Syracuse Center of Excellence Symposium

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Infrastructure Innovation in Syracuse

In late 2014, Syracuse became one of now 19 cities across the world to receive a grant from Bloomberg Philanthropies to create an Innovation Team. These teams take on big problems that cities face, and try to find innovative solutions. They take on a different problem each year. Cities like Chicago have made it easier for small businesses to get the permits they need to open. New Orleans lowered its murder rate. Syracuse is taking on infrastructure. I'm one of five members of the Innovation Team, and I'm here to talk a little about what we've been working on.

After looking at infrastructure in a very broad way, we've decided to focus on the physical structures that help to make our city operate - things like roads, sewers, and water mains. We've got some challenges here.

Our roads are rated on a scale of 1-10, with anything 5 or below needing to be reconstructed. This means at the very least taking off three inches of asphalt and then repaving, but often replacing curbs and sometimes needing to do work on the underlying cement below the asphalt. Roads rated 6-8 are in fair condition, but will soon be poor. Roads rated 9 or above are in good condition. We don't have many of those. Reconstructing a road costs tens and sometimes hundreds of thousands of dollars. The city can generally budget about $3 million to the effort. The estimate is that roads should last about 30 years before they need to be fully reconstructed. In a city with more than 500 miles of road, where each mile can cost more

than $1 million, it is almost impossible to even keep roads at their current state throughout the city. Almost 40% of the city's roads should be fully reconstructed, and as you can see, many roads are rated at 6, meaning they will soon fall to a 5 and really need reconstruction, too.

You've probably heard on the news that Syracuse had a water main break. There is a good chance there will be one today. If there isn't, there will almost surely be one tomorrow. The city has needed to deal with at least 200 water main breaks every year for the past ten years. For a system that is only about 500 miles long, the number of breaks is astronomical. This map shows all of the breaks in the past 3 years. Water main breaks mean residents and businesses don't have access to water for hours or days if they live nearby. This means no air conditioners in the summer, no flushing toilets, no drinking from the tap while the repair is done.

The incredible thing is, that even though the water mains continue to break, we in Syracuse are actually incredibly fortunate that our water is so plentiful. Skaneateles Lake provides millions of gallons of water to the city each day. Since Skaneateles Lake is so clean, our water is unfiltered, one of the only systems in the country like this. Since the lake is at a higher elevation than the city, the system is almost exclusively gravity fed, meaning we don't need to rely on pumps to push the water to our homes. This system was largely built more than 100 years ago, an engineering feat. We now face a different kind of engineering feat - to figure out how to maintain and fix a system where it would cost more than $700 million to replace every water main.

What I'll do for the remainder of my talk today, is lay out how these infrastructure problems affect different people throughout the city, from the mayor down to a resident. Then, I'll talk about how the Innovation Team, in partnership with staff throughout the city, is hoping to make things better.

It is said that Syracuse has two seasons, winter and construction season. It's true, the city has a small window of time to get a lot of work done. For residents, though, this construction wreak havoc on their lives, especially since it is very difficult to find information about what work is being planned, or is even happening right now. Case in point, there is currently a major infrastructure project happening across the street from my house. I was not notified that it would happen, and it took four calls - two of them to the same agency - to find out just who was digging into the ground. No one should have to put in that much work to find out what is happening on their block. For emergencies, like water main breaks, residents and businesses do not always find out what has happened until they try to turn on their water, and nothing comes out of the faucet. Communication in these situations is key, and often times that communication is not happening adequately.

The crews work night and day to fix and maintain the city's infrastructure, but are so busy that they are not able to ever really step back and think of better ways to do their work. In the cases where they do have an idea to do work better, they often do not have the mouthpiece or avenue to propose a

new solution to the problem. The Innovation Team has heard several times from crew members that we are the first ones to ever ask of the folks on the ground how things could be done better. Much of the way business is done, too, is on paper. This means that valuable data is stuck in a format that is very difficult to analyze and use to see a bigger picture.

Commissioners and superintendents in the water department see the damage that a failing infrastructure causes every day. Any vision they have for more proactive maintenance is pushed aside because of the latest water main break. They have the difficult task of motivating a workforce that faces thousands of potholes and hundreds of miles of poor pavement. Because the data about the different infrastructure systems is not easily available, many decisions are made based on gut feelings or institutional knowledge. Many times these decisions are exactly right, but with ever growing problems and an aging workforce in the city, that institutional knowledge is nearing retirement.

