

GEORGIA SMART

Enabling Resiliency and Sustainability through
Academic Research and Public Sector Collaboration

City of Woodstock

2019-2020 Class

Final Report

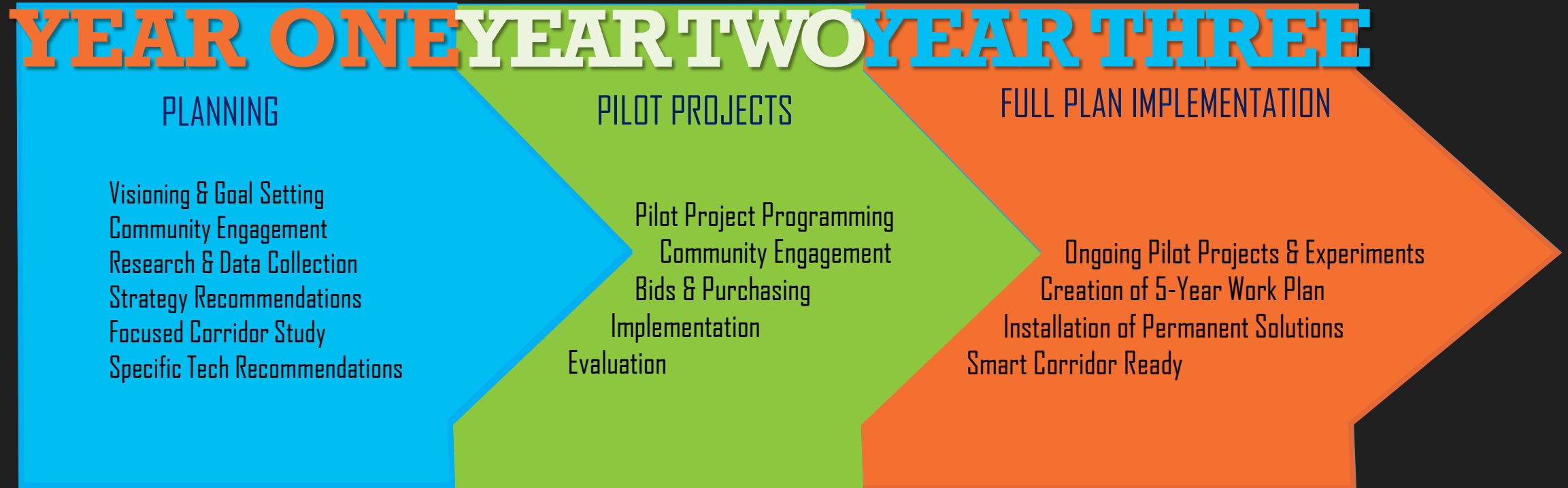
9/3/20



Social Media Tag
#GeorgiaSmart



OVERALL PROJECT FRAMEWORK



PROJECT OVERVIEW (YEAR 1)

Smart Woodstock Citywide Strategy

- A planning document to set overarching goals & vision
- Objective: Answer the question "What are we trying to achieve by becoming a Smart City?"

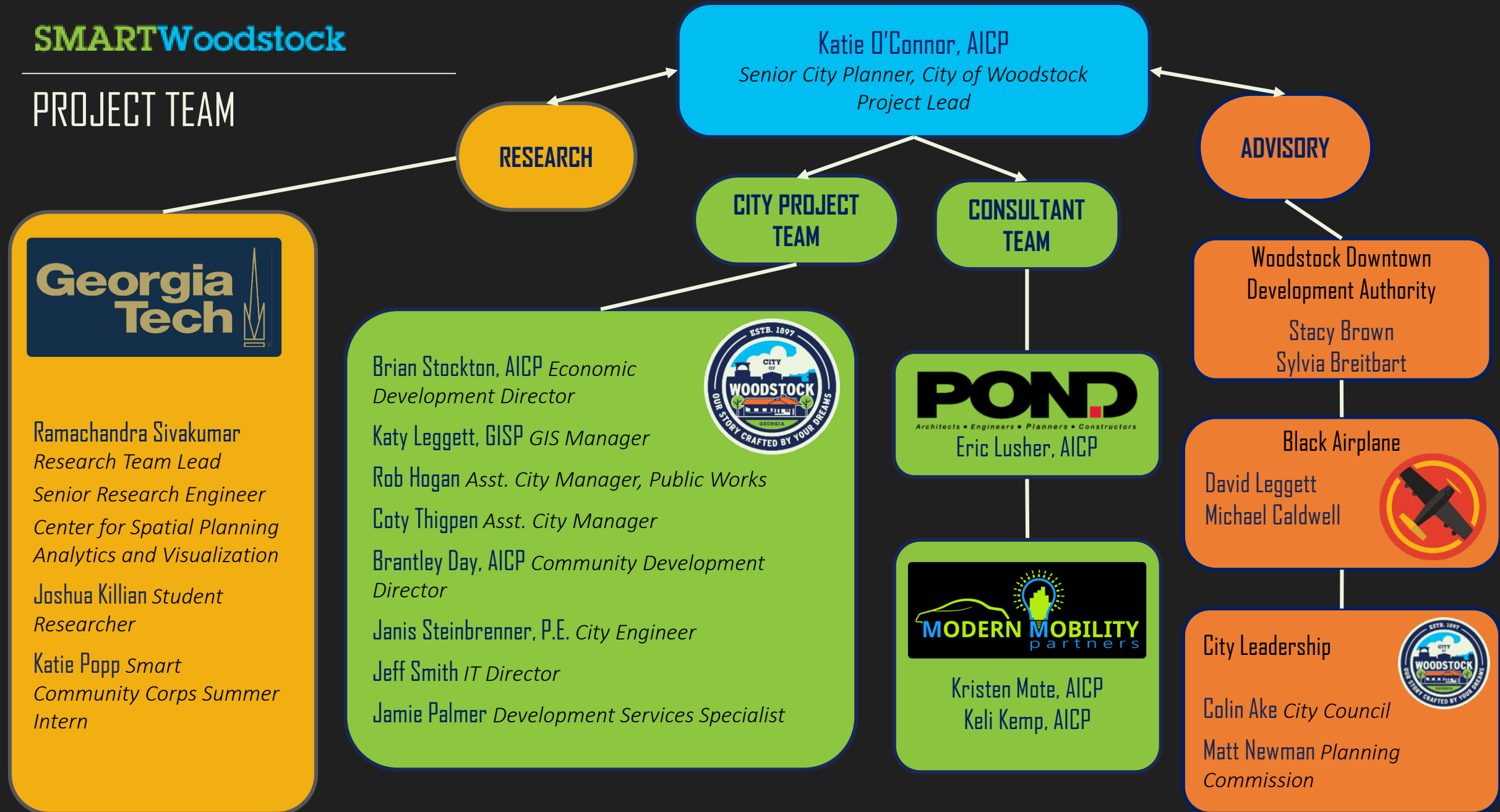
Smart Woodstock Downtown Corridor Study

- A more specific planning document with an identified study area
- Outlines issues in the corridor and recommends specific technical solutions
- Objective: Readiness to put technology on the ground in year 2

Study Area: Main Street, Arnold Mill Road, and Towne Lake Parkway, and the busiest intersection in town where they converge



PROJECT TEAM



SMARTWoodstock

WOODSTOCK'S MOTIVATION TO BECOME SMART

The need to balance pedestrian comfort & safety with vehicular efficiency & commuter throughput in a booming walkable urban center



Downtown Activity: It is estimated that over 100,000 people attended events in DT in 2018. Amphitheater, Farmer's Markets, Scarecrow Invasion, Friday Night Live

