



# Heat Maps, Green Dot Management, and GIS

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1. About Oakland
2. "Green Dot Management"  
...Sewer pipes cleaned and televised
3. Heat Maps  
...Quickly show what we know





# Oakland Public Works

# Oakland, California

- } 10<sup>th</sup> largest city in California
- } Incorporated in 1852
- } Population: 411,000
- } 53.8 square miles



- } 805 miles of streets
- } 1500 miles of sidewalks
- } 920 miles of sewer pipes
- } 402 miles of storm drain pipes
- } 309 City owned buildings
- } 38,000 street trees
- } 640+ acres of parks, public grounds
- } 36,000 street lights
- } 671 traffic signalized intersections

# 6th Year of Cityworks Server CMMS

- } Cityworks Server 2013
- } Map Services for different work groups (e.g., sewers, illegal dumping)
- } ArcGIS Server 10.1
- } ArcSDE 9.2
- } ArcGIS Server Web Adapter 10.11



# Cityworks CMMS – Completing a work order

- } Crews select asset in GIS,
- } Enter labor + materials + equipment,
- } Enter units accomplished,
- } Enter actual start date, actual finish date, completed by, and relevant custom fields

*So we can “tell the story” of:  
What work is done,  
on what assets,  
at what cost*



# Selecting the GIS asset in CMMS is inherent to completing the work

The screenshot displays the Cityworks CMMS interface. The top navigation bar includes 'Inbox', 'Recent', 'SR New', 'SR Search', 'WO New', 'WO Search', and 'I New'. A search bar is located on the right. Below the navigation bar, there are icons for 'Work Order', 'View', 'Save', 'Close', 'Delete', and a location pin.

The main content area is divided into two panels. The left panel, titled '3 - Use Map to Attach Assets to Work Order', contains a table with columns: Type, Id, EntitySid, Legacy Id, and Warranty Date. The table lists a 'SANITARYSEWERCOLLECTIONSYSTEM' with Id 4883 and EntitySid 25148. Below the table, a tooltip reads 'Add asset(s) currently selected on the map.' A cost summary shows: Labor Cost: \$554.40, Material Cost: \$0.00, Equipment Cost: \$59.70, and Total WO Cost: \$614.10. The right panel, titled '4 - Go to View', shows 'Related Work Activities' with a table of Service Requests. One request is listed: Id 524268, Date Initiated 6/18/2014, Description Sewers - Blockage, Priority 1, Category SEWERS, and Submit To GUZMAN, MIGUEL.

The right panel also features a GIS map showing a street grid. A green line represents a sewer collection system asset, labeled with ID 4883. Other assets are shown as yellow circles with IDs like 83-103-37, 83-102-20, 83-102-05, 83-102-04, 83-102-03, and 4906. The map includes a toolbar with various navigation and tool icons.

Type	Id	EntitySid	Legacy Id	Warranty Date
SANITARYSEWERCOLLECTIONSYSTEM	4883	25148		

Service Requests					
Add:					
Id	Date Initiated	Description	Priority	Category	Submit To
524268	6/18/2014	Sewers - Blockage	1	SEWERS	GUZMAN, MIGUEL

