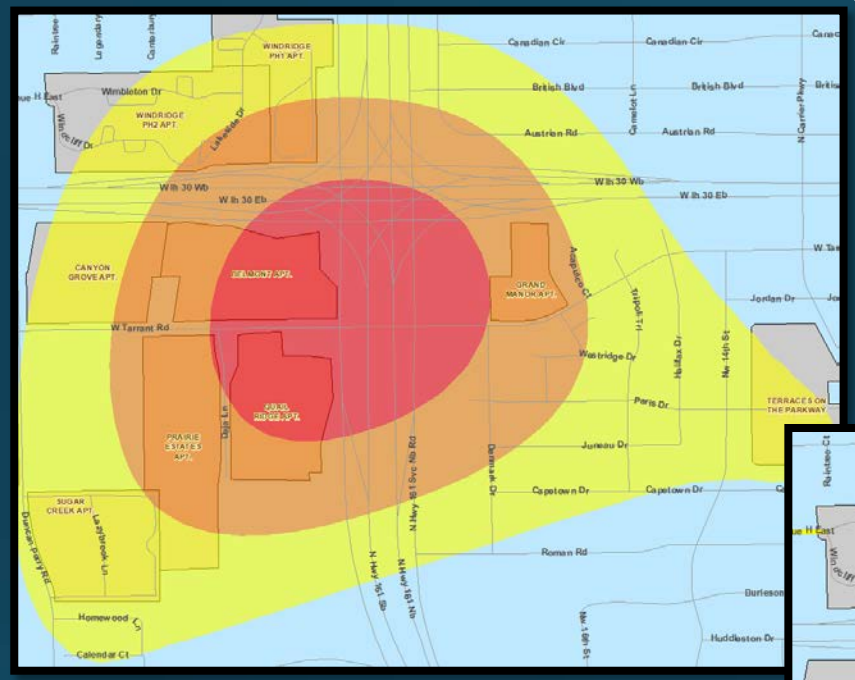
HEAT MAP VS. **HOT STREETS MAP**





Kernel Density vs. Hot Streets

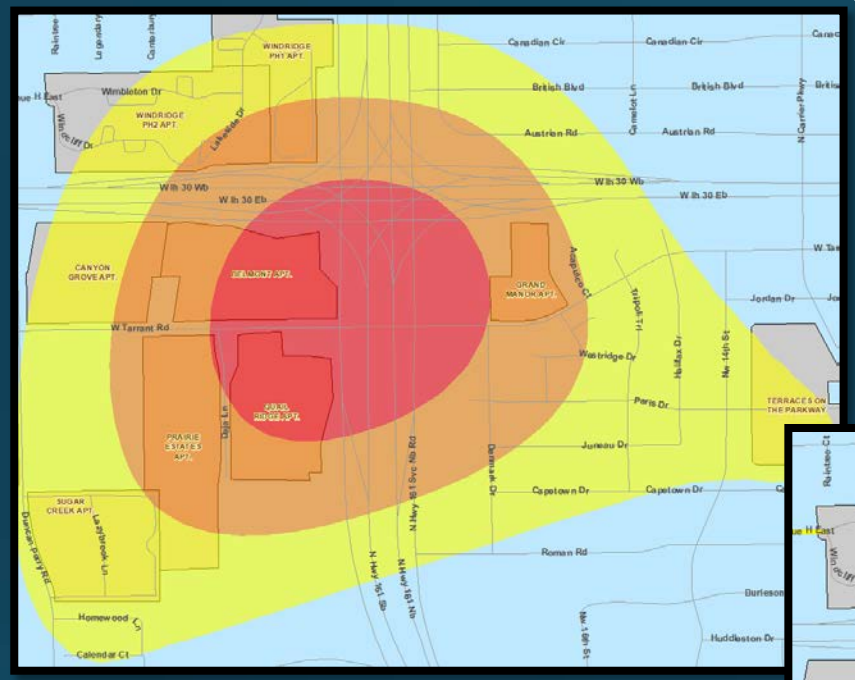
Choosing Target Sites



Hot Street Analysis is a micro-analysis of a larger "hot" area to allow officers to target the exact street segments responsible for the majority of your Calls for Service