Commuter Traffic: Main Street has 18,400 vehicles per day and Arnold Mill Road has 12,700 vehicles per day

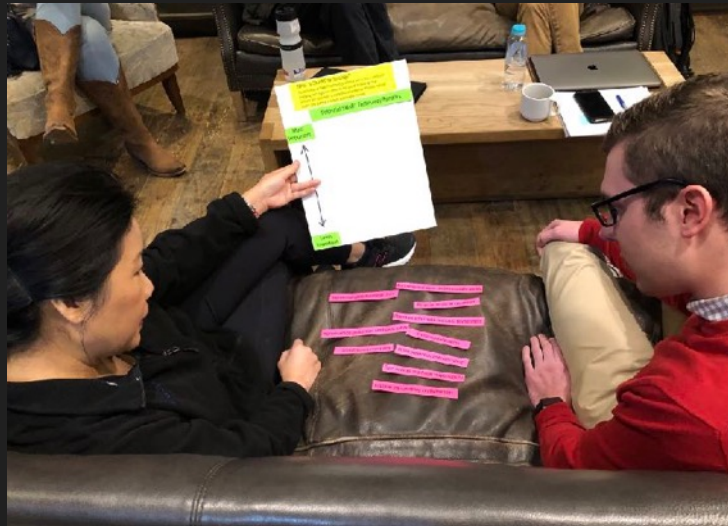
PROJECT TIMELINE



PUBLIC ENGAGEMENT

Citywide Strategy Survey

- Project-defining question: *When it comes to smart technology, which potential benefits are most important to you?*
- 469 total responses
 - 95 in-person Intercept Interview sessions
 - 374 online survey responses



What is SMART technology?

The definition of SMART technology is broad and in many ways still emerging, but in general refers to the use of technology that collects and uses data to autonomously improve efficiency, reduce waste, and operate in a more sustainable manner.

Most
Important

Potential SMART Technology Benefits

- Crime prevention and monitoring
- Improve vehicle, pedestrian, and bicycle safety
- Environmental benefits
- Cost savings and fiscal responsibility
- Improve transparency in government
- Infrastructure monitoring
- Potential return on investment
- Opportunity to create economic development
- Technology that won't become obsolete quickly
- Improve transportation travel times

Least
Important

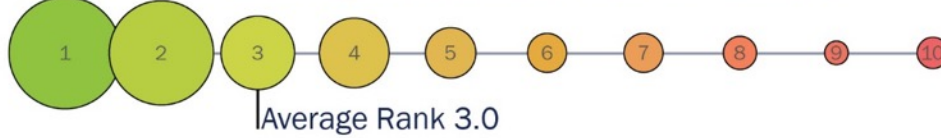
#1
(tie)

Improve vehicle, pedestrian, and bicycle safety



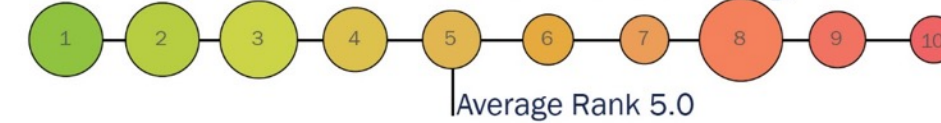
#1
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Improve transportation travel times



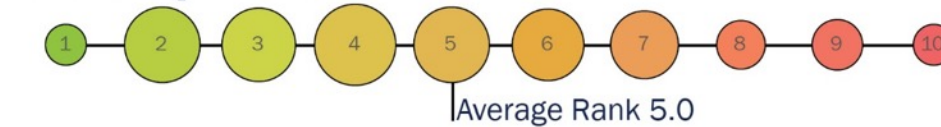
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Crime prevention and monitoring



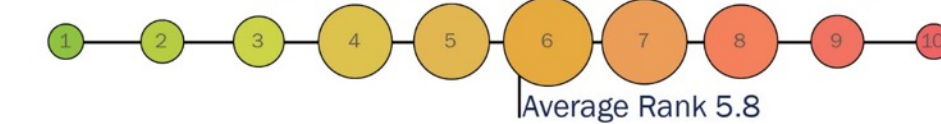
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Opportunity to create economic development



#5

Cost savings and fiscal responsibility



Number of Responses

10

25

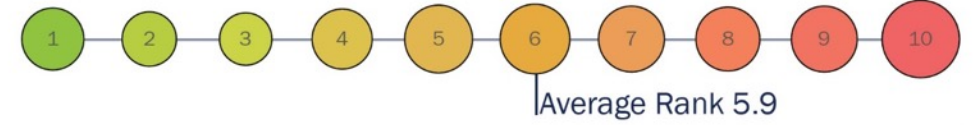
50

75

100

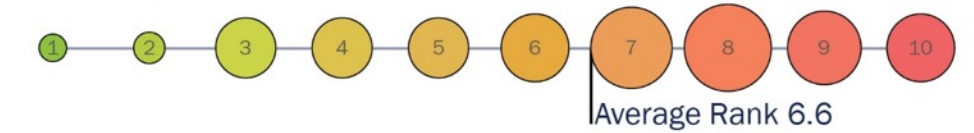
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Potential return on investment



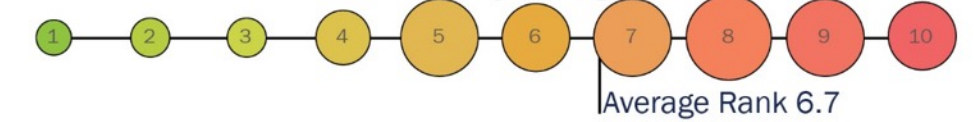
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Technology that won't become obsolete quickly



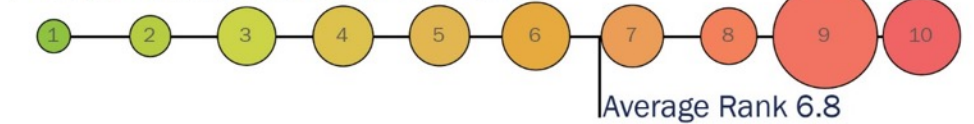
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Improve transparency in government



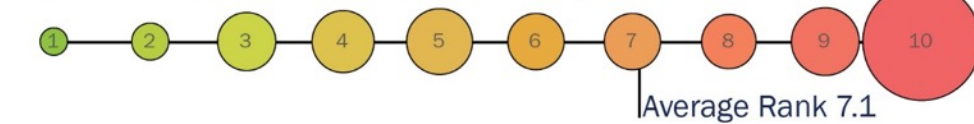
#9

Environmental benefits



#10

Infrastructure monitoring



Results from the Citywide Strategy Survey
Responses
Graphic produced by Pond

469

PUBLIC ENGAGEMENT

Downtown Corridor Study Survey

- This longer survey included multiple choice questions related to demographics and how people move to and through Downtown and a map component
- Mapping feature with commenting and ability to vote on comments is popular, currently 162 comments, not including up and down voting on comments
- Survey publicized with small sticker-flyers
- Please visit smartwoodstock.com or wdstk.ga/smart to access the final map comments

