SUM BIO '19
SUSTAINABLE URBAN MOBILITY CONGRESS

A Pick-up Game With Lebron James:

The Complex Future of Mobility In Boston

Kris Carter

20 February 2019

A Pick-up Game with Lebron James:

the complex future of mobility in Boston

City of Boston
Mayor Martin J. Walsh

Kris Carter
Mayor's Office of New Urban Mechanics
SUM BIO.19
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Boston: *Some Context*

Facts & Figures

Key characteristics

Population: 685,000 inhabitants
990,000 at daytime
4.5 Million in Metro Boston
8% growth 2010-2015

Pop.-density: 4,800 inh./km^2

Size: 125 km^2

Household income: $54,485

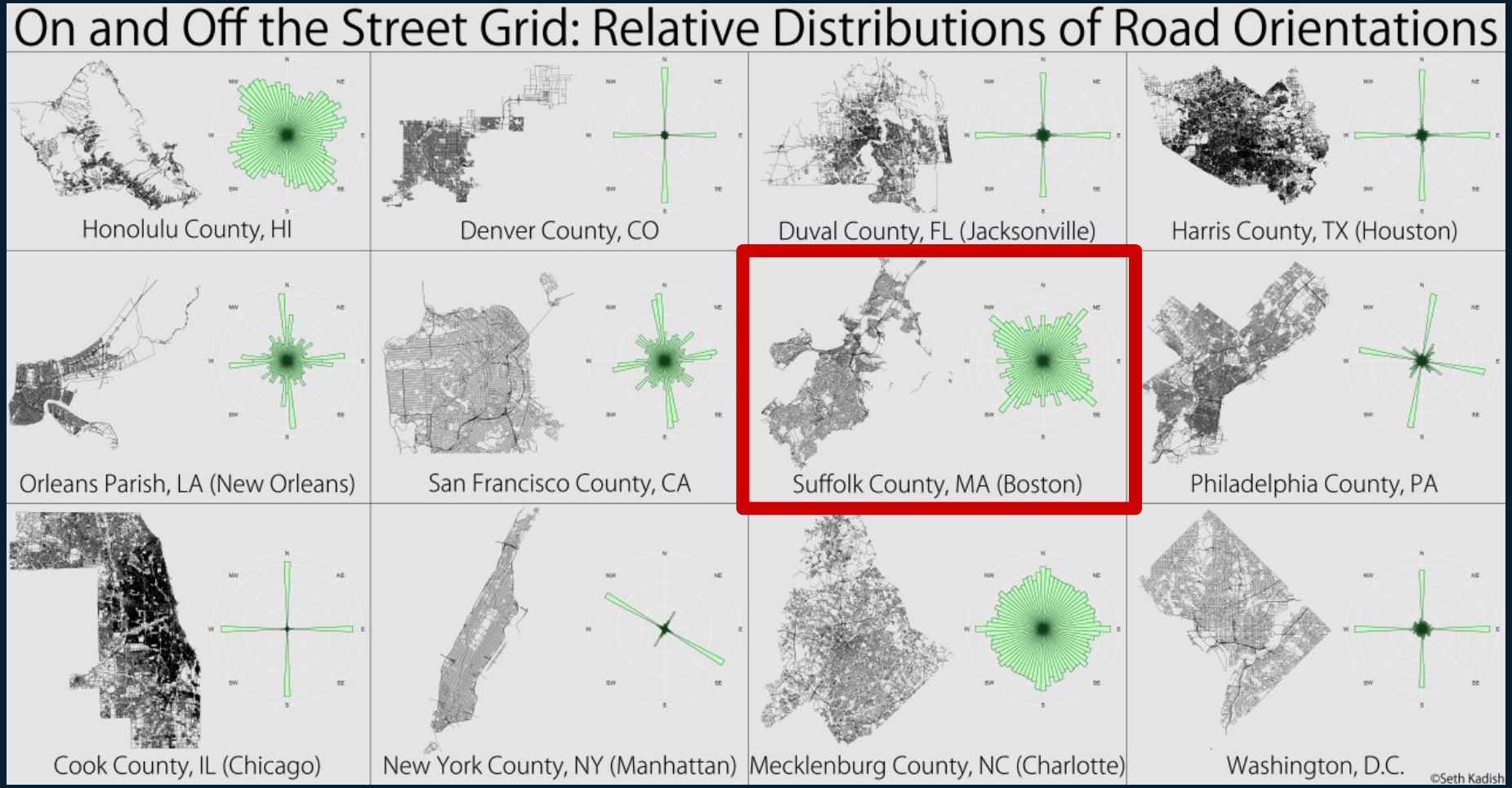
Unemployment rate: 3.5%

Private car ownership: 60% of households

Roadways: 850 miles

Getting to work: 40% drive alone, 5% carpool
33% use mass transit
15% walk, 2% bike