Kernel Density vs. Hot Streets

Choosing Target Sites



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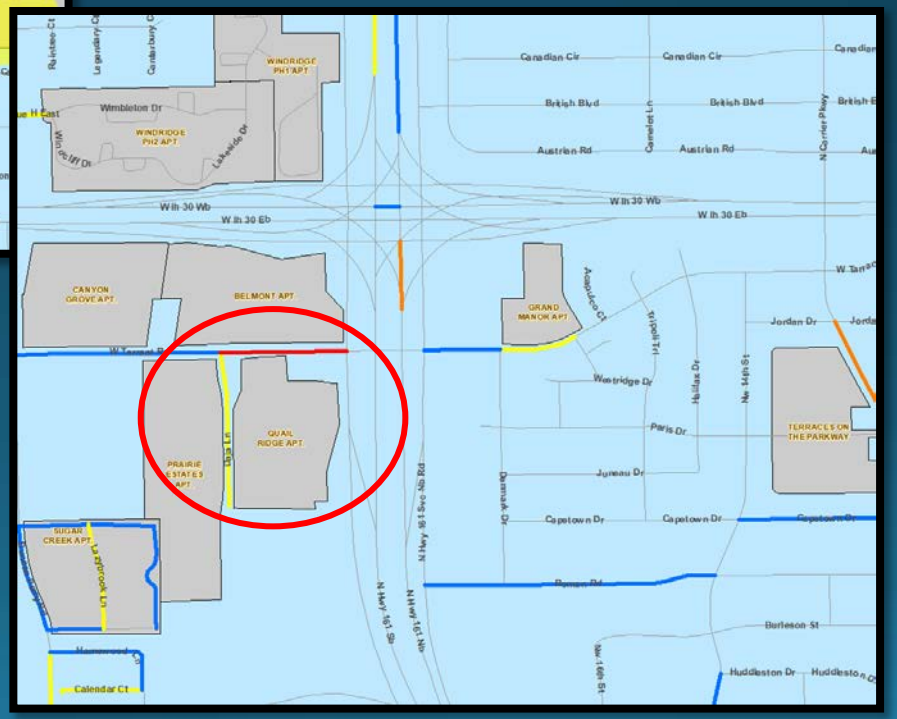


Pre-Study Data Analysis

Choosing Target Sites

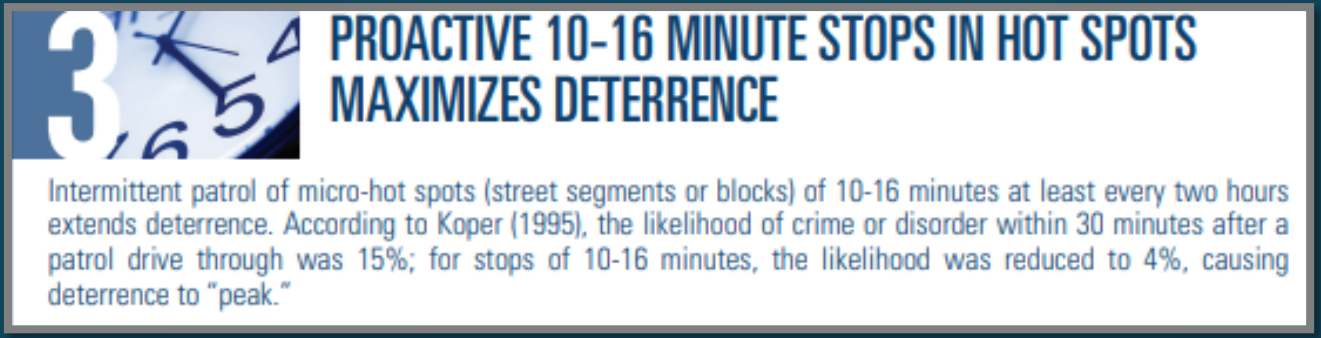
NORTH TREATMENT SITES

SITE	STREET SEGMENT
1	SOUTH BUDGET SUITES
2	NORTH BUDGET SUITES
3	DAJA / TARRANT
4	SKYLINE
5	DUNCAN PERRY
6	14TH STREET
7	EL PASO STREET
8	WE ROBERTS
9	FAMILY
10	ROYAL

Crime Reduction Strategy Results

What Needs To Be Measured At The End Of Your Project

Keeping Data On Target With GIS



DAILY SITE VISIT GOAL

VISIT LENGTH: 10-16 MINUTES

VISIT COUNT GOAL: 100 Visits Per Day Total

(Sites 1-10 – 10 visits per site / per day)

Keeping Data On Target

????? How Do I Do This ?????