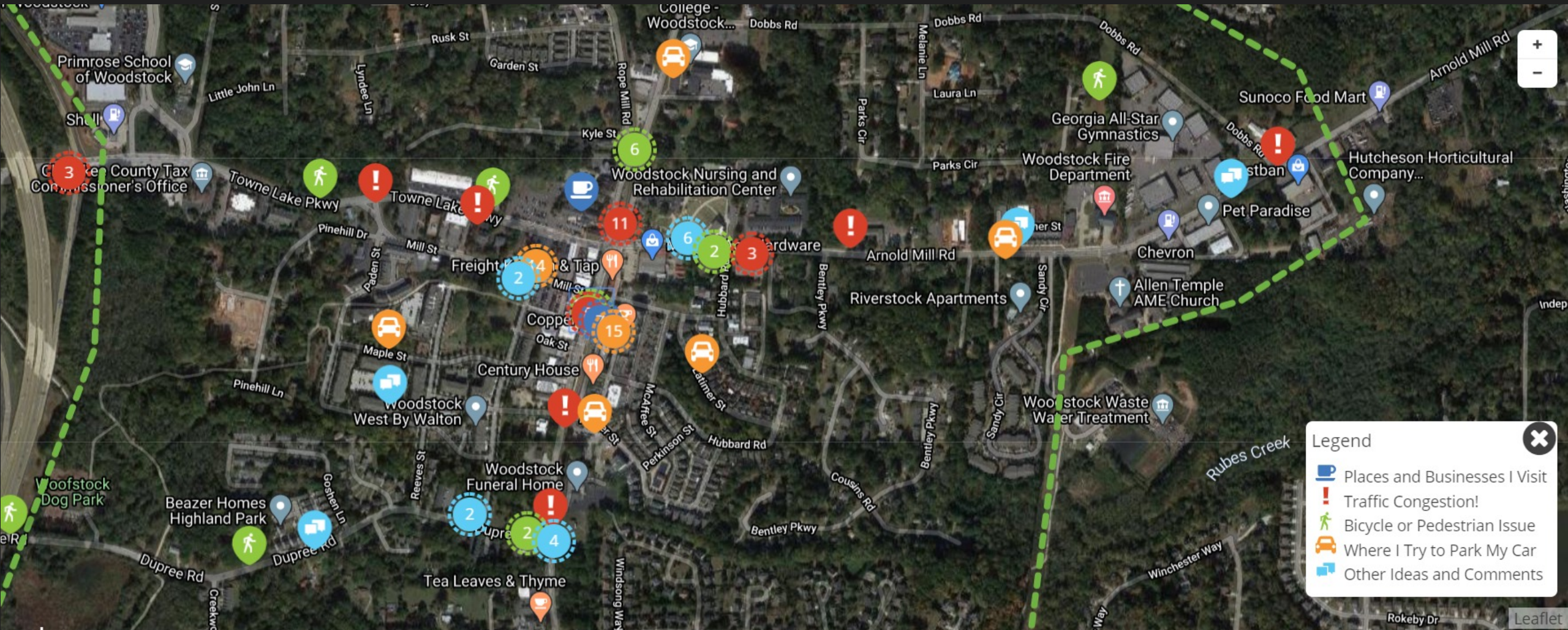


MORE COMMUNITY ENGAGEMENT!

181 initial pins

836 additional up/down votes

1,107 total comments

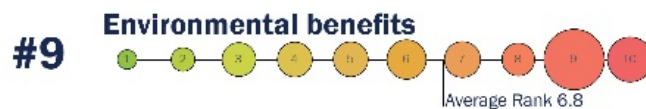
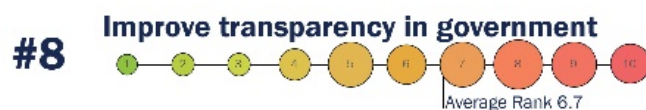
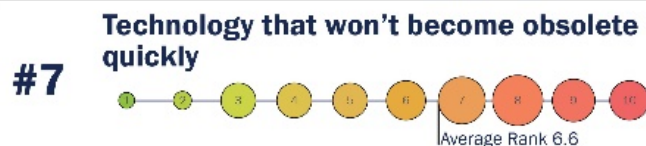
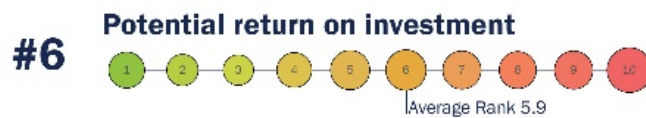
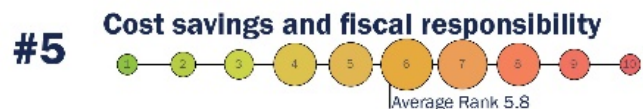
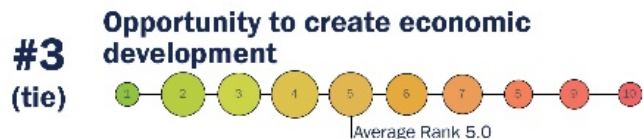
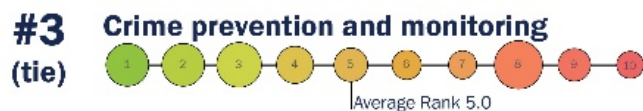


SMARTWoodstock

VIRTUAL TOURS & PANEL DISCUSSION

SHORTLISTING INITIATIVES

March 6, 2020 Work Session



Project Type	Improve Vehicle, Pedestrian, and Bicycle Safety	Improve Transportation Travel Times	Crime Prevention & Monitoring	Opportunity to Create Economic Development	Cost Savings & Fiscal Responsibility	Potential Return on Investment	Technology That Won't Become Obsolete	Improve Transparency in Government	Environmental Benefits	Infrastructure Monitoring	PRELIMINARY SCORE
Average Survey Rank (as of 2/18/20)	3	3	5	5	5.8	6	6.6	6.7	6.7	7.1	n/a
Score Allotment (Differential from 10)	7	7	5	5	4.2	4	3.4	3.3	3.3	2.9	n/a
Automated traffic monitoring/detection	7	7	5	5	0	4	3.4	3.3	0	2.9	37.6
Shared Mobility	7	7	5	5	4.2	0	3.4	0	3.3	0	34.9
Signal pre-emption (emergency vehicles)	7	7	5	5	0	4	3.4	3.3	0	0	34.7
Trash receptacle sensors	7	0	5	5	4.2	0	3.4	3.3	3.3	2.9	34.1
Integrated data exchange	7	7	5	5	0	0	3.4	3.3	0	2.9	33.6
Cameras/license plate readers	7	7	5	5	0	0	3.4	3.3	0	2.9	33.6
Automated Parking Systems (garage or outdoor system)	7	7	0	5	4.2	4	0	0	3.3	2.9	33.4
Solar/smart streetlights	7	0	5	0	4.2	4	3.4	3.3	3.3	2.9	33.1
Smart dots in street centerlines	7	7	0	0	4.2	0	3.4	3.3	3.3	2.9	31.1
Vehicle-to-Infrastructure, vehicle-to-vehicle, vehicle-to-everything applications	7	7	5	5	0	0	3.4	0	0	2.9	30.3
Signal priority (transit, bike, ped)	7	7	0	5	4.2	0	3.4	0	3.3	0	29.9
Parking availability app (included preferred parking for carshare)	0	7	0	5	4.2	4	3.4	0	3.3	2.9	29.8
Micro-delivery (drone, autonomous couriers)	0	7	5	5	4.2	0	3.4	0	3.3	0	27.9
Roadside sensors to communicate conditions	7	7	0	0	4.2	0	3.4	0	3.3	2.9	27.8
Flexible curbside management (loading, Lyft/Uber, on-street parking, EV charging)	7	7	5	5	0	0	3.4	0	0	0	27.4
Electric Vehicle (EV) charging stations	0	7	0	5	0	4	3.4	0	3.3	2.9	25.6
Adaptive traffic control	7	7	0	5	0	0	3.4	0	0	2.9	25.3
Vehicle/Pedestrian warning applications (in transit vehicle)	7	7	0	5	0	0	3.4	0	0	2.9	25.3
Bus stop warning applications (alerts nearby vehicles or pedestrians)	7	7	5	0	0	0	3.4	0	0	2.9	25.3
Curb/lane flexibility	7	7	0	5	0	0	0	0	3.3	2.9	25.2
Gunshot detection technology	7	0	5	5	0	0	3.4	3.3	0	0	23.7
Video Surveillance PPP	7	0	5	5	0	0	3.4	3.3	0	0	23.7
Technology for extreme weather conditions	7	7	0	0	0	0	3.4	0	3.3	2.9	23.6
Mobility as a Service (Plan, ticket, and pay for all modes in one app)	0	7	0	5	4.2	0	3.4	0	3.3	0	22.9
Micro-mobility	0	7	0	5	4.2	0	3.4	0	3.3	0	22.9
Digital wayfinding signs/kiosks	7	7	0	5	0	0	3.4	0	0	0	22.4
Navigation assistance sensors for visually impaired	7	7	0	5	0	0	3.4	0	0	0	22.4
Solar/smart pavement/sidewalks (ice, Wi-Fi, striping, electric vehicles)	7	0	5	0	0	0	3.4	0	3.3	2.9	21.6
Autonomous shuttles	0	7	0	5	0	0	3.4	0	3.3	2.9	21.6
Bike traffic signals	7	7	0	0	0	0	3.4	0	3.3	0	20.7
Cross alert system for bike/ped (motion sensor triggers)	7	7	0	0	0	0	3.4	0	0	2.9	20.3
Flashing pedestrian beacons	7	7	0	0	0	0	3.4	0	0	2.9	20.3
School zone beacons	7	7	0	0	0	0	3.4	0	0	2.9	20.3
Construction zone related applications	7	7	0	5	0	0	0	0	0	0	19.0
Real-time transit data and system coordination	0	7	0	5	0	0	3.4	0	3.3	0	18.7