As mayor, Stephanie Miner has made a concerted effort to call attention to the problems that a failing infrastructure causes a city. She's contended that without well-functioning infrastructure, the economy will not grow. Without growth in the economy, there will never be enough tax revenue to pay for even routine maintenance of different infrastructure systems. The task at hand is enormous. The city's operating budget is less than $300 million, replacing every water main is more than twice that.

After all that, I hope people are not too depressed, or stressed, about the situation we are in. I think it is important to talk about how difficult the situation is, so we are all on the same page. But now I'll talk about how I think we can make things better.

The mayor has talked about wanting something like an innovation team for a long time. She has given our team full access to staff throughout the city and we meet with her and other leadership within the city regularly to give updates on what we have learned, and how we think we could effectively move forward. Her leadership and continued advocacy around this issue ensure that everyone in the city's organization knows how critical it is to think critically about potential solutions, and then be open and vocal about them. Already, her advocacy has garnered attention from places like the Clinton Global Initiative and other nationally-recognized organizations as well as some within the federal government. More importantly, the city was recently the recipient of a $10 million grant from the state of New York with the purpose of fixing some of the infrastructure in the city. The mayor has empowered the Innovation Team, in partnership with other departments within the city, to determine how that money should be spent. The bulk will be spent on water main replacement, other dollars will go to road repair, and there is also a chunk to invest in new technologies. The Innovation Team is currently looking at different types of sensors for sewers, water mains, and roads, as well as systems that could help the city better collect and store its data, and then eventually coordinate projects better.

One of the key concerns that the Innovation Team has had is a perceived lack of collaboration between departments when planning infrastructure work. Projects are occasionally coordinated, but this only happens when multiple departments coincidentally are planning work individually in similar locations at similar times. Until now, planned infrastructure work on a global level has not happened. This is why you might have heard about a water main breaking soon after major road reconstruction happened. Just last month, though, the Innovation Team worked with departments from around the city to plan capital projects for the next couple of years that are more coordinated from the outset. All of the grant money from the state will go toward projects that include at least two, if not more, infrastructure departments. We hope this includes organizations like National Grid and potentially broadband internet companies, too. It is our goal to have this process more automated, too. This way, a commissioner can see exactly which assets are at the most risk of failing, and also have the highest impact if they do fail. Using data to drive decisions will help commissioners plan work, and spend money more efficiently. Restoring and repairing roads is the most expensive part of any infrastructure project, so digging once into the ground can save the city hundreds of thousands of dollars per project.

Members of crews that fix infrastructure are stretched thin and often do not see an end to the work of trying to maintain a failing infrastructure. We are going to try to make their jobs a little easier for them. By using data to make decisions about where work should happen, coordinating projects, and predicting where infrastructure is most likely to fail, crews should see fewer instances of their work being destroyed by a water main break or sewer

leak. They will begin to collect data digitally so they can show the work they have done and help to paint a better picture of the system overall. They will also have digital tools on hand so they do not have to print off paper maps to see how the water system is arranged.

Finally, residents will see a city that is better at communicating about its infrastructure, even if it is bad news. The reality is that water mains will still break, roads will still get potholes, and sewers will continue to back up. Additionally, if the city does it right, and begins to follow a dig-once policy where all infrastructure is fixed at the same time in a location, roads will continue to be closed during construction season, sometimes for extended periods of time. But, we are working to ensure that residents can report problems through more functional digital methods like apps and responsive web forms. At some point in the near future, residents will be able to see all upcoming infrastructure projects on an interactive map. They will also be able to see how the city is working to conserve scarce budget dollars by coordinating projects. Finally, both residents and businesses will be able to better determine the status of the infrastructure on their block as the city makes it easier to access much of the raw data that it generates.

We still have a long way to go, and even if the Innovation Team is able to come up with incredible solutions that are implemented perfectly, infrastructure will always be an issue in the city. But it is our hope that our work will be built upon. Part of this effort is beginning already as we prepare to submit an application to the Rockefeller Foundation's 100 Resilient Cities program. Getting this grant would enable the city to hire a

Chief Resilience Officer. In the meantime over the next couple of months, we will begin implementing many of the initiatives I detailed today. Our team would love to hear your feedback and ideas, we invite to to follow along with us. You can do that at innovatesyracuse.com.