Keeping Data On Target: Crystal Reports

????? How Do I Do This ?????

(The old way)

NORTH SIDE PATROL STUDY
AUGUST 2018
Total Site Visits Per Day/Per Site
Average Site Visit Time Per Day/Per Site
Daily and Monthly Site Visits and Average Visit times

		SITE 1	SITE 2	SITE 3	SITE 4	SITE 5	SITE 6	SITE 7	SITE 8	SITE 9	SITE 10	Total
8/1/2018	Total Visits	7	5	6	5	11	9	10	10	11	7	81
	Avg. Time Per Visit	00:12:35	00:12:18	00:08:46	00:10:16	00:08:27	00:07:51	00:08:46	00:05:51	00:09:02	00:12:05	00:09:13
8/2/2018	Total Visits	10	12	15	12	15	14	6	10	9	5	108
	Avg. Time Per Visit	00:11:02	00:10:24	00:09:41	00:09:33	00:09:28	00:07:37	00:06:16	00:09:06	00:09:11	00:08:30	00:09:14
[illegible]	Total Visits	[illegible]	11	[illegible]	11	[illegible]	11	[illegible]	13	[illegible]	12	[illegible]
	Avg. Time Per Visit	00:07:32	00:11:32	00:10:10	00:09:17	00:07:26	00:10:11	00:10:27	00:10:46	00:12:00	00:09:50	00:09:49
8/31/2018	Total Visits	12	12	10	11	11	15	10	14	9	12	116
	Avg. Time Per Visit	00:10:22	00:09:20	00:07:37	00:10:06	00:09:09	00:09:05	00:09:40	00:09:57	00:19:40	00:10:25	00:10:20
Total	Total Visit Count	278	290	316	308	318	325	275	290	307	247	2,954
	Avg. Visit Time	00:11:27	00:10:29	00:09:26	00:09:40	00:08:43	00:09:59	00:09:15	00:09:13	00:10:15	00:10:01	00:09:50

Keeping Data On Target: Crystal Reports

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(The old way)

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8/2/2018	Total Visits	10	12	15	12	15	14	6	10	9	5	108
	Avg. Time Per Visit	00:11:02	00:10:24	00:09:41	00:09:33	00:09:28	00:07:37	00:06:16	00:09:06	00:09:11	00:08:30	00:09:14

