

**Dublin City Council Work Session  
Monday, April 15, 2019  
Council Chambers**

Minutes of Meeting

Mayor Peterson called the Monday, April 15, 2019 Work Session of Dublin City Council to order at 6:00 p.m. at Dublin City Hall.

Members present were: Mayor Peterson, Vice Mayor Amorose Groomes, Ms. De Rosa, Ms. Fox and Mr. Reiner. Mr. Keenan was absent. Ms. Alutto arrived at 7:00 p.m.

Staff members present: Mr. McDaniel, Mr. McCollough, Ms. Mumma, Ms. Richison, Mr. Plouck and Mr. Dearth. Also present was Greg Dunn, Ice Miller.

Broadband

Mr. McDaniel noted that in the packet memo, some questions were listed that can serve as the agenda for tonight's session.

Mr. McDaniel introduced Greg Dunn, Ice Miller who is the City's special counsel for broadband/telecommunication matters. He first worked with the City in cable TV franchising years ago and is essentially the co-founder of Dublink. Some key questions for discussion tonight are:

- How does Dublin compare at a regional, national and global level relative to internet speeds and capacity?
- What challenges does broadband access and speed pose for the future of technology and work? Some articles were provided in preparation for this discussion.
- What does the City of Dublin have relative to broadband?
- What has prohibited or otherwise caused Dublin to hesitate deploying Dublink further than it currently has? This is related to Council's visionary goal of being the most connected city and what might that mean. There is some history to be shared about this.
- How have other cities addressed their broadband situation? Information was provided in the packet, and there is a lot of information available on this topic that can also be shared.

Mr. Dearth, Intern, presented regarding the internet speeds in Dublin. The source of his information was databases that bring together speed tests from around the country. This gives an opportunity to look at the gaps in the general speeds experienced by our community. But internet speeds are generally tested by a user when they are experiencing problems. It does provide a general highlight of speeds, but not a scientifically specific number for our service.

- For 2018, the annual average download speed for the City of Dublin was 14.4 megabits per second (mbps) download with 17,000 plus different data points throughout the year. This is up from 2016 and 2017 by a couple mbps. This breaks down the 2018 average into an hourly average download speed. Early in the morning and from midnight to 3 a.m., residents experience their fastest download speeds. Later in the afternoon with more people on the network, speeds tend to lower dramatically. One could hypothesize that this is due to ISP throttling speeds to expanded bandwidth to other members. In hours without many customers accessing the infrastructure, there is more access to bandwidth.
- Regarding annual average upload speeds, this is important to those who work from home. Ultimately, they have to connect to dashboards, networks and upload whatever they are working on. For 2018, Dublin averages between 5 and 6 mbps, which is up from prior years.