Boston: *Some Context of our roadways*



Worst Traffic in America *(?)*

Inrix Global Traffic Scorecard

URBAN AREA	2018 IMPACT RANK (2017)	HOURS LOST IN CONGESTION
Moscow	1 (1)	210 (10)
Istanbul	2 (3)	157 (32)
Bogota	3 (2)	272 (1)
Mexico City	4 (4)	218 (9)
Sao Paulo	5 (5)	154 (39)
London	6 (6)	227 (6)
Rio de Janeiro	7 (8)	199 (13)
Boston, MA	8 (7)	164 (25)
Saint Petersburg	9 (9)	200 (12)
Rome	10 (13)	254 (2)

Source: Inrix Traffic Scorecard 2018

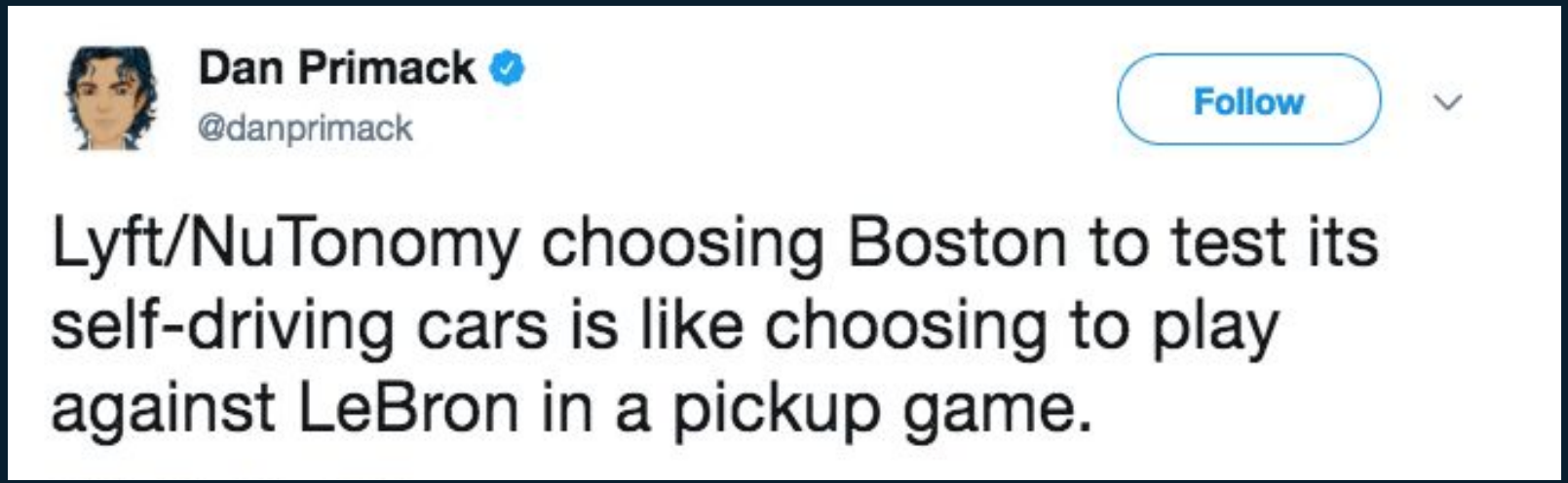
Autonomous Vehicles: *Made in Detroit. Tested in Boston.*

ALEX DAVIES AND AARIAN MARSHALL TRANSPORTATION 11.22.16 09:11 AM

SELF-DRIVING CARS WILL LOVE THE DRIVING HELL THAT IS BOSTON

Source: Wired Nov. 2016

Autonomous Vehicles: *Made in Detroit. Tested in Boston.*



Increasing Inequality

Source: Brookings Institute
Graphic by Huntington News

Effects of Climate Change

f Boston
r Martin J. Walsh

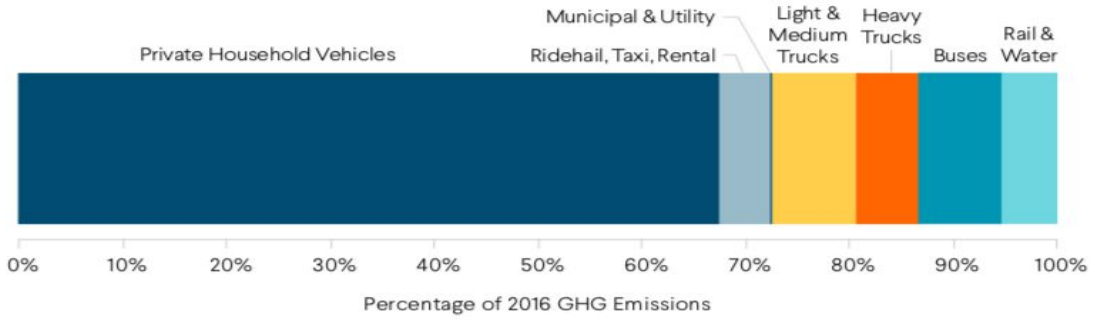
Our Goal: *Carbon Neutral by 2050*

The **City of Boston** has committed to **ambitious energy savings and emissions reductions targets**