# “Green Dot Management”

Green pipes are cleaned pipes,  
brown pipes have not been cleaned



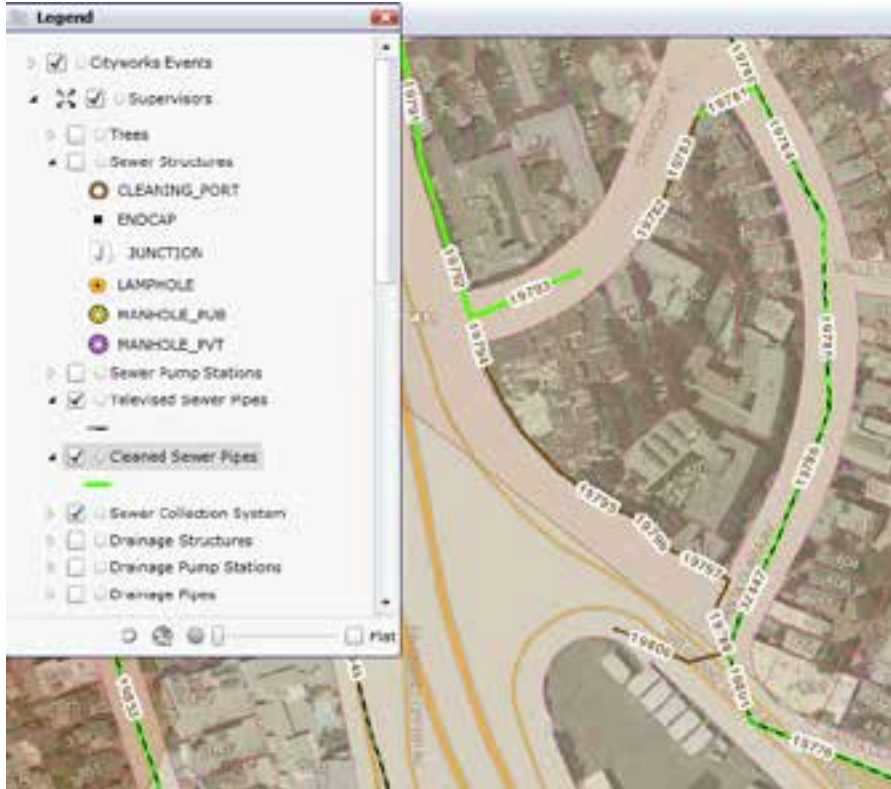
**Legend**

- Center On XY (1)
- Cityworks Events
- Supervisors
- Trees
- Sewer Structures
- Sewer Pump Stations
- Televised Sewer Pipes
- Cleaned Sewer Pipes
- Sewer Collection System
  - ABANDONED
  - FORCE MAIN
  - INTERCEPTOR
  - MAIN
- Drainage Structures
- Drainage Pump Stations
- Drainage Pipes
- Traffic Signals

Flat



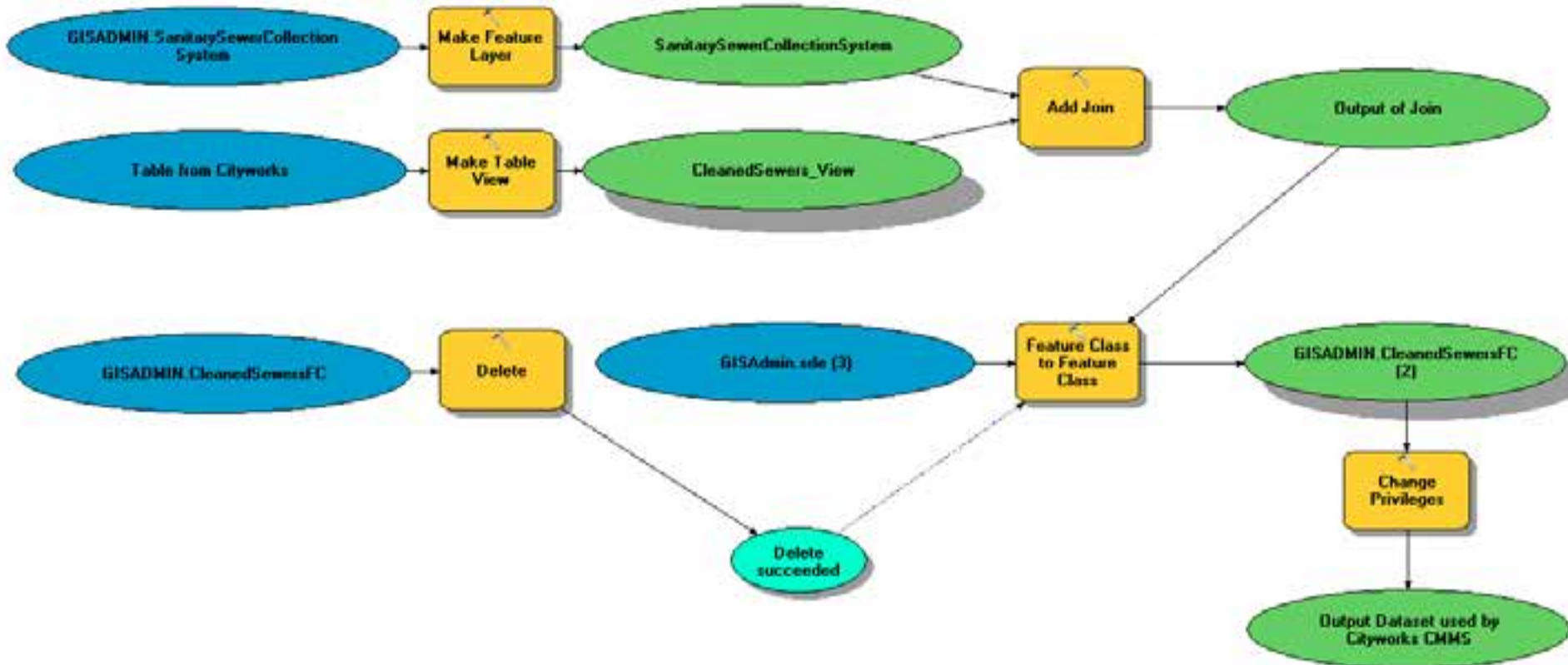
# A green pipe is a cleaned pipe. Every pipe must be cleaned.



- } Current: Crystal to Excel, Model Builder, Color pipes in GIS/Cityworks
- } Planned: Automate coloring of pipes

# Current: Model Builder, create 2<sup>nd</sup> Cleaned FC

} Future: Automate:  
Cleaned attribute, one FC



# Green Dot Management beyond the map

} Work history for an asset helps identify next actions

Work History for pipes that had 2 or more overflow(s) between 2011-04-01 and 2014-04-01

ENTITYL	DESCRIPTION	WORKORC	ACTUALFINISHD	WOADDRESS	SSOinDateRange	CIWQS
24803	Sewers - Back Up	557222	2013-10-10	1957 ASILOMAR DR		
24803	Sewers - Clean - Power Rod	445308	2012-03-16	1965 ASILOMAR DR		
24803	Sewers - CCTV	445272	2012-03-16	1957 ASILOMAR DR		
24803	Sewers - Overflow	445201	2012-03-15	1957 ASILOMAR DR	SSO in Date Range	778781
24803	Sewers - Overflow	401420	2011-07-10	1965 ASILOMAR DR	SSO in Date Range	768324

Pipe:	24804	Overflows in Date Range: 3				
24804	Sewers - CCTV	581752	2014-02-18	1957 ASILOMAR DR		
24804	Sewers - Overflow	580200	2014-02-08	1957 ASILOMAR DR	SSO in Date Range	803984
24804	Sewers - Clean - Power Rod	445308	2012-03-16	1965 ASILOMAR DR		
24804	Sewers - Overflow	445201	2012-03-15	1957 ASILOMAR DR	SSO in Date Range	770701
24804	Sewers - Clean - Power Rod	445192	2012-03-15	5630 BALBOA DR		
24804	Sewers - Overflow	401420	2011-07-10	1965 ASILOMAR DR	SSO in Date Range	768324

Pipe:	25257	Overflows in Date Range: 2				
25257	Sewers - Clean PM - Hi-Freq 3 Month	574115		6245 WESTOVER DR		
25257	Sewers - Clean PM - Hi-Freq 3 Month	556888	2014-01-09	6245 WESTOVER DR		
25257	Sewers - Clean - Power Rod	553729	2013-09-24	6245 WESTOVER DR		
25257	Sewers - Clean - Hot Spot Inspect/Service	539211	2013-07-11	6245 WESTOVER DR		
25257	Sewers - Clean - Power Rod	524600	2013-04-25	6245 WESTOVER DR		
25257	Sewers - CCTV	509659	2013-02-08	6245 WESTOVER DR		
25257	Sewers - Clean - Flush	509654	2013-03-08	6245 WESTOVER		
25257	Sewers - CCTV	494416	2013-01-11	6245 WESTOVER		
25257	Sewers - Clean - Hand Rod	493895	2012-11-18	6245 WESTOVER		
25257	Sewers - Overflow	493000	2012-11-17	6245 WESTOVER DR	SSO in Date Range	700251
25257	Sewers - Overflow	483868	2012-09-27	6245 WESTOVER	SSO in Date Range	786831
25257	Sewers - Locate Structures	449737	2012-04-09	6257 WESTOVER DR.		
25257	Sewers - Replace - Missing Manhole Cover	446050	2012-03-21	6245 WESTOVER DR		

# Tracking by assets allows tracking of progress

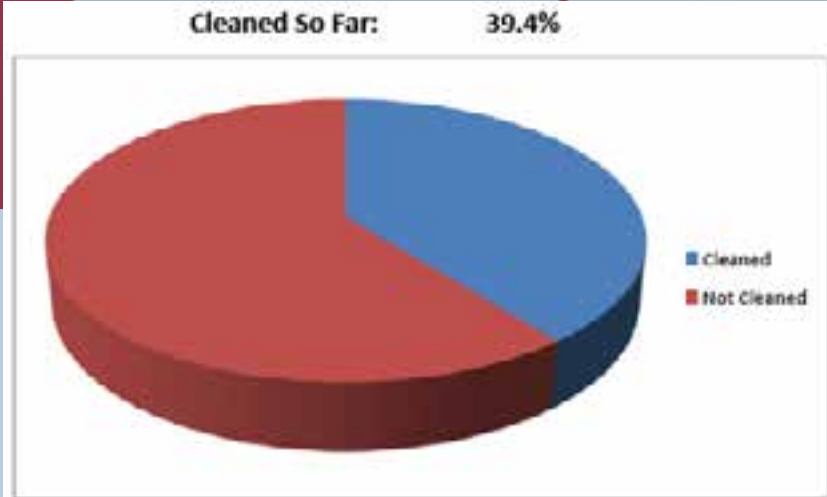
} Regularly identify remaining pipes to clean

DRAFT 4/7/14

## Sewer Subbasin Cleaning Tracking

CCTV Tracking

Zone	Subbasin	Data Date: 4/7/14			List	Ballpark feet/day:		CCTV data as of 4/7/14										Feet CCTV	% C	
		Feet Sewer Main	Feet Cleaned	% Cleaned		Ballpark # Days Total	Ballpark # Days Remain	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%			
3	85501	15,316	15,316	100%	Both	8	0												14,440	94%
2	5401	48,711	16,603	34%	Both	24	16												4,849	10%
2	5416	37,867	27,561	73%	Both	19	5												28,241	74%
2	5604	47,522	6,746	14%	Both	24	20												3,657	8%
2	5606	33,421	21,279	64%	Both	17	6												9,462	28%
1	5607	64,003	60,632	95%	Both	32	2												42,459	66%
2	5612	52,366	12,114	23%	Both	26	20													
1	17	49,106	12,255	25%	Both	25	18													
1	5014	49,009	19,293	39%	Both	25	15													
1	5017	98,136	18,740	19%	Both	49	40													
1	5019	67,066	9,914	15%	Both	34	29													
1	5021	63,593	11,618	18%	Both	32	26													



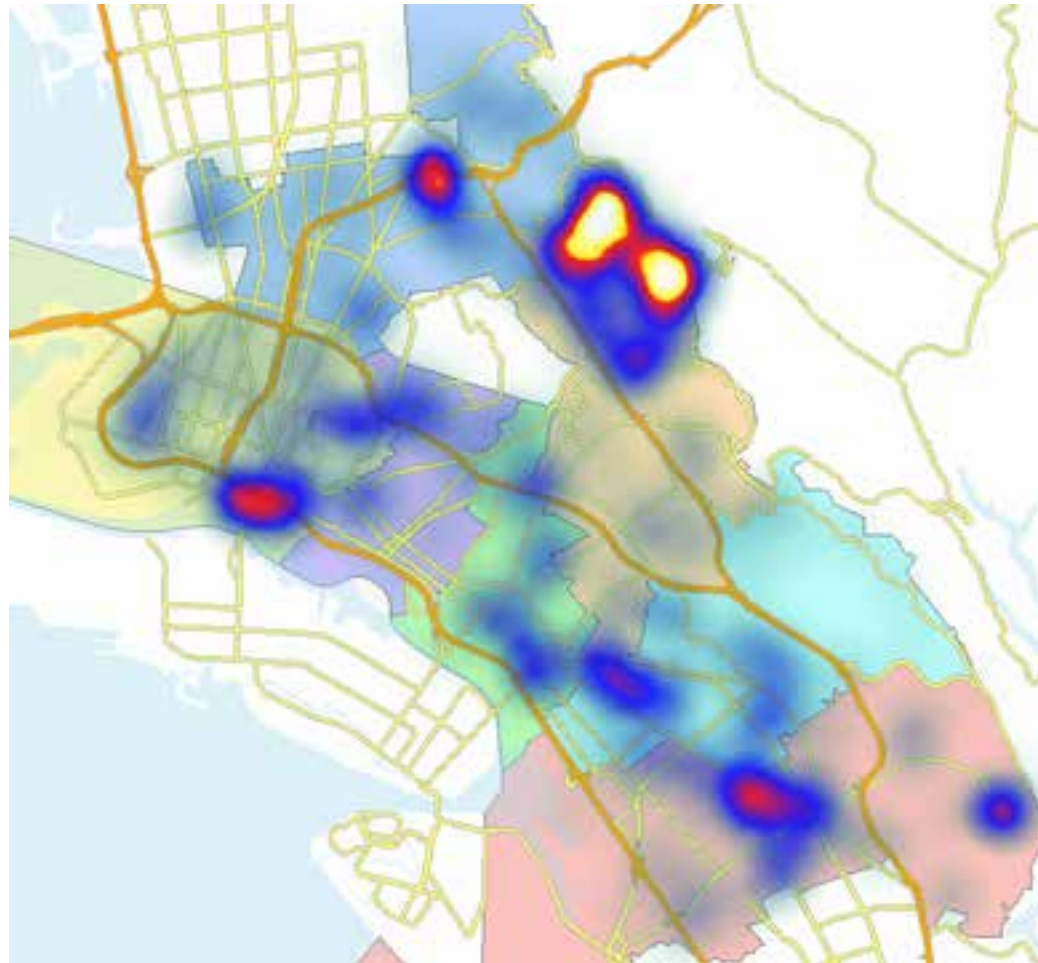


# Heat Maps

Quickly show what we know

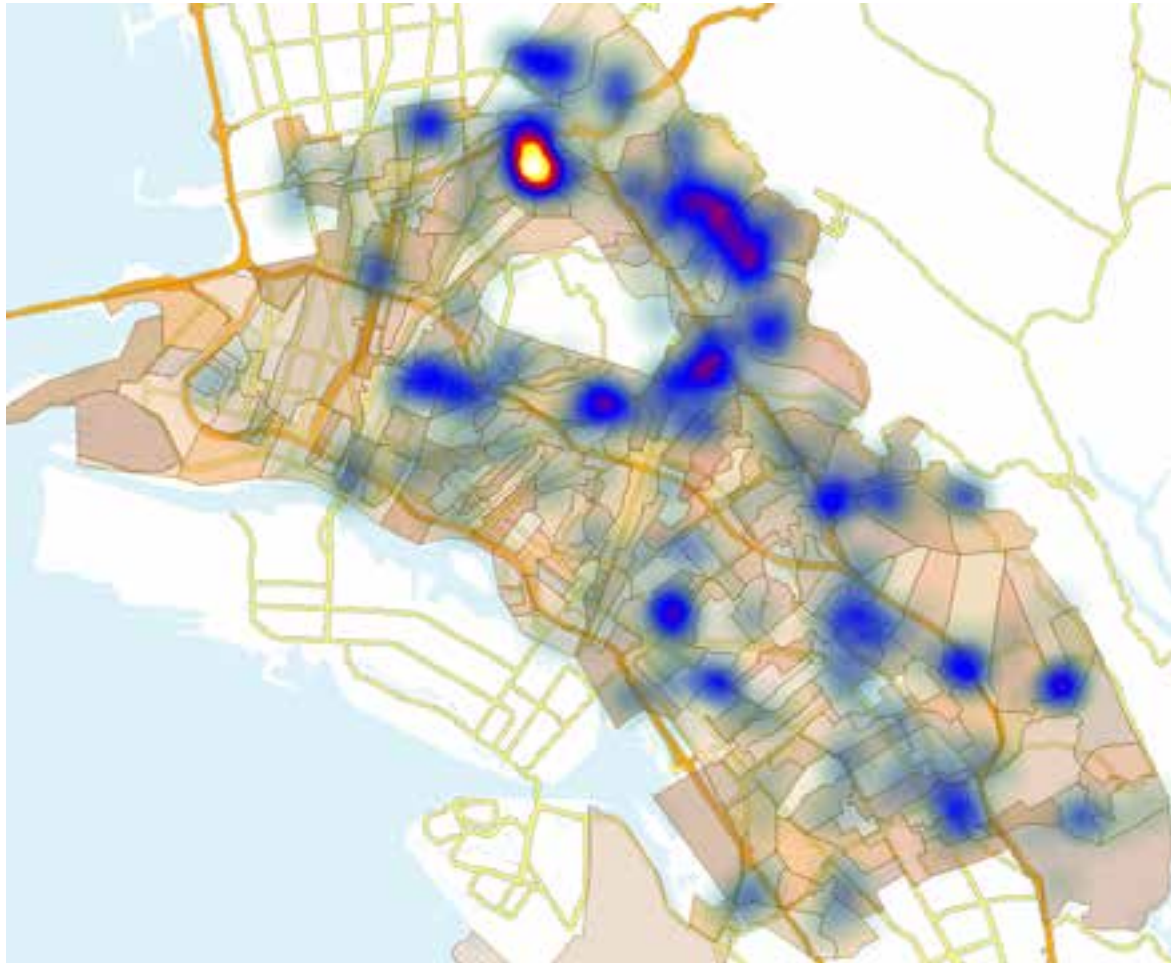
# Heat Maps Answer Management Questions

} Where have we had flooding?



# Heat Maps Answer Management Questions

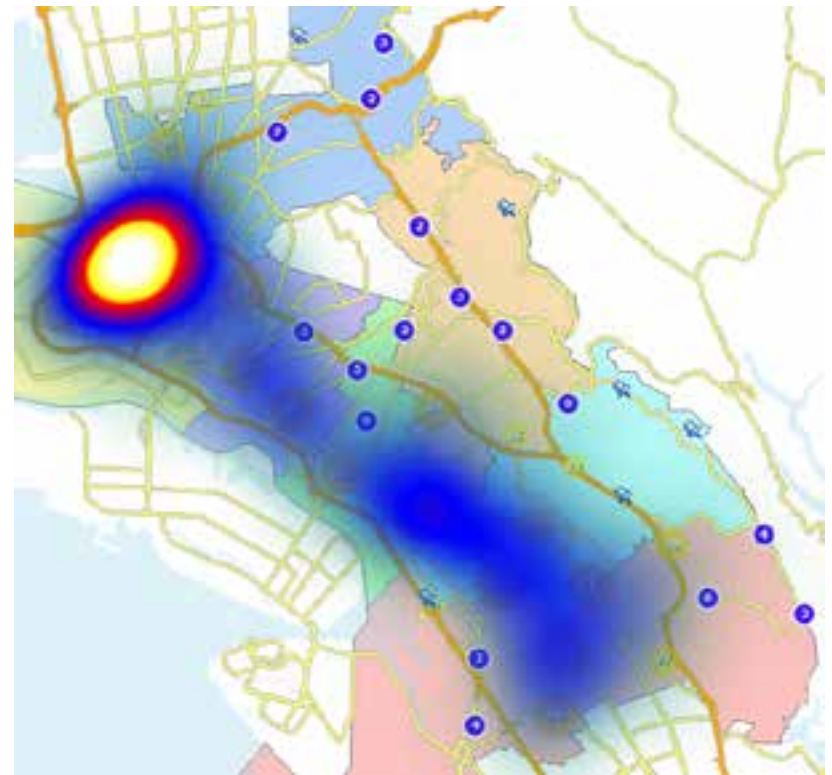
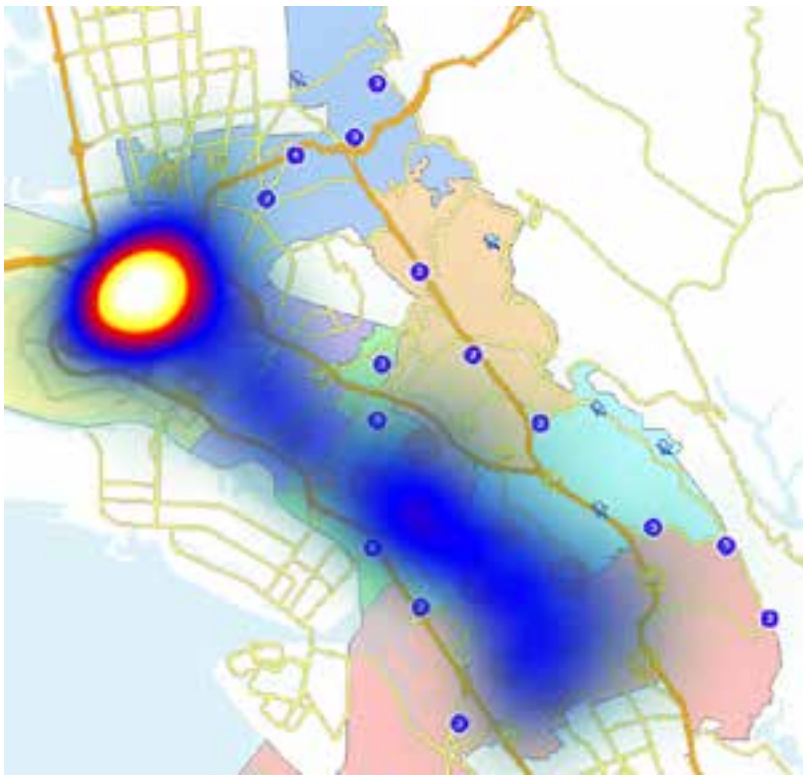
} Where have we had sewer overflows?





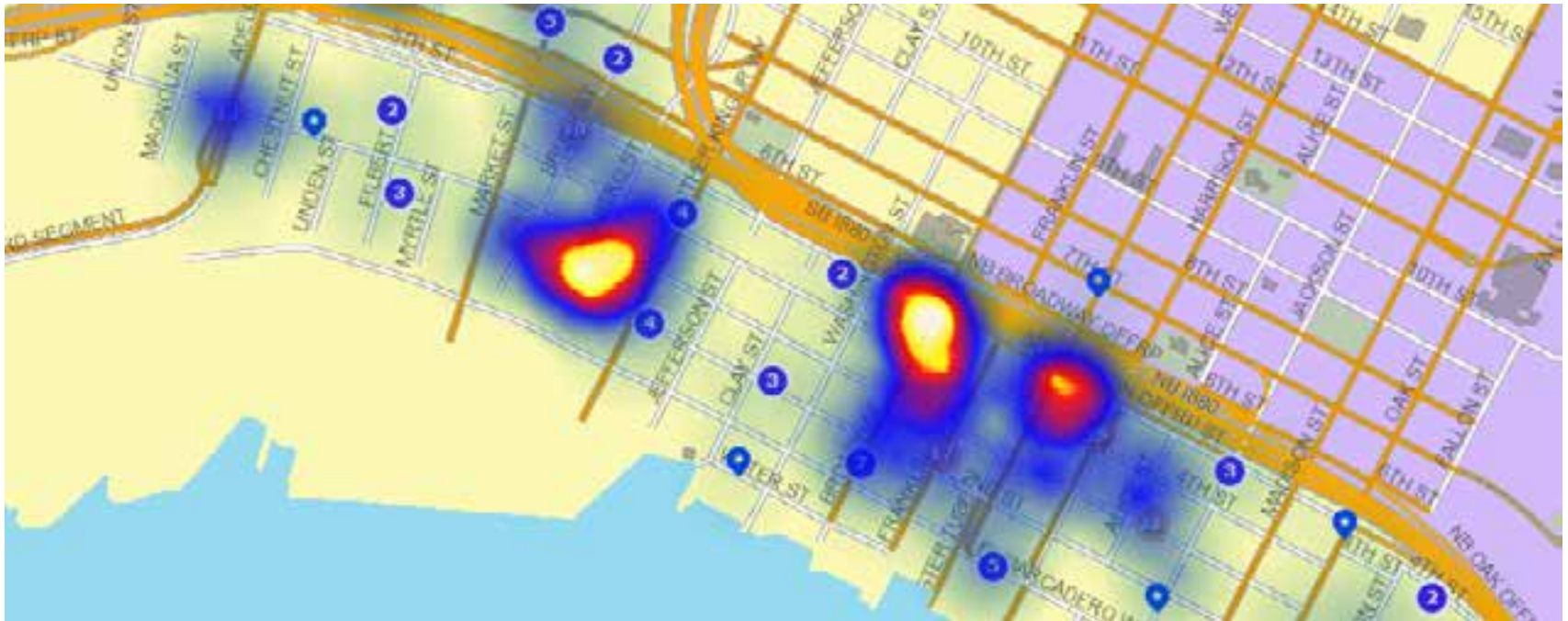
# Heat Maps Answer Management Questions

} Did illegal dumping change from one year to the next?

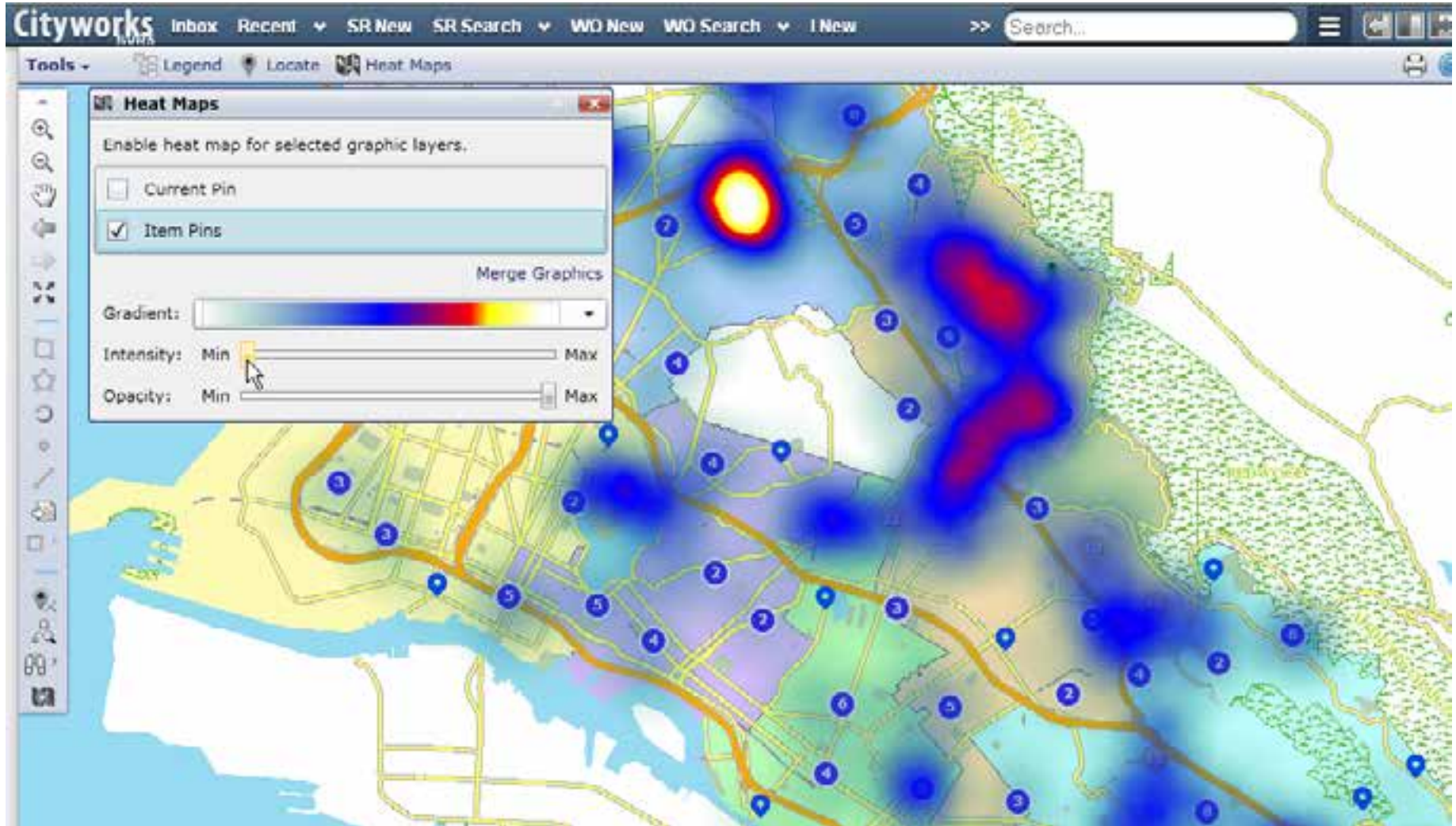


# Heat Maps Answer Management Questions

- } Which areas of a new Business Improvement District have the most illegal dumping issues?



# Heat maps: Created by users who are not GIS analysts



# Take-Aways

# Take-Aways

## } Green Dot Management

- } Rapidly understood by supervisors
- } Rapidly understood by management
- } Rapidly understood by field staff
- } Helps plan work
- } Helps monitor / track compliance

## } Heat Maps

- } Quickly show what we know
- } Communicate issues to management and elected officials faster than just "data"
- } Are readily available in the tool that staff already uses

# Questions?



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