8/30/2018	Total Visits		11		11		11		13		12	21
	Avg. Time Per Visit	00:07:32	00:11:32	00:10:10	00:09:17	00:07:26	00:10:11	00:10:27	00:10:46	00:12:00	00:09:50	00:09:49
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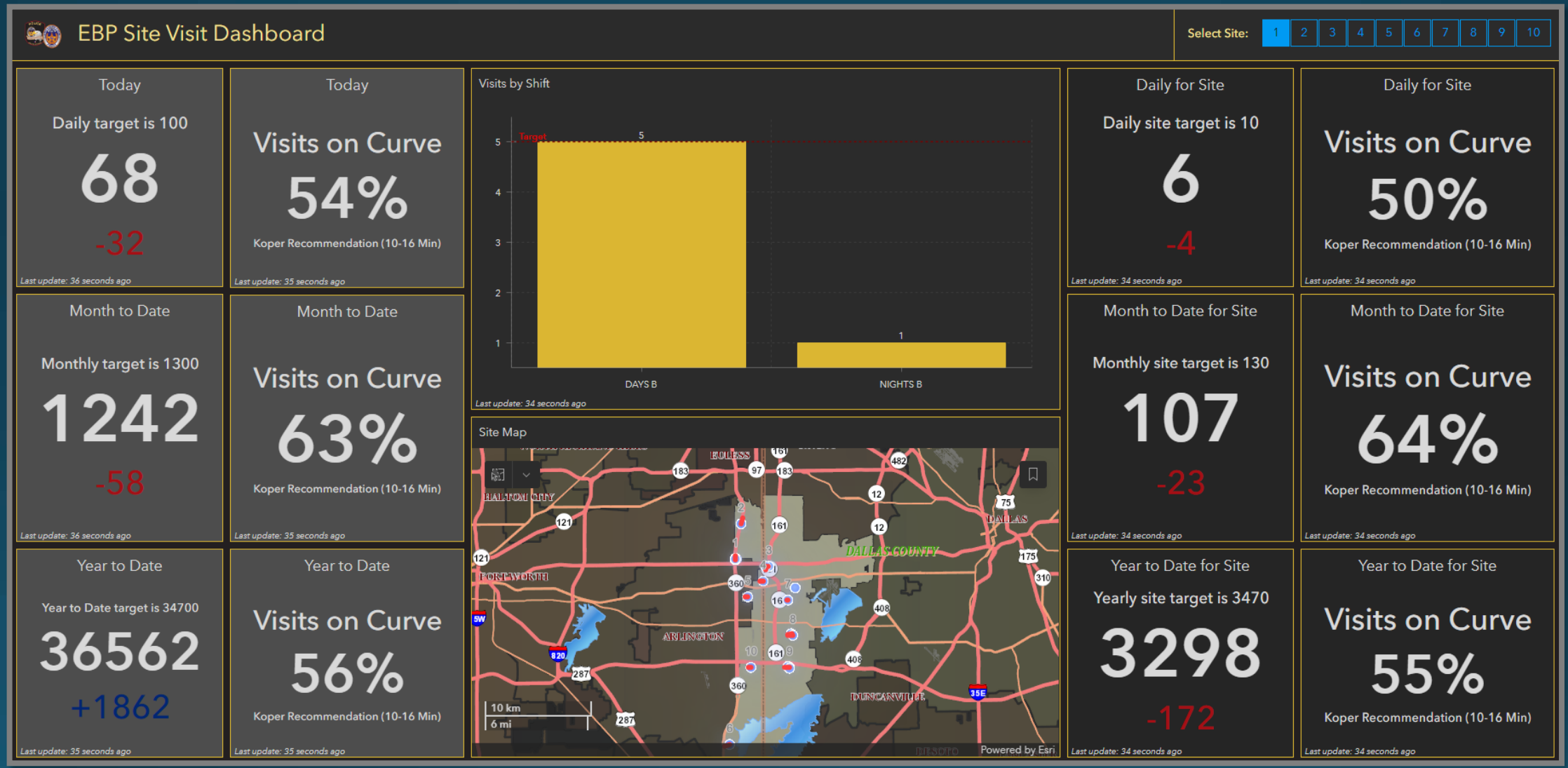
Keeping Data On Target: Arc Online

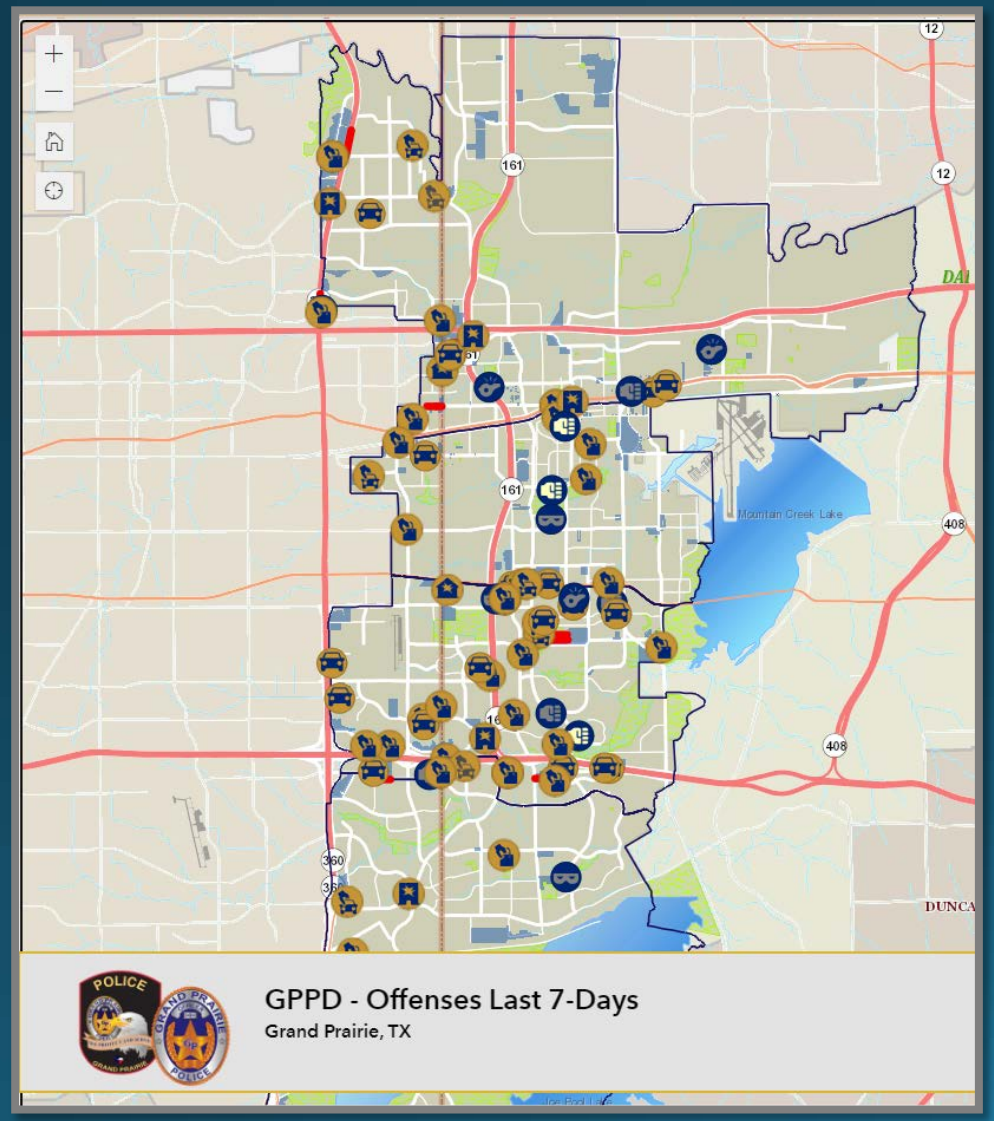
????? How Do I Do This ?????