CITY WIDE STRATEGIES



DOWNTOWN CORRIDOR STRATEGIES



POTENTIAL PILOT PROJECT INITIATIVES



Image Source: LightGuard Systems



Image Source: COORD

Illuminated Sidewalks



Mobility



Parking



Data /
Information



Connected &
Autonomous
Vehicles

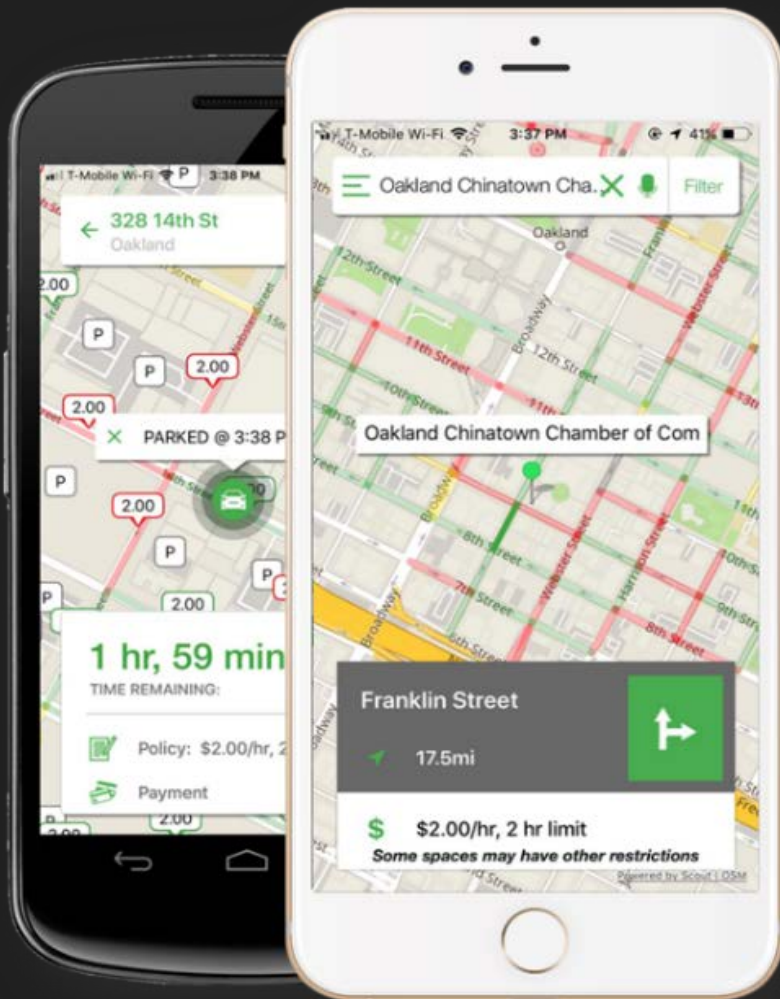


Goods /
Delivery

Description

The in-pavement illuminated sidewalks and crosswalks are embedded with lighting systems that are oriented towards oncoming traffic and to provide a lit walking path for pedestrians and notify drivers that pedestrians are in the crosswalk.

POTENTIAL PILOT PROJECT INITIATIVES



Parking Availability



Mobility



Parking



Data /
Information



Connected &
Autonomous
Vehicles



Goods /
Delivery

Description

Real-time parking availability apps serve to inform drivers of available parking spaces based on street-level sensors that detect when a space becomes available. This may also be broadcasted using dynamic signage at the entrance to a parking lot or parking deck to show how many spaces are available. Can be integrated into existing app platforms.

POTENTIAL PILOT PROJECT INITIATIVES

Curb/Lane Flexibility



Mobility



Parking



Data /
Information



Connected &
Autonomous
Vehicles

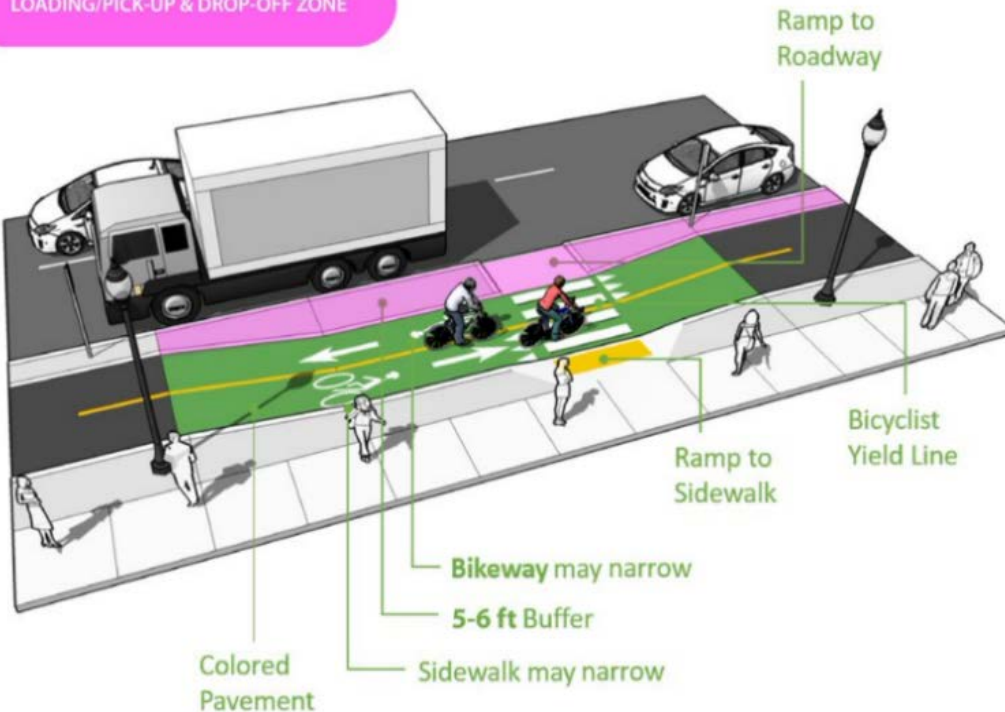


Goods /
Delivery

Description

Curb/Lane flexibility is all about repurposing the parking and/or travel lane. Space for parking cars along the curbs could be transformed into a multi-use space that is adjustable based on a city's needs and goals. Usage can even change throughout the day; a loading zone in the afternoon (including micro-delivery), and a ride share drop-off space at night in an entertainment district. This is best paired with curbside occupancy sensors.