- He was asked to compare Dublin's speeds with those around the state, country and some worldwide players to see how Dublin compares to other institutions or other locations. The cities of Columbus and Dublin are exactly in the middle between Cincinnati at the highest speed and Cleveland at the lowest end. This ultimately shows that Dublin is not performing as well as the City of Cincinnati, but is performing better than the City of Cleveland. This is further highlighted by corresponding suburbs. Hamilton, Ohio, a Cincinnati suburb is performing relatively similar to Cincinnati at large. Dublin is performing relatively similar to Columbus at large. Beachwood is performing similarly to Cleveland at large.
- Looking at our region, one can see that Westerville, Hilliard, New Albany, Columbus and Grove City are performing slightly better than the average for Ohio. All of the central Ohio communities perform very similarly in terms of download speeds.
- Looking internationally, this showcases the gap in service – not only in Dublin, but with the U.S. at large. In 2016, Luxembourg started a fiber to the home program nationally. They are one of the smallest European nations with just over 500,000 people living in the country. By 2017, 60 percent of all households had the fiber network passing their home. Twenty-five percent of that 60 percent of households had taken service and subscribed to the fiber to the home. Ultimately, that gave a bump to their average download speed coming in at nearly 40 mbps. Denmark, who has operated a national utility for some time and has incrementally incorporated fiber into their services has remained relatively stable. In comparison, Irvine, California is a part of the Google fiber project. They receive residential Google fiber. One can see on the chart where that places them in comparison to the U.S. at large and Dublin, Ohio. Ultimately, the major difference is fiber availability.
- Looking at the national average a bit deeper, these last statistics for the U.S. incorporate wireless speeds as well as speeds that are not within the FCC's defined broadband threshold of 25 mbps download and 3 mbps upload. Speedtest.net took all of their speed tests for Q2 and Q3 2018 and excluded all of the wireless services and sub broadband speeds to get a better idea of what speeds are experienced on broadband infrastructure. They found the average download was 96.25 mbps and 32.88 mbps upload. This test was comprised of 115 million different tests and almost 25 million unique users.
- Ultimately, 99 percent of the residents of the City of Dublin have accessibility to wired, fixed broadband infrastructure.
- In terms of providers to the City of Dublin, these include Spectrum internet. Through their cable infrastructure, Spectrum operates and is accessible to 100 percent of the City. AT&T over their DSL lines offers service to 92.1 percent of the City. The only residential fiber provider is AT&T fiber, serving only 7.6 percent of the community.
- According to FCC metrics, Dublin is the 39<sup>th</sup> most connected city in the State of Ohio. This accounts for density of broadband options at census block level; however, it does not account for performance or how expensive the service is – which are both defining metrics in terms of connectivity and the use of broadband internet.
- In summary, for 2018, Dublin, Ohio is at 14.4 mbps average download and average upload speed of 5.7 mbps. Palo Alto, CA – part of Silicon Valley – has 5.5 mbps up and 31.1 mbps download. This is substantially higher than Dublin's speeds as well as the U.S. average. Luxembourg and the Netherlands also have substantially higher speeds.

He offered to respond to questions.

Mr. Reiner asked how the international samples and national samples were selected.

Mr. Dearth responded that through the measurement lab data space, he has access to a majority of the regions and countries throughout the world. He took a list from the FCC of the fastest countries in the world for these and tried to identify where the fiber infrastructure lies and what average speeds they experience. This data is based off the speed tests of their residents.

Mr. Reiner asked if other countries were considered, such as France or Germany.

Mr. Dearth responded that he can forward that information for other countries. Staff found that Japan performs slightly above the U.S.; the UK was relatively similar. In reviewing the data, for countries that performed better than the U.S., they were typically substantially better. The similar ones were all within the 12-16 mbps download average.

Mr. Reiner asked about the cities in Ohio that perform better than Dublin.

Vice Mayor Amorose Groomes indicated there is a significant spread from 10<sup>th</sup> fastest city in Ohio to the 40<sup>th</sup>. Is it a small or large gap?

Mr. Dearth responded he did not have access to that information because broadbandnow.com -- the site that ranked them -- did not provide the specific data they used. However, another website he used found that the average download speeds were all relatively similar. There was not a huge variance between highest and lowest speed cities.

Mr. Reiner asked if there was any information about how this correlates with economic development potential.

Mr. Dearth responded he did not find this in his research.

Mr. McDaniel added that this was not really investigated. The Intelligent Community Forum (ICF) that the City works with extensively will say that broadband is an absolute must and that there is a correlation to economic performance. Hence, Denmark has been a benchmark for the ICF and Dublin staff has interacted with them on a number of occasions. They are the benchmark for the countries in Europe.

Mr. Reiner commented that the U.S. is such a large country in comparison to these smaller countries, which is an important factor.

Mr. McDaniel stated that in comparing within Ohio, the higher upload/download speeds is where there is density in large metropolitan areas. More rural cities, even like Hudson that is building out its own system are constricted in their connections because they are more removed from the metro area.

Mr. Dunn added there are a lot of "architecture" issues involved. The way cable modems work -- and that is the way most of the service is delivered in the U.S. -- everyone is sharing the bandwidth on that loop. With fiber to the home, it is not constricted in terms of the bandwidth and it is a matter of what a customer is willing to pay for speed. If all are sharing the same bandwidth, at 2 a.m., there is much higher speed due to the few users.

Mayor Peterson asked if you look at just Dublin as a system, what would the download and upload speeds be? Do the numbers in the comparison cities include residential and commercial systems?

Mr. McDaniel responded that the information shown reflects a blend of residential and commercial. Taking the others out and looking only at Dublin, there is the ability to do more and different things -- as it consists of fiber into a building. The only limitation is the head-in equipment. Much higher upload and download speeds can be achieved, depending upon what a customer wants to pay. In residential neighborhoods, there is fiber to a node and then running on a coax after that to get to the house. That is the slowing down factor. If you run fiber to the home, there are lots of possibilities. These are a function of the architecture, as Mr. Dunn has indicated.

Mr. McCollough added that there are some inconsistencies in all of this data. What Mr. Dearth has done is pull together different measures to provide a general sense of where Dublin sits. As Mr. Dearth indicated, if one has a new service and wants to test the speed, they go to a speed check and some of this data logs that speed check. But if you are in a law firm in Metro Place, for example, and you have a gig, you would not likely check that speed. Therefore, because some never measure the speeds, the data is not picked up. Dublin speeds are likely not reflected in the 5.7 mbps speed.

Mayor Peterson stated that with Dublin, a user can then be as fast as they desire. The concept Council is exploring is the potential of getting residents access to a Dublin kind of system.

Mr. McCollough stated that the City took the same fiber being used for many years and put a 10gig capability on one end. The speeds across that fiber are now 10gig. When one places a 40gig box on the end of it, the speeds are then 40gig. The fiber is not the barrier. It has always been capable of all of those speeds. The difference is that the 100gig box is very expensive and does not make sense to provide to every household. It would provide way too much capacity. The question is could we use fiber or a similar connectivity and some sort of hardware that would give residents more than other communities have available.

Vice Mayor Amorose Grooms asked if there are communities that are providing fiber to the home. Dublin currently has fiber in the ground in excess of what we use and leases that fiber out. Who is putting the fiber in the ground around the globe? She assumes the person selling it is not necessarily the same one who installed it. How is that working around the globe?

Mr. McCollough responded that there are very few who are installing fiber into the ground to reach residential homes. Of the examples shown, they are coming across cable modems and getting broadband in other ways and using a lot of wireless. There are not any communities that have fiber to the home. Mr. Dearth mentioned the California community because Google fiber is in that city. Google fiber is only successfully deployed in perhaps 10 cities, with a real deployment to more than half the residents in that particular city.

Vice Mayor Amorose Grooms asked who is putting the fiber into the hubs. Would this be companies like Spectrum?

Mr. McCollough responded affirmatively – it is the carriers and the carrier industry.

Vice Mayor Amorose Grooms asked if it has to be operated in that manner due to FCC regulations or others.

Mr. McCollough responded it would not. Similar to how Dublin goes to businesses, the City could put fiber in the ground to remain in place until we connect it to something else. A carrier could come and connect to someone else's fiber and deliver their bandwidth to their customer over a network already in place. That is one business model. The installation and construction is the major expense involved. If it were already in place and a network anyone could use, it is possible that carriers could share that resource as well as the expense of constructing it.

Vice Mayor Amorose Grooms stated in regard to the capacity – whether it is 100 gigs or 40, does he believe that if the front end units were changed for the fiber in the ground, would that dramatically change anyone's speed, or is the limiting factor the actual copper cable in the ground. Mr. McCollough responded that the limiting factor is not the equipment; the limiting factor is if we have fiber or cable up and down Emerald Parkway, it can't get to someone's house. The real expense is not extending further along Emerald Parkway, but from a residential street to a residential street. Along Emerald Parkway, one lane can be dug to install a lot of fiber. To access

someone's home, however, it is necessary to dig through many neighbors' yards and there are right-of-way issues involved. In the home, the piece of equipment that would allow that home to enjoy those feeds is not the limiting factor. It is a device that is not very costly. He added that if one is on fiber optics, that capacity is limitless. It is limited by the head-in or what they term "router" on the end. What's limiting in residential neighborhoods is what is delivering it. It is the coax or wire system in the home that is limiting. If fiber is extended to the home, there would be significant capacity available. We are also seeing companies going to fiber and offering a type of "blended" internet service – a choice of three providers. It comes as a set with different speeds. Businesses that are knowledgeable of this can take advantage of options. The residents in Dublin are fortunate to enjoy two or three providers of these services, which is pretty rare. The problem is the flat line of the speeds of these services over the years.

Mr. Dunn commented that what exists now is a kind of non-competitive situation for the providers. At one time, there was more competition among providers in Dublin.

Mr. Reiner stated that what he is hearing is that providing the fiber to the houses would be expensive. How would this be accomplished?

Mr. McCollough responded that getting this fiber to the house is the expensive part. The industry is trying to be creative now about reaching the houses. One advantage of the recent project for fiber connection to Dublin Schools is that a connection was made to many of the school buildings. Previously, the City did not have a strategy of connecting to those areas. Currently, we have fiber now installed near many neighborhoods where it previously was not – Dublin fiber. So the Schools have the ability now to connect to the Dublin fiber system. Further, there is now proximity of the fiber to the neighborhoods – that did not exist previously. There is new technology that may get the fiber closer to the homes. It is in exploration. Council direction for staff to investigate what would be required to have the fiber accessible to Dublin homes would be needed. This question has not been pursued yet because there may be other ways to achieve the connection aside from fiber. For example, if the City could increase competition in a way that would make the City more connected, that is a legitimate path to improved bandwidth speeds. That would not involve the City building anything. Before proceeding and selecting a new technology or looking at fixed wireless through 5g – and it could be a combination of those – staff wanted to have this conversation with Council and receive guidance. If Council wants to explore this and have staff bring back information that includes solid cost numbers, that is the direction that would be needed.

Vice Mayor Amorose Groomes asked what kind of strategy he is talking of.

Mr. McCollough responded it would be a strategy of using a combination of fiber and wireless to develop a new service that would be managed by the City or an existing carrier. The City would need to strategize regarding what infrastructure would be needed to deliver that – regardless of who was the service provider.

Mr. McDaniel suggested there are different options to achieve the goal. A strategy to do this would likely include an RFP process to see who might respond and how they might respond. There are likely some legal and competitive issues that would be involved. The industry would certainly be invited to be part of this as the industry will have some "say" in this and will be concerned about any consequences. Generally, an RFP process allows any parties to come forward. This would help ferret out the various technologies. Most likely, a combination of leveraging the City's backbone, leveraging someone already present, maybe installing some 5g and wiring it all together, testing it, and then deploying it in a way that is cost effective.

Mr. McCollough added that there could be a difference also between some of what we are hearing the market and the world say. They have mentioned "highest speeds" and "most connected." It is important to consider that if all homes are connected in some way, that could constitute most connected, but with low speeds. If a lot of bandwidth is available through a few providers in a couple of neighborhoods, Dublin as a city might have some of the highest speeds but would not be connecting to many homes. Staff is interpreting Council's goal as more, most or all people connected with high speed choices across the board. He wants to ensure that both goals are encompassed in this.

Mr. McDaniel stated that another term he would suggest is "maximizing choice." The difference between what has existed in cable service and what could be is the means to get to the home. If a homeowner can get to a local data center with the wide choice of internet service providers – Metro Data Center currently has 33 -- this provides the power of choice, which would drive down the cost and boost service.

Mayor Peterson stated that residents currently have only a few choices for internet service providers.

Ms. Fox stated that choice, speed and connectivity are all important. But the reason behind all of this is to promote the future economic development of the City and the fastest and best way to do that. The city has connectivity now – perhaps the speeds are not high, but everyone is connected who wants to be. Her question in looking over the best practices of the cities who have increased their speeds and connectivity is what are we trying to accomplish by doing this? How do we do it – full connections to all commercial establishments, full connections to commercial and residential, what kind of connection is that and what speeds can be achieved; and who pays for it? She first wants to look at a "shining star" city to see if there are lessons to be learned from what they have done differently. Perhaps it will be a combination of things. She wants to understand what the "end game" is to ensure it is accomplished.

Mr. McCollough commented that this is the conversation staff wanted to have to make sure the direction is clear. We are in somewhat new territory and what Dublin did in the past is it accomplished growth by giving broadband access to businesses. We are now in a situation where people at home may be the source of economic growth. We are not necessarily saying that better broadband is needed to attract more people to Dublin; we need better broadband to make sure that gains we have had in the past with businesses who were attracted to Dublin could extend now that the nature of work is changing. It is not a clear economic description. We want technology businesses to come to Dublin so we give them tech business resources and we receive the benefits of that. We are now in a different scenario.

Ms. Fox stated that we currently negotiate incentives for companies who might come to Dublin by offering broadband services. Is it possible to create a program to provide this connectivity to home-based businesses and is it something that home-based businesses can afford through a program?

Mr. McCollough stated that the expense of getting this into a neighborhood for single homes and not the rest of the neighborhood is not economically sensible. Getting broadband to that person who operates their business out of their home is not cost effective; providing this to all the homes in the neighborhood would be more cost effective. He is not aware of anyone in the country who has approached home-based businesses specifically; they have just approached residences.

Ms. De Rosa stated that the Trump Administration announced today a \$20 billion initiative to bring broadband to the home. The FCC is now involved in broadband, as they were involved years ago with extending phone lines. That could be the start of a change if federal monies could support infrastructure.

Mr. Dunn commented that he believes this initiative is directed toward rural locations.

Ms. De Rosa stated she believes it indicated rural and business focused.

Vice Mayor Amorose Groomes stated a friend talked of moving out of the school district given their oldest child is graduating and they would like to reduce their tax burden. She responded that the millage for Dublin is not very different from other Districts, but the valuations are significantly different. A house in another suburb could be valued much less than a house in Dublin. This broadband and connectivity is priority number one in terms of competitiveness in the marketplace. She knows of many people on her street who work from home and whose company would pay the expense of the high speed connectivity to enable the work they do to be done at home. She believes geo tracking of where people work will occur soon and will be the next phase of determining where the income taxes are to be paid. She has heard from several people that this is the wave of the future. People will want to live where they can have fast speeds for download and upload. This is how we will preserve our high property valuations, which supports all of what we do as a city. She does not believe there is much that is more important to the community aside from this.

Mr. Dunn agreed. He noted that the issue as well as opportunity is that this community is on the edge. Dublin has always been out ahead and is moving into uncharted territory. We need to be creative and devise a plan that will work. He agrees it is important.

Mr. McCollough noted there are many other benefits to being a higher broadband community, including the homework gap. This would elevate the quality of schools and students, experiences, Dublin's events, etc.

Vice Mayor Amorose Groomes added that this would be a quality of life element, similar to Dublin's bikepaths and greenspace. It will be a factor that can escalate the valuation of property – or do the opposite if others get out ahead of Dublin. Everyone "works" from home in many aspects of their lives.

Mr. Dunn stated that fiber to the home would be the best solution, clearly. It may be helpful to walk through a financial analysis of what this would require. First, the density needs to be determined – how many homes per mile and how many miles; out of the homes the fiber would pass, how many would take the service; and what will they pay for this service. Once that is computed, the operating costs are subtracted and the rate of return on the initial investment can be determined. Dublin does not have high density, other than in an area like Bridge Park; many people may be content with their current service and don't believe they need high speed; an operator may drop the cost to attract these people. Therefore, the question is how many homes would be willing to connect. Those who have been researching fiber to the home have found it does not work in terms of the rate of return on investment. But perhaps it would be viewed as a quality of life issue, and Dublin would then not focus on the ROI. The City could agree to provide this service, but there would be costs involved in doing so.

Ms. De Rosa asked if staff has done any preliminary review of what the costs would be to have high speed broadband available to all residents.

Mr. Dunn responded this has not been done to date.

Vice Mayor Amorose Groomes asked if there is any city installing fiber in creative ways, i.e., in sewers, etc. There are existing trenches in the right-of-way, and perhaps some could be utilized. Mr. McDaniel responded that the sewer line installation was tried previously with Dublink, but they encountered challenges. Dublin was the first to beta test with a company called "Empirion" – a subsidiary of AEP that was running fiber optics over electric lines. Dublin connected two of its City buildings for a few years in that way and it did work. AEP did get out of that business due to some difficulties encountered with deployment. There is some exploration of running fiber along a shared-use path in the asphalt. The 5g is very interesting, and work done by municipalities at the Statehouse to enable that was worthwhile.

Mr. Dunn stated that we are looking at a millimeter wave system fed by fiber that shoots microwave to houses or businesses. They are testing it in Canton, Ohio later this year.

Vice Mayor Amorose Groomes stated there is emerging data about acceptable frequencies and there are claims that health problems result from use of high intensity wave length.

Mr. McCollough responded that all of this must be considered, including people's belief that such technology is not safe, even if studies indicate it is safe. It is important to consider what people want. He added that staff has been monitoring a number of different technologies that could be used to deliver broadband to residents. He does not believe the numbers are solid yet. Cities have looked into this concept, but very few have a solid business plan. It is possible to develop a business plan that includes the items Mr. Dunn has mentioned – how many homes, how many would take the service, what would they be willing to pay for how much speed – but also what would it take construction wise to deliver the hardware to all of these locations. Beyond that, there is more creativity in terms of how to finance it or phasing with a multi-district plan over time and a financial plan to do this across the City over a period of time, with these different technologies. That is more realistic than looking just at fiber or just certain bandwidths or technology.

(At this point, Ms. Alutto arrived.)

Ms. Fox asked what coverage exists at this time for Dublink with commercial areas. What is the use? How many businesses use it who have it available?

Mr. McCollough responded that the strategy for the Dublink program in Metro Place was centered around the legacy office buildings. An expansion outside of that area is now beginning. The measurement is based on reaching legacy office parks. Of the Metro Place North and South circle, all of the buildings have access to Dublink. However, many firms, because competition remains, are not using Dublink but opt for Time Warner business class. The businesses have a choice between Dublink and reaching Time Warner Business Class from the Metro Data Center or accessing Time Warner Business Class in their building.

Mr. McDaniel clarified that the fiber extends to the curb in front of 90 percent plus of Dublin businesses.

Ms. Fox asked about the utilization of Dublink by those businesses.

Mr. McDaniel responded that the City has not marketed Dublink as an ISP. Fiber is used for leveraging economic development retention, expansion and attraction; dark fiber is leased by the City to ISPs who use the dark fiber. There are 125 miles of this throughout Central Ohio. They may lease locally or through the entire system. The City receives revenue from the leases. The City also uses the dark fiber for its own purposes to reduce costs. The City is pushing laterals into the large buildings in the Metro Office park. Each year, these laterals are programmed in the budget. In terms of Expedient and Metro Data Centers, they are also building laterals.

Ms. Fox stated she sees the benefit of everyone being connected and at the fastest speeds possible. But the City has fiber in the ground and commercial buildings are not using it. By the time the fiber is pushed out to all of the residential, will the technology have changed? Can we optimize the use of what we have? If the businesses won't access the fiber, why do we believe that homeowners would access the fiber if it were available to them?

Mr. Dunn responded that the City leases fiber to the companies who do provide the service. Those are a lot of the lessees of the City's fiber. It was part of the plan. Now that the City is doing this with the 100 gig project and our own routers, we are somewhat competing with ourselves. However, everyone is obtaining connectivity if they are willing to pay for it. Most of the providers require a five-year contract for their services, so the City can only get new customers as they roll off their five-year plan with the current provider.

Mr. McDaniel stated that in terms of what has prohibited or caused Dublin to hesitate deploying Dublin further than it currently has done, the City has been very careful. The City is not an internet service provider (ISP) but is an enabler or "middle man" in some cases. The relationships with Expedient and Metro Data Center are still new in terms of how they are deploying that. It was never the City's mission to be the provider. The mission was first to resolve the City's own problems; through this, the City learned the value of having this and how it could be leveraged for economic development. For example, the entire Ohio Health system operates on Dublin's fiber optics as well as Nestle, CareWorks, Wendy's and OCLC. Fiber to the home may be similar – maybe the City could work with companies to get fiber to the home. There are many approaches across the spectrum for this.

Mr. McCollough stated that the City has a large capacity of fiber and the important concept is that the City be the provider of infrastructure that will pay for itself, with someone else providing the services to benefit the end user. If no one else will provide it, however, the City may need to do something until such time as someone else comes forward. That is a level of competition that we believe is healthy and economically sustainable.

Mr. Dunn added there is a political "rubicon" that the City could cross if it chooses to be the provider itself. That is when the City would be hit hard politically by the carriers who have a lot of investment in the community. This does not mean we should not move forward, but simply recognize the actions the carriers will take at the Statehouse to change the law. Our approach has been to enable the competition and we offer the opportunity for them to lease fiber from Dublin.

Vice Mayor Amorose Groomes stated that she assumes the fiber extended to the Schools is more capacity than what they will use. Would staff recommend an RFP to attract interest from companies about taking the fiber to the home? They could begin with the neighborhoods with the most interest in connecting. Across the City, it could vary from 5 to 50 percent sign-up rate.

Private industry would make the decision about the priorities for the extensions to the homes.

Mr. McCollough responded "yes" but noted that it would be in the City's interest to look at a small section of the community and be more involved, as it would provide information that would inform an RFP. There are not many companies that have extended fiber to homes. Google has done so, but not successfully – it is hard to do and very expensive. Also, a low take rate can be economically feasible, if it generates a profit and pays off the asset. There is a larger economic plan that needs to be done. But doing an RFP and asking the market what their cost and willingness to do this, based on the size of our community, the density, how number of homes and the take rate would be worthwhile.

Vice Mayor Amorose Groomes stated that in order to make it more economically feasible, they

could take it from the school to the neighborhood.

Mr. McDaniel stated that he assumes responses across the spectrum would be received as occurred with Dublin. The City has a fiber backbone to contribute or a partnership could be established where the City would extend a certain amount of backbone and the partner does the rest. Or maybe we take fiber to the node or we help to fund fiber from the node to the home. There are many variations to be explored if there are interested parties

Vice Mayor Amorose Groomes stated that fiber, specifically, is less difficult now to work with, as she understands.

Mr. McCollough agreed that the technology is advancing. The concept of running the fiber above ground is very interesting. If it would not require digging and would be reliable and affordable, that is important to know. In terms of going to the market and asking them to tell the City how it can be done and making it work, the City needs to remain involved as the market is not reaching certain places now and the competition is not functioning. The City needs to do as much as is appropriate to make sure the market gets to areas not well served, such as west of Avery. The City would need to be willing to invest in some infrastructure where difficulties are encountered, but we would want those areas well served versus just those with the most profitable customers.

Ms. De Rosa asked him what he believes the potential of 5g will bring and does it make sense for the City to invest in today's technology or would it be prudent to invest in the next level.

Mr. McCollough responded he has some reservations about 5g, simply because of the promises made and that it has not been seen. Industry wisdom at this point says that fiber continues to be the resource that will even power 5g. 5g is a wireless standard. At this point, the carriers are still building fiber. Our fiber has functioned extremely well for 20 years. He would have no hesitation about putting new fiber in the ground and viewing that as