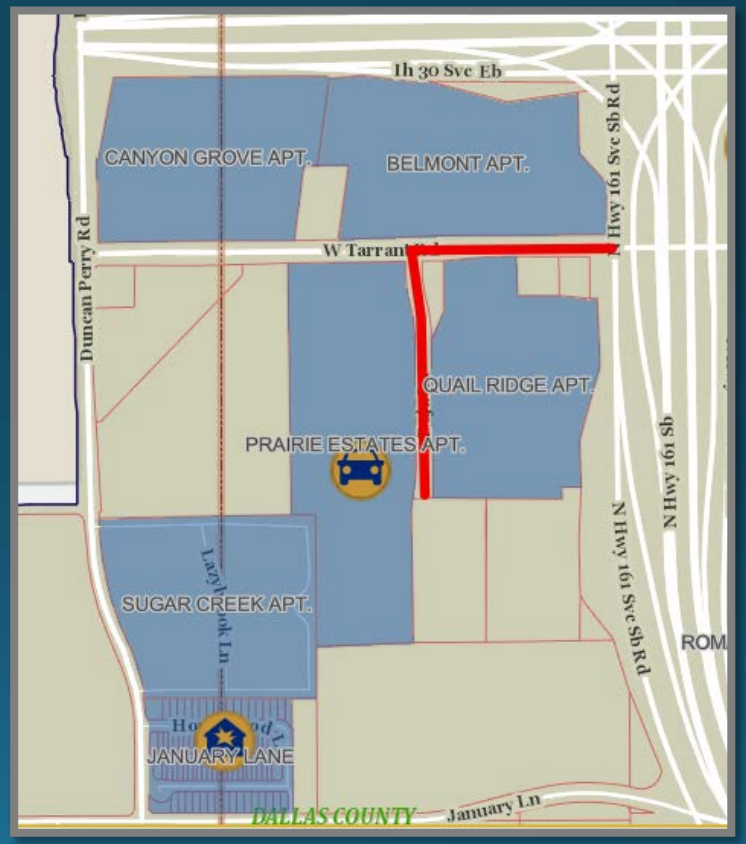


EBP Site Visit Dashboard

Keeping Data On Target: Arc Online

????? How Do I Do This ?????