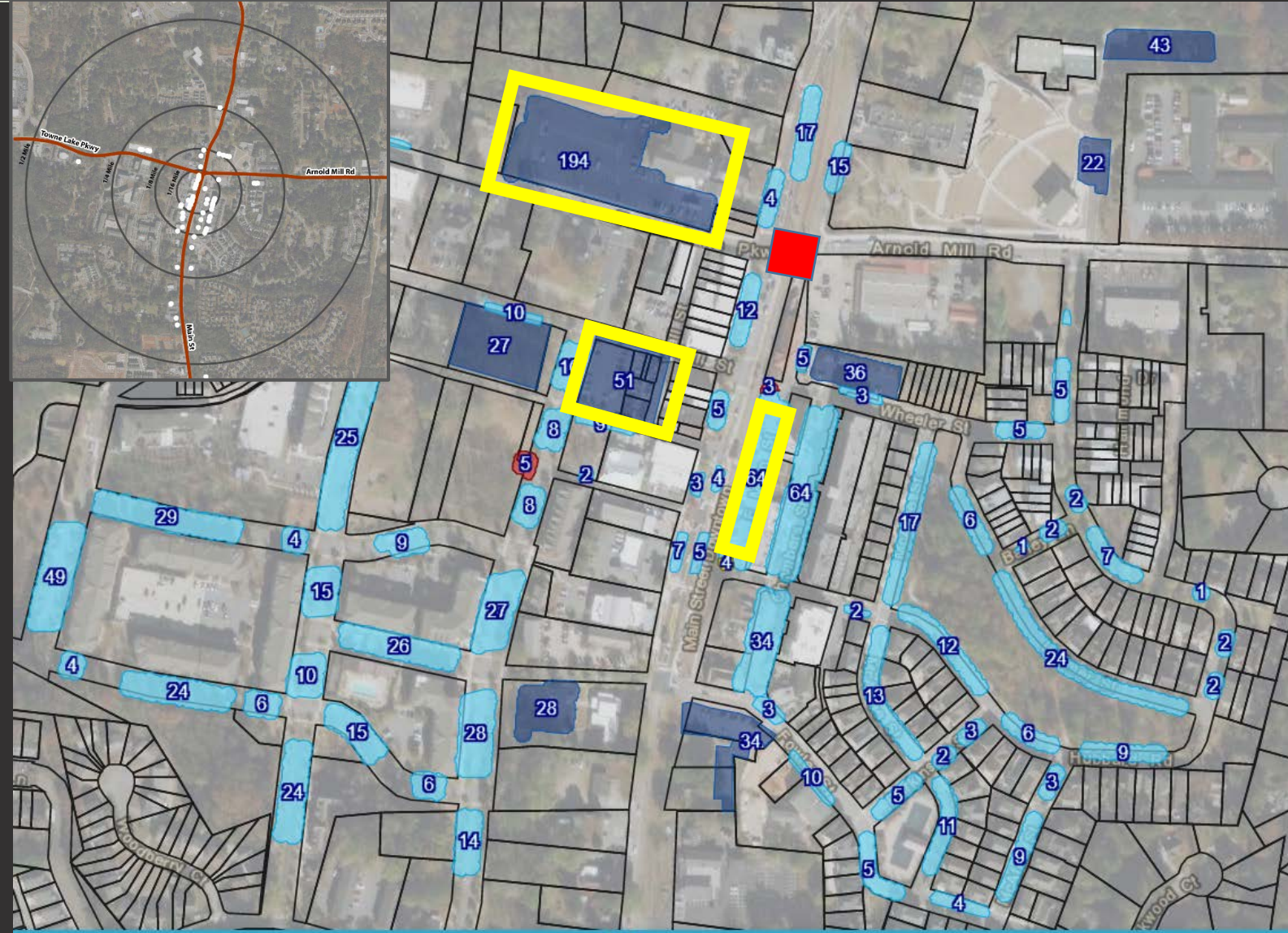
LOADING/PICK-UP & DROP-OFF ZONE



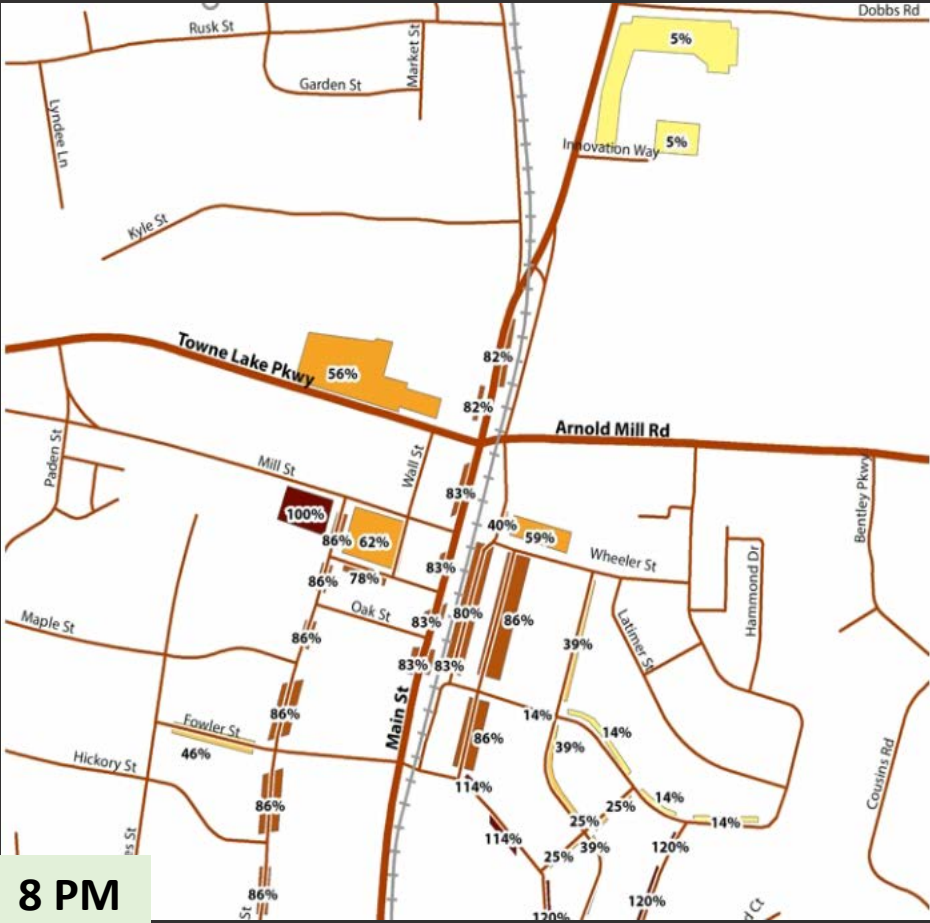
Source: New Frontiers on the Street: Managing Your Curb Space in a Time of Mobility Disruption, Local Government Commission.

Downtown parking inventory

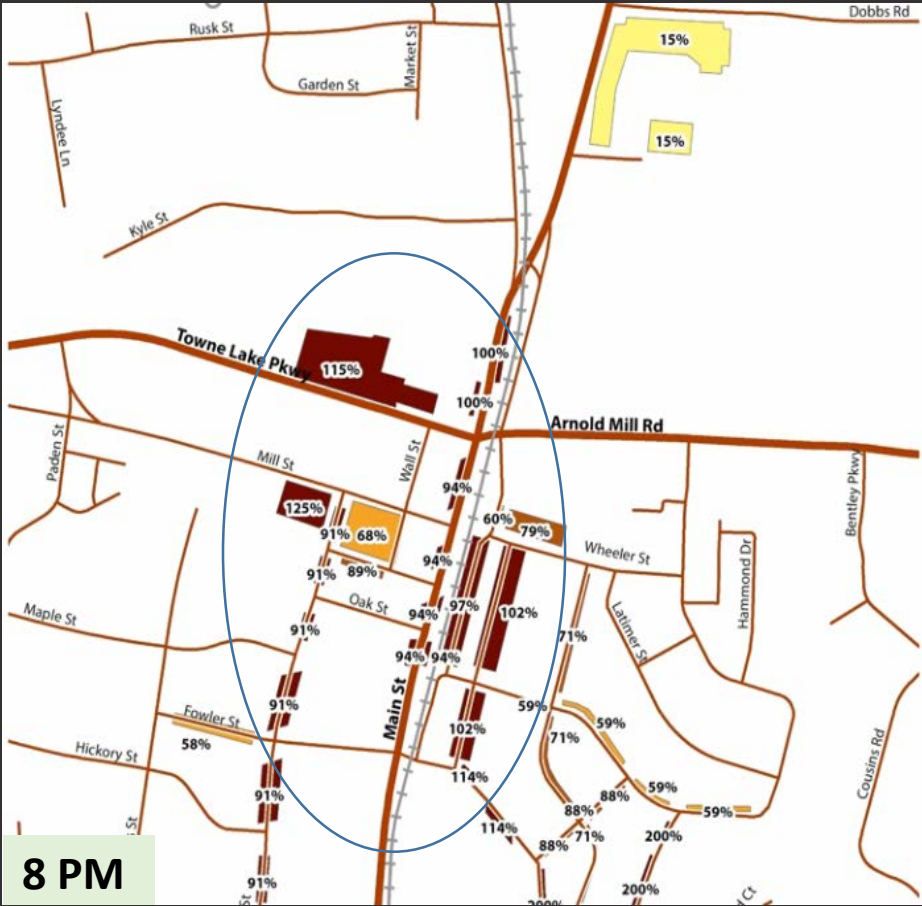
- 960 + parking spaces
- Spatially distributed across downtown
- Lots of street parking
- No parking decks
- Free parking
- Congestion caused due to visitors looping around to find parking
- Long term parking in prime spaces
- Lack of parking space rotation
- Lack of parking availability info



Parking Availability

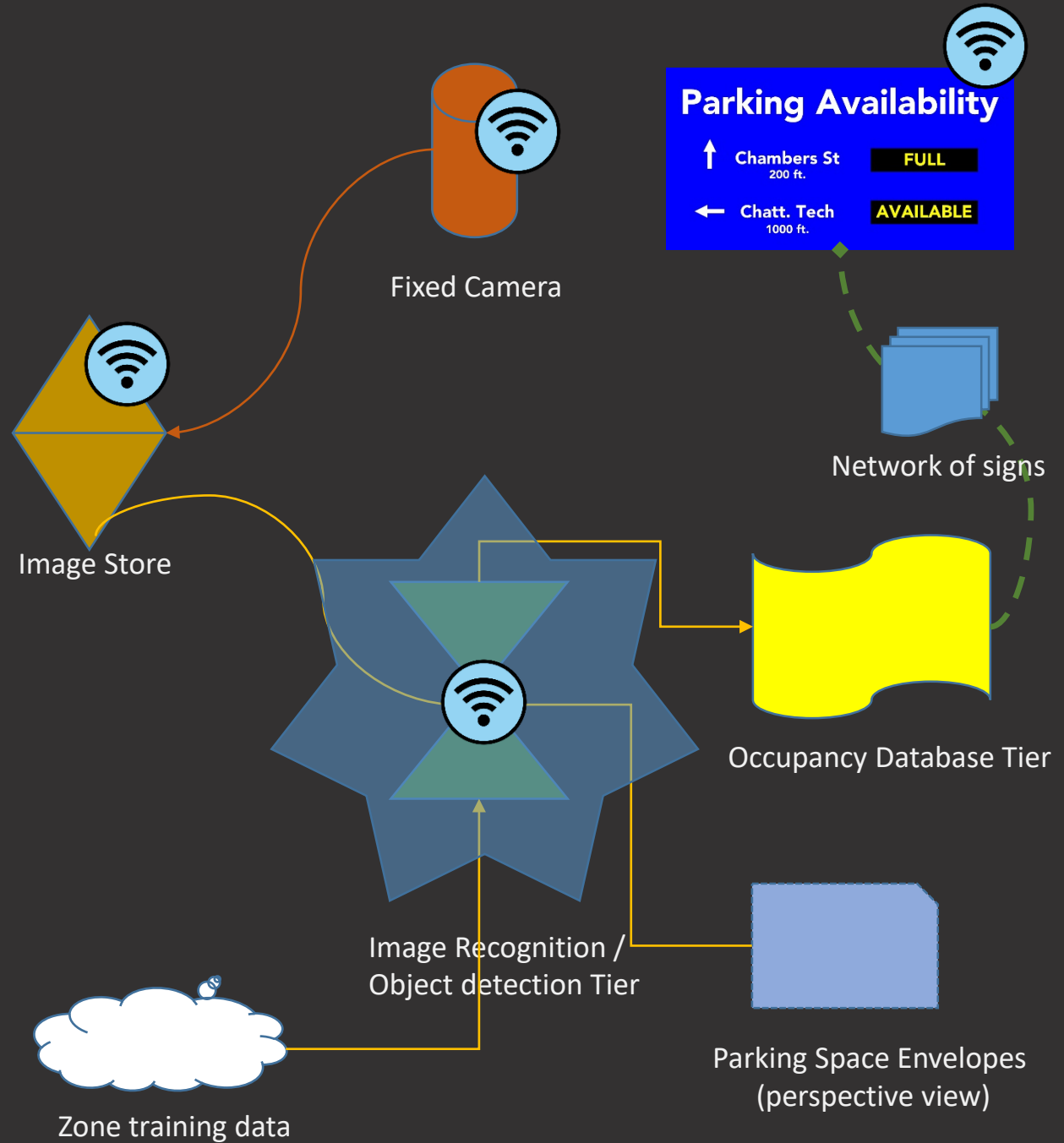


Downtown parking on a **weekday (Wed)** reaches its peak in the evening hours.



Downtown parking on a **Saturday** remains busy throughout the day.

Parking Availability



View Overlooking Parking Lots

Approach to parking lots from 4 different directions



Deep Learning Methodologies:

R-CNN (Region - Convolutional Neural Network), Fast R-CNN, Faster R-CNN

R-FCN (R- Fully Convolutional Neural Network), YOLO (You Only Look Once), SSD (Single Shot Detector)

Computer vision based occupancy determination for Parking Spaces

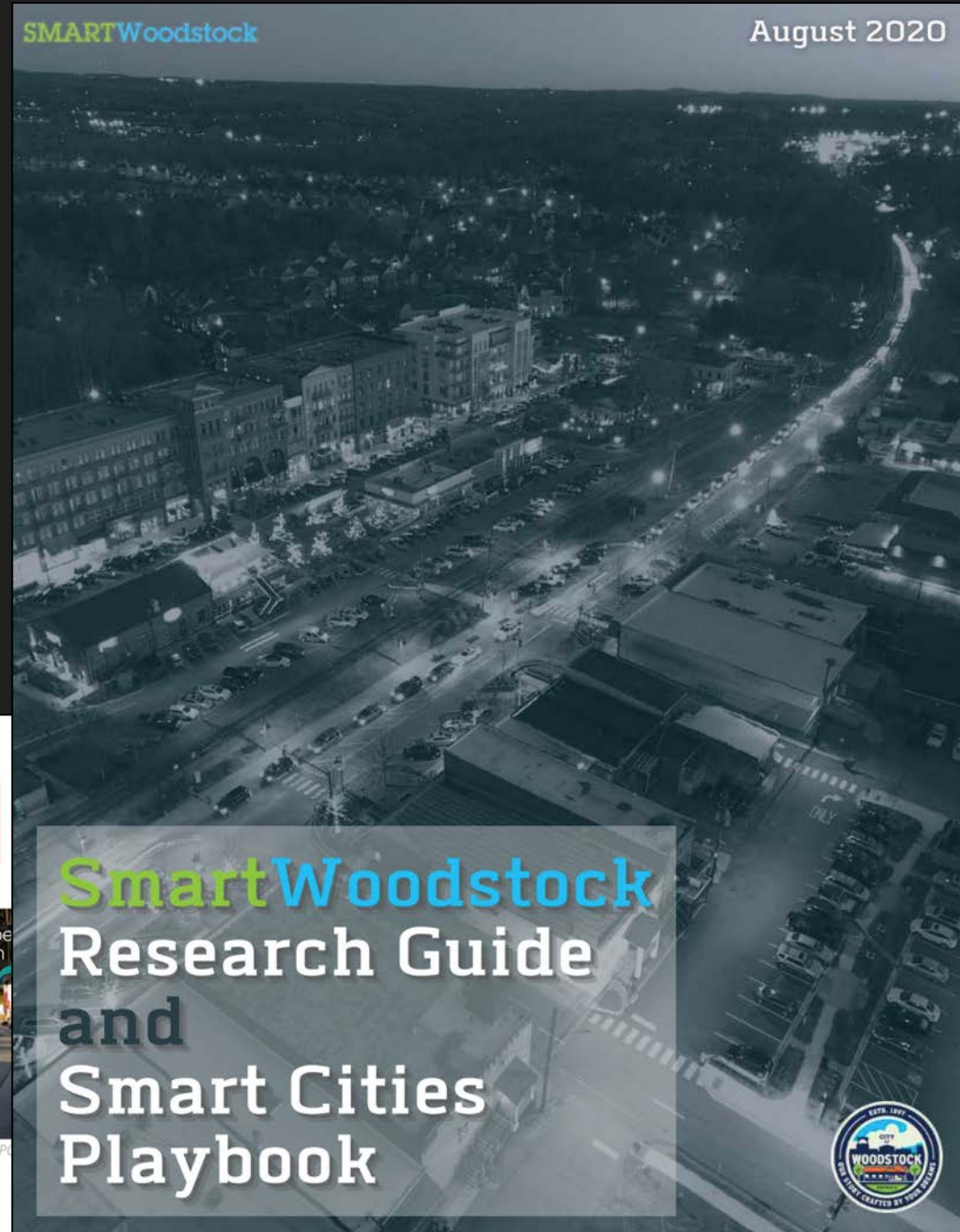
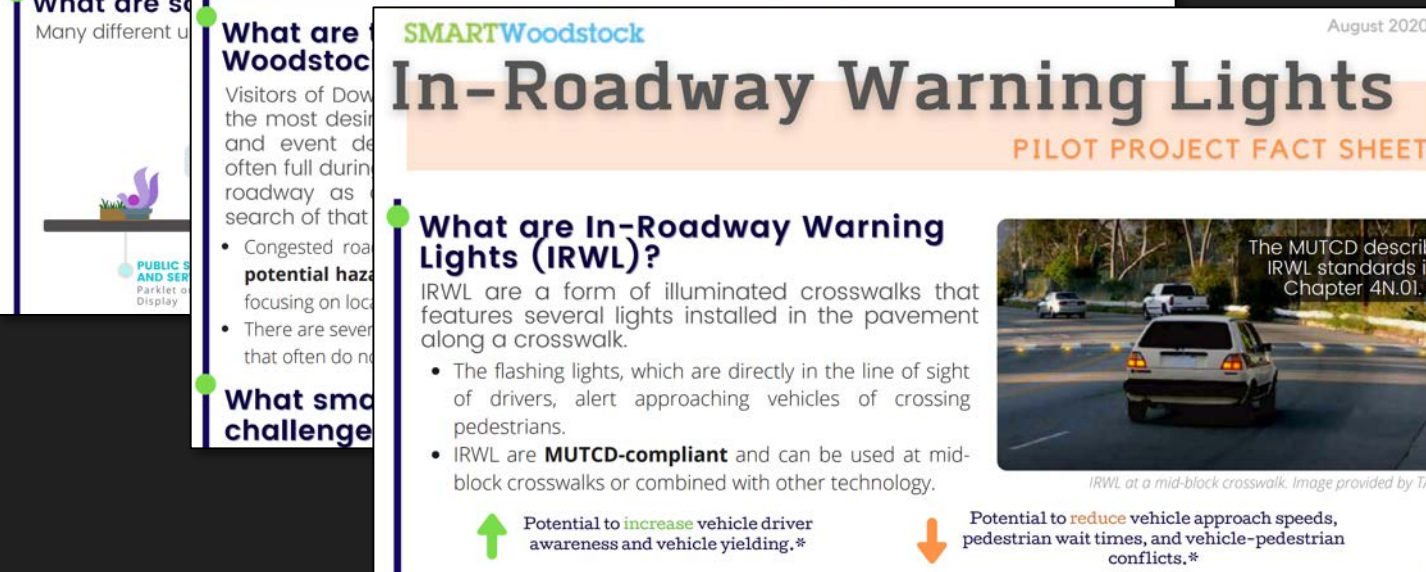
 Available  Occupied



Data Governance and Management

- Design Woodstock citizen-centric data governance and management charter – City departments, advisory council, private entities, external experts, and citizens.
- Adopt a responsive, scalable, and agile governance and management model for smart city needs now and far into the future.
- Negotiate with service providers to retain ownership of city data assets.
- Invest in solutions that are open, interoperable, and not tied to specific proprietary formats.
- Develop protocols for data ownership, storage, access control, open data, and interoperability.





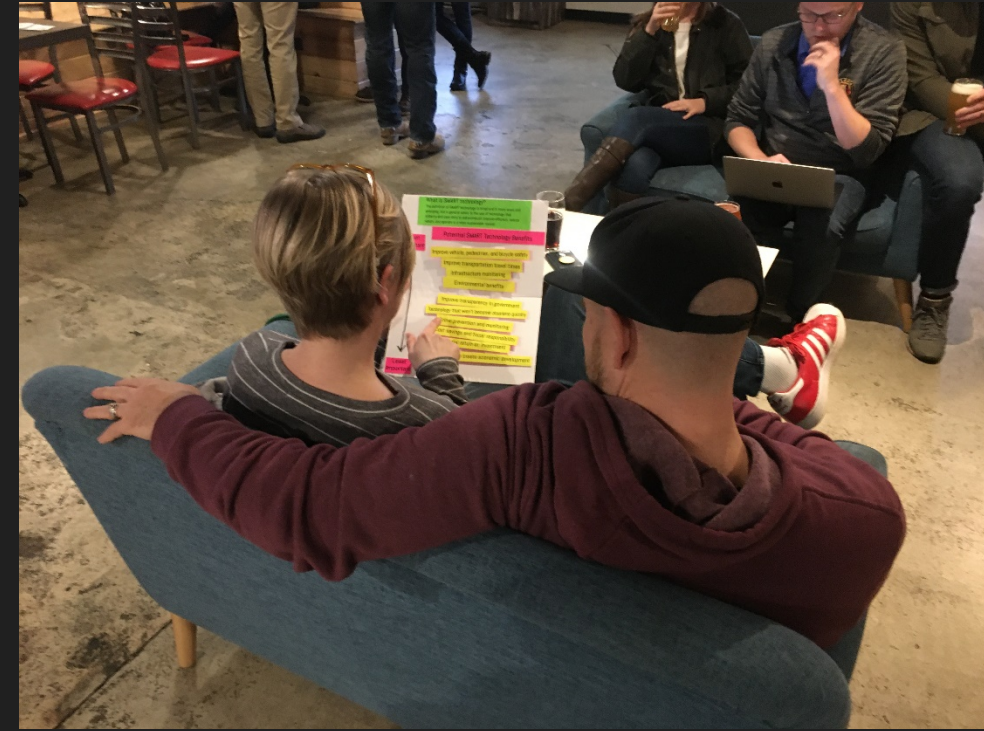
CHALLENGES & LESSONS LEARNED

- **Challenge:** The nebulous nature of this project because it is a plan rather than a pilot project creates confusion with how to move forward and makes determining concrete roles difficult for the different entities involved - who can do what and to what extent?
- **Challenge:** Time constraints for city staff who have other full time duties. Smaller cities have fewer employees
- **Lesson:** Identify our internal subject matter experts earlier. For us it's the Directors of Economic Development, Public Works, and Community Development. Creating a sub-committee or smaller project team with these vital people made for faster decision-making.
- **Lesson:** We need a recommended internal infrastructure for city operations to support whatever is going to happen; we need to plan for the staff and technological resources needed to be able to push this project forward.

IMPACT // CURRENT

100% PUBLIC-DRIVEN APPROACH

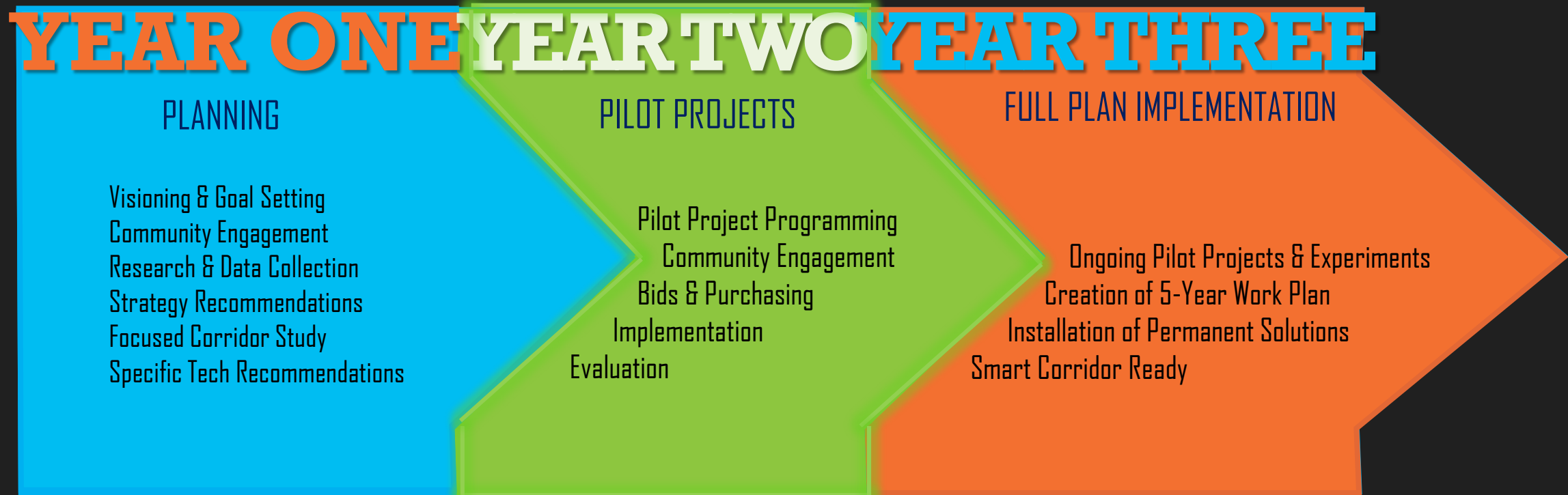
- We took 3 months to conduct face-to-face interviews at city events, farmers markets, coffee shops, and around our Downtown Corridor – a new input format for our City!
 - Received over 90 responses and had many in-depth conversations with the general public about where our focus for Smart Woodstock should be.
 - Offered an online survey tool for those we couldn't reach in person – this format allowed for not only survey feedback, but specific map-based feedback on specific problem areas in town.
 - We were able to use these map-based results to create heat maps of the most popular issues, which helped drive our decision making even further.
- ENGAGED OUR LOCAL ELECTED LEADERSHIP
 - Involved our Mayor, Council, Planning Commission, and State Representatives – support from these individuals is crucial to support any new city objectives, especially Smart Technology.



IMPACT // FUTURE

- **PILOT-SPECIFIC PUBLIC INPUT MEETINGS**
 - Holding more in-depth public input meetings about specific pilot projects will help us be sure that we're implementing solutions that the public supports
- **ADDING SMART STRATEGIES TO EXISTING LONG-TERM PLANS**
 - Like our 10-year Transportation Plan, Comprehensive Plan, and the new LCI Update Plan we are about to start this fall
- **SHOWING PROGRESS PROVIDING SOLUTIONS TO POPULAR PROBLEMS**
 - Our public is very vocal about issues in Downtown Woodstock revolving around parking availability and pedestrian accessibility/safety – we're looking forward to showing them that we're trying to solve these issues in the best way possible.

WHAT'S NEXT



FUTURE FUNDING

- **LOCAL OPTIONS FOR FUTURE FUNDING INCLUDE:**
 - The City's General Fund - Particularly the IRWL project could be piloted at one intersection for less than \$20,000 and both the Mayor and City Manager over Public Works have expressed interest in self-funding this technology at one crosswalk
 - Livable Centers Initiative project grant funding
 - SPLOST (Special Purpose Local Option Sales Tax) Funds
- **STATE FUNDING OPTIONS INCLUDE:**
 - TAP (Transportation Alternative Program) from GDOT/FHWA
 - LMIG (Local Maintenance and Improvement Grant) from GDOT
- **FEDERAL FUNDING OPTIONS INCLUDE:**
 - Programs financed from the FAST (Fixing America's Surface Transportation) Act

PROJECT TEAM CONTACT INFORMATION

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GEORGIA SMART
COMMUNITIES
CHALLENGE