- ↓ 25% by 2020
- ↓ 37.5% by 2025
- 100% carbon neutral by 2050

29% of total city emissions are from transportation. 75% of those are from private passenger vehicles

Transportation Emissions by mode



GoBoston 2030 Goals

ACCESS

Make Boston's neighborhoods interconnected for all modes of travel

SAFETY

Collaborate on design & education to substantially reduce collisions on every street

RELIABILITY

Prioritize making travel predictable on Boston's transit and roadway networks

GoBoston 2030 *Mode Shift Goals*

Boston Commuters	Share Today	2030 Aspirational
Public Transit	**33%**	**44%**
Walk	14.5%	20%
Bike	1.9%	8%
Carpool	5.4%	5%
Drive Alone	**40.6%**	**18%**
Other, Work from home	4.5%	5%

Three Case Studies: *in 8 minutes*

PROTOTYPE #1:
How can we change the culture of driving in Boston?

PROTOTYPE #2:
How can we nudge a mobility revolution towards a better societal outcome?

PROTOTYPE #3:
How can we be more equitable in our approach?

PROTOTYPE #1:

Can we change the culture of driving in Boston?

93% of drivers surveyed, rate themselves as above average.

Also known as "illusory Superiority"
a
Svenson, O (1981).
"Are we all less risky and more skillful than our fellow drivers?"
**93% is from the USA driver sample*

Allstate Insurance awards **Boston**
“worst drivers in the nation” two years in a row.

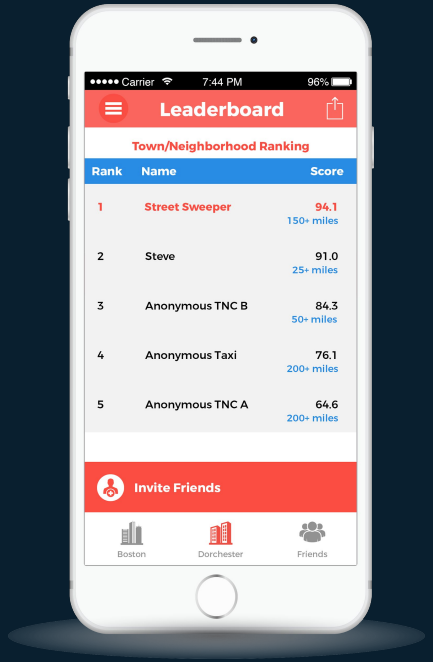
The typical driver in America gets into a collision once every **10 years.**
The typical driver in Boston gets into a collision once every **3.7 years.**

The Paradox: *an app for safer driving*

- Runs in the background
- Generates a Score out of 100
- Leaderboards & badges
- Points for “non-car” trips
- $10,000 in prizes

The Five Evaluated Behaviors

1. Phone Distraction
2. Speeding
3. Rapid Acceleration
4. Harsh Braking
5. Harsh Cornering



City of Boston
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“This app *finally* allows me to prove to my husband I’m a better driver.”

Carrie, Charlestown, MA

Actual Impact: 3 *Million Miles & 300,000+ trips*

Over 10-weeks, among the top 25% of users...

Phone distraction scores dropped by -47%

Harsh braking scores dropped by -37%

Speeding scores dropped by -35%

PROTOTYPE EXAMPLE #2:

How can we nudge a mobility revolution towards a better societal outcome?

SAFETY **ACCESS** **RELIABILITY**

How will autonomous vehicles help us achieve these goals?

SAFER STREETS

for Bicyclists & Pedestrians

94% of crashes in the USA are a result of human error
28% of fatal crashes in the USA are alcohol related

2017 in Boston

14
FATALITIES

4,537
SERIOUS INJURIES

Sources: 2017 Boston Vision Zero
2016 NHTSA

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BETTER ACCESS

Could autonomous micro-buses better connect Mattapan to rapid transit?

The longer an average commute...the worse the chances of low-income families moving up the ladder. Commute time has a stronger correlation than crime rates, school test scores, or family structure.

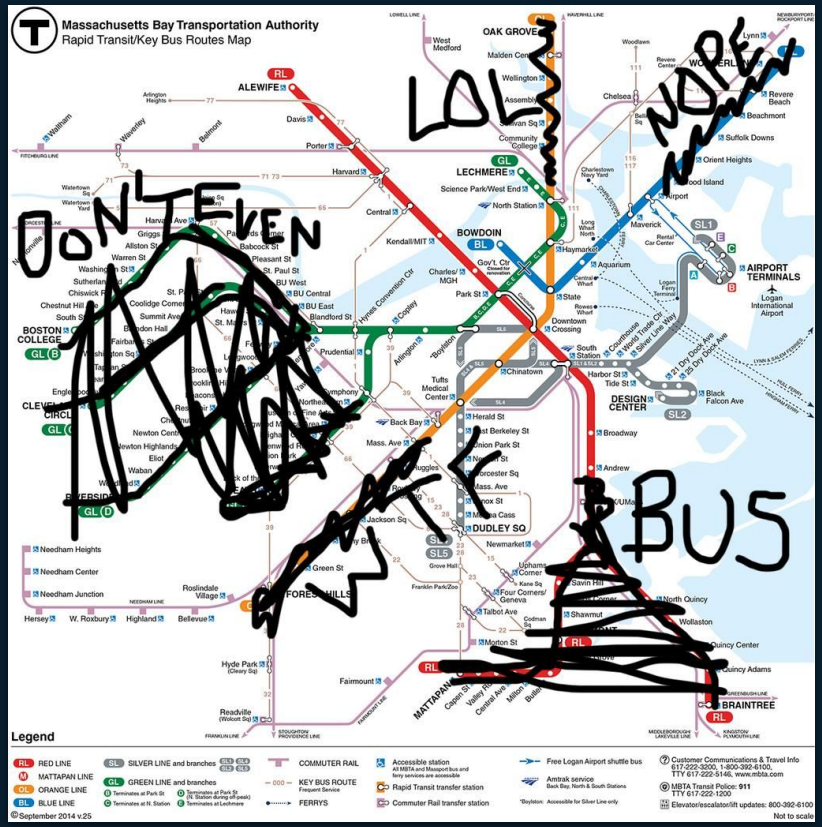
"The Impacts of Neighborhoods on Intergenerational Mobility"
Raj Chetty and Nathaniel Hendren, Harvard University

The average commute in Boston is 28 minutes

24% of Mattapan residents have a commute over 60 minutes

MUST BE RELIABLE TO BE MEANINGFUL

Mobility options that don't work in snow, don't work for us.

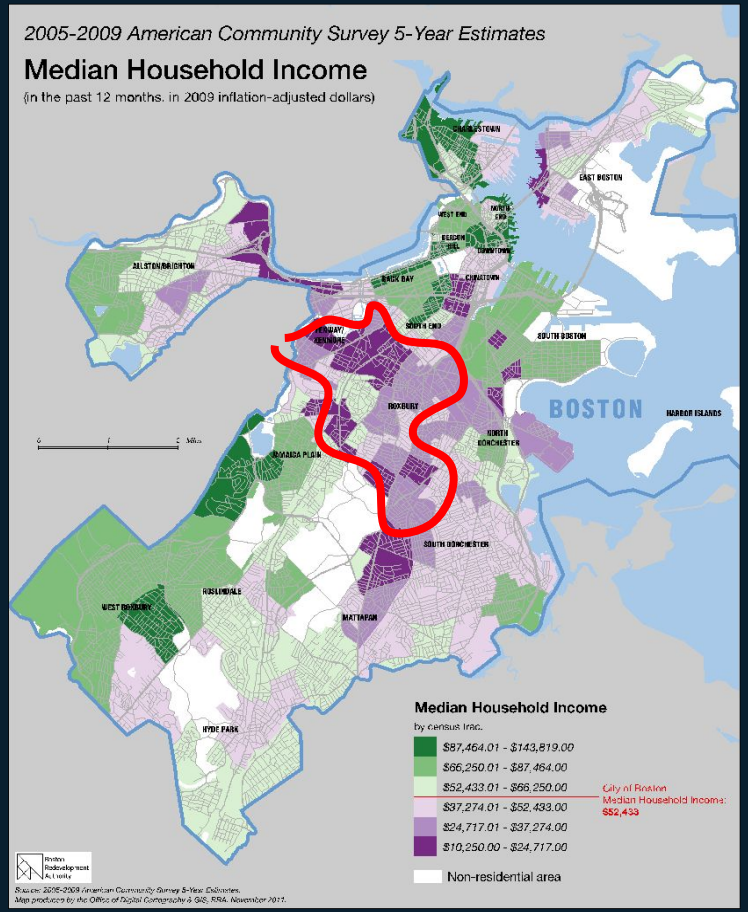


Unofficial Winter 2015 Snow Map

Source: MBTA Snow Map, Sara Morrison

ENSURE EQUITY

Who should ensure that algorithms are not biased?



If you’re not at the table, you’re on the menu

Si no estas en la mesa, estas en el menu*

*Via traductor de google

MAYOR WALSH SIGNS EXECUTIVE ORDER ON AUTONOMOUS VEHICLES

"...that our expected preferred deployment will be **fleets of autonomous vehicles that are electric and shared**...**ensure equitable access to opportunity** for those least well served by transportation options today, including seniors, youth, and those with physical disabilities."

All AV documents available at Boston.gov/boston-av

Testing: *Testing Partners*

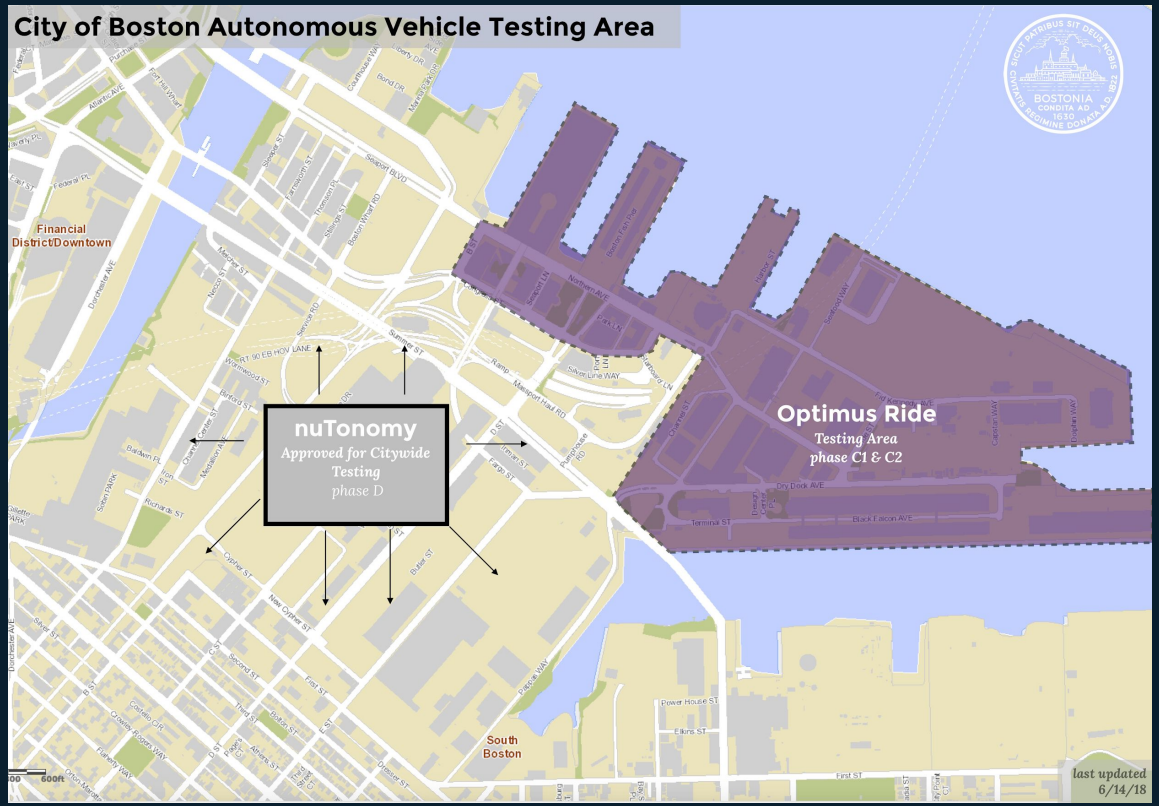
nuTonomy

"full-stack" & ride-hailing

Optimus Ride

"Super TOD"
first/last mile

Testing: *Phased Approach*



Generic Example (individual plans vary)

Full documentation of testing plans and approvals are in the "related documents" section at www.boston.gov/Boston-AV

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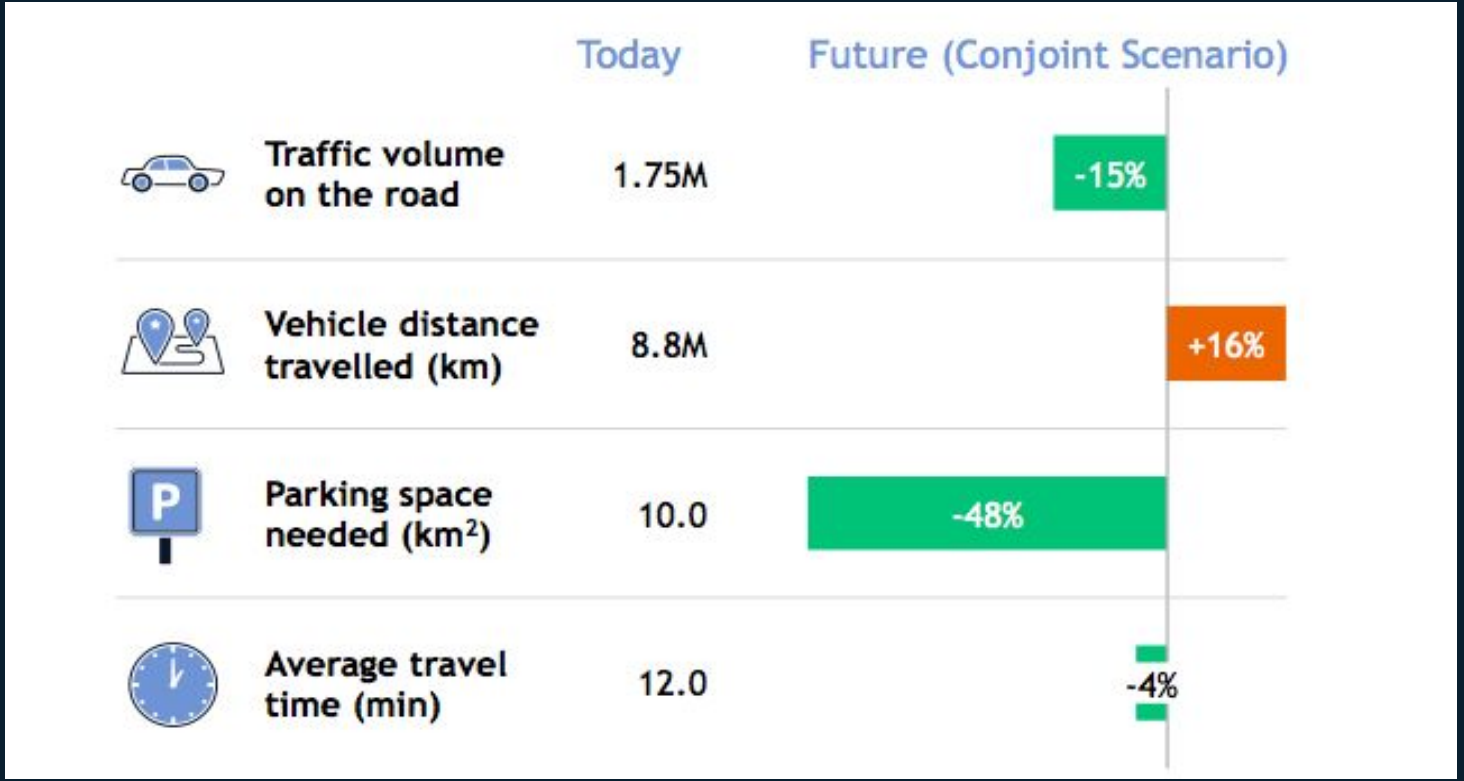
Testing: *Quarterly Reports*

Traffic signal solar glare, roadway ponding, snow removal, left turns, and other issues highlighted for further discussion & research

passenger pilots require 15% of people have mobility impairments

Each Quarterly Report can be viewed at www.boston.gov/boston-av
The report referencing passenger pilots from nutonomy can be found: https://www.boston.gov/sites/default/files/document-file-02-2018/q4_report.pdf

Research: *Modeling a future Boston*
[at 37% Autonomous Vehicle penetration]



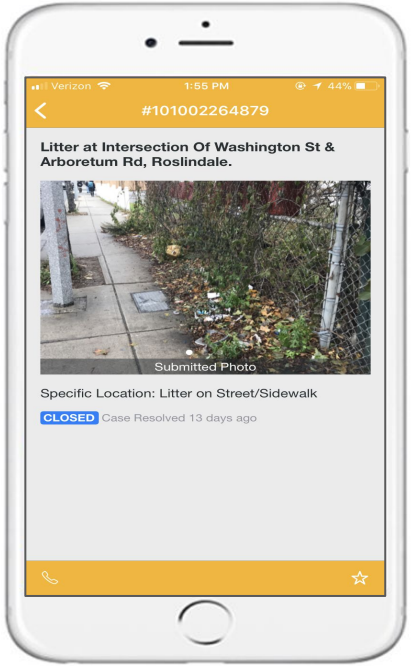
Source: WEF; BCG & MIT Analysis; 2018
http://www3.weforum.org/docs/WEF_Reshaping_Urban_Mobility_with_Autonomous_Vehicles_2018.pdf

PROTOTYPE #3:

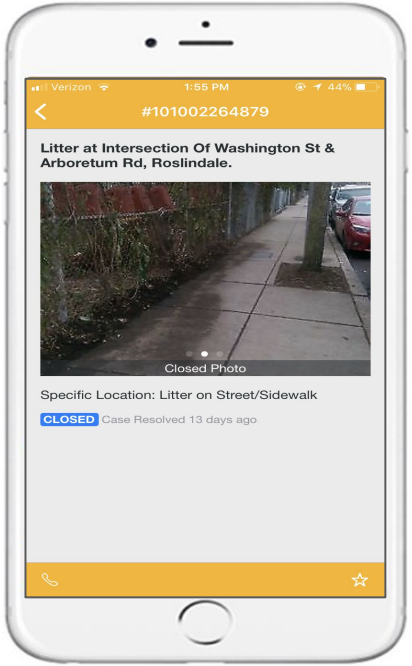
How can we be more equitable in our approach?

Civic Engagement with 3-1-1

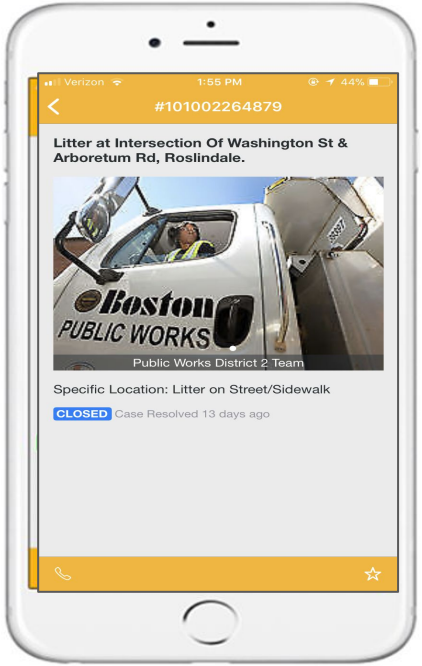
The Problem



The Result



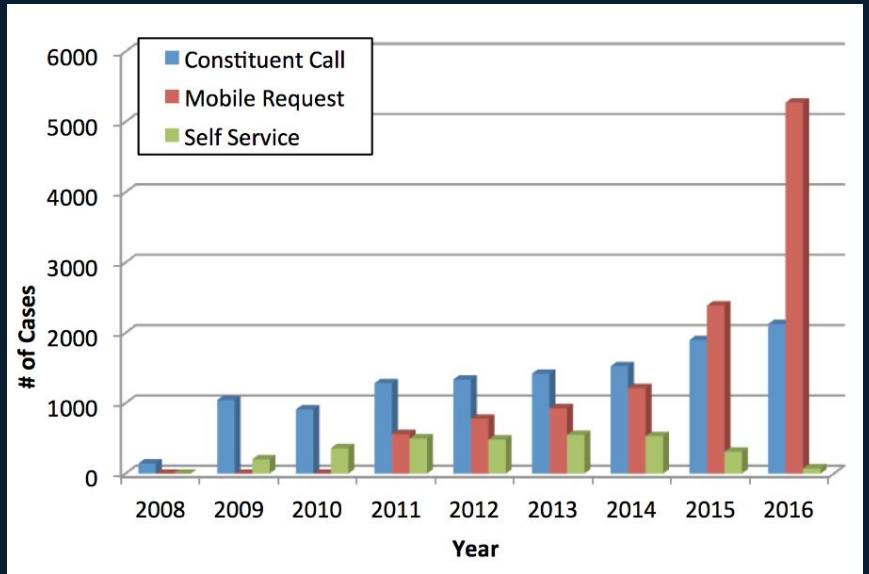
The Team



Too Much Civic Engagement?

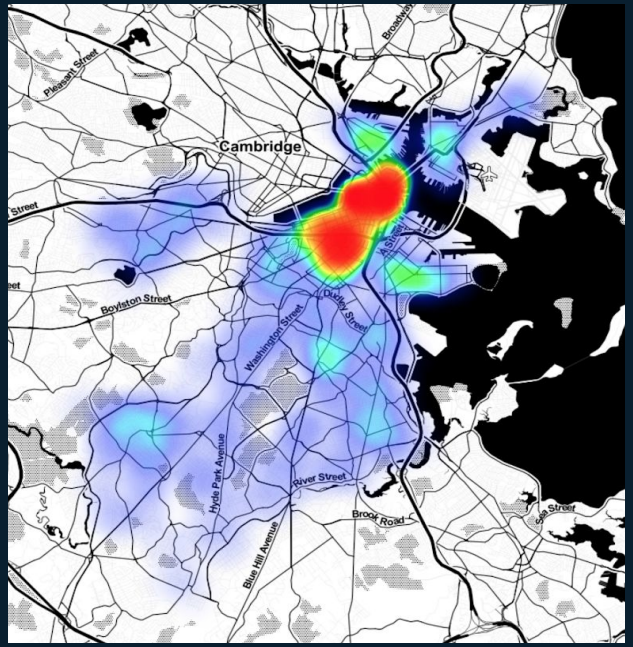
- The City used constituent requests to determine repair locations with the promise that all requests will be met within 18-24 months.

- After updating the 3-1-1 app to be more user-centered, the number of requests skyrocketed and made this “promise” impossible, creating a $500M repair backlog

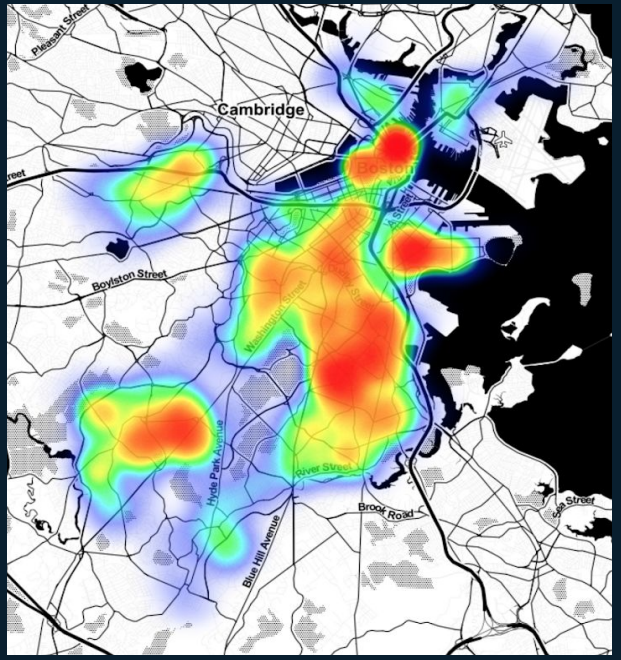


A Look at Repair Requests

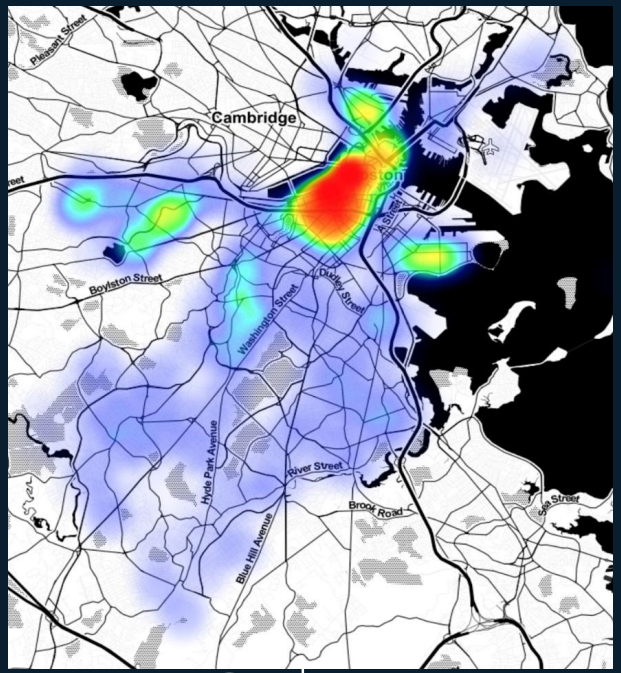
Requests
(red=high frequency)



Sidewalk Conditions
(red=poor)



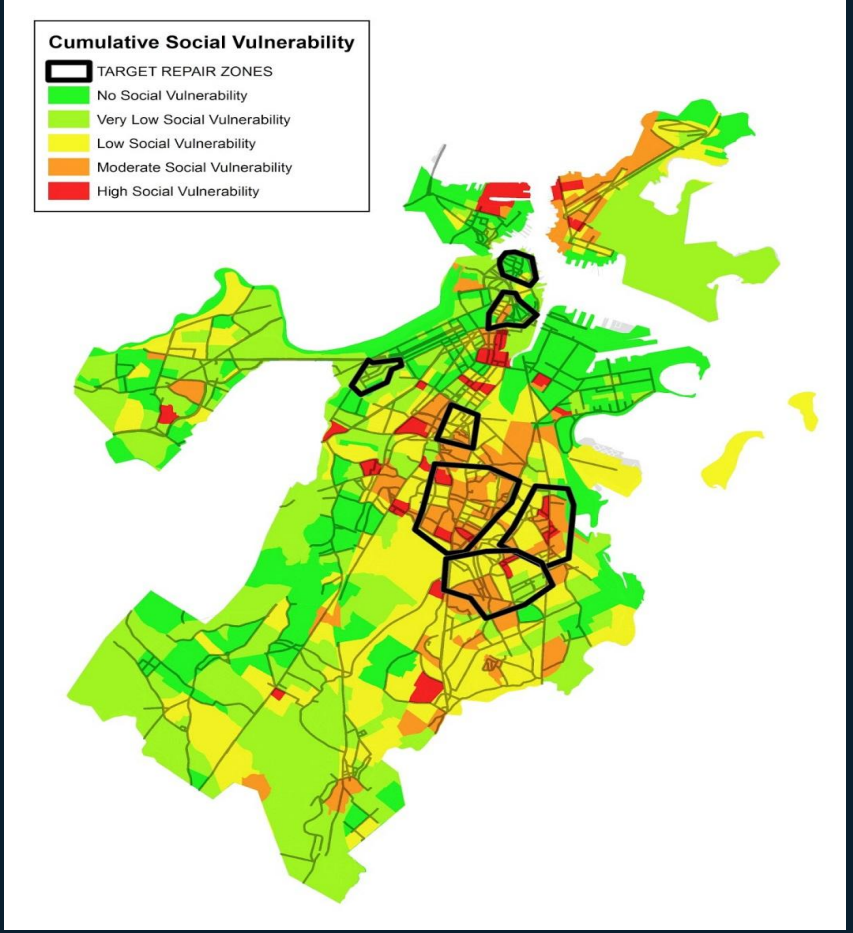
Per Capita Income
(red=highest)



A New Strategy

Look for ***highest impact per dollar, increase effectiveness, focus on people***

- Full replacement instead of partial repairs
- Prioritize repairs where people are/walk the most **(high priority network)**
- Prioritize where our repairs will help citizens the most (**social vulnerability)**



A Final Thought

We shape our buildings; thereafter they shape us.

-Winston Churchill

A Final Thought

Streets

We shape our ~~buildings~~; thereafter they shape us.

-Me

Thank You

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