EBP Site Visit 7-Day Offense Web Experience

Results of Koper Method

Site Results

SITE 1 – SOUTH BUDGET SUITES

-Extended Stay Motel
-Transient Population
-Freeway Service Road

Top Calls For Service
Disturbance
Suspicious Activity
Theft
Burglary
Drugs

Results of Koper Method

Site Results

SITE 1 – SOUTH BUDGET SUITES

July 1st – December 31

ISOLATED CFS

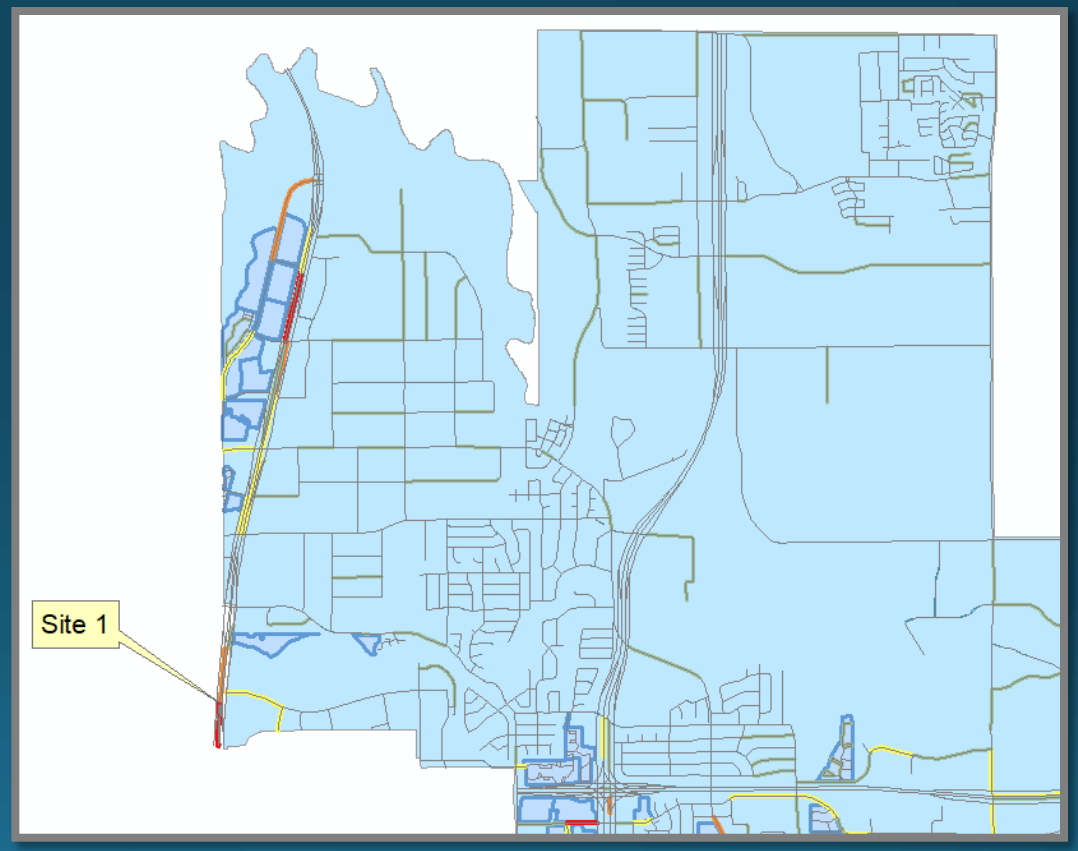
	5 Year AVG.	2018	% CHNG
ISOLATED CFS	389	280	-28%

ALL INCIDENT REPORTS TAKEN

	5 Year Avg.	2018	% CHNG
ALL REPORTS	169	127	-25%

PART 1 CRIMES AND SOCIAL DISORDER REPORTS

	5 Year Avg.	2018	% CHNG
PART 1 & SOCIAL DISORDER	68	56	-18%



Results of Koper Method

Site Results – Three-Four Years Later

SOUTH BUDGET SUITES		
EBP Project Year	Data Span	Total Isolated CFS
2018	2013-2017	2,826
2021	2016-2020	1,318
From 2018-2020 the 5 Year Data Set - Reduced 1508 CFS		

- EBP Sites are chosen from an isolated list of nature codes from CFS (No Officer Initiated)
- EBP Sites are chosen from 5 years of historical CFS data (Highest CFS per street segment)

RESOURCES

hlane@GPTX.org

https://www.americansebp.org/ (American Society for Evidence Based Policing)

https://www.policefoundation.org/ (National Police Foundation)

https://www.ojp.gov/pdffiles1/nij/254326.pdf ("EBP in 45 Small Bytes")

https://crimesolutions.ojp.gov/ (NIJ - What programs/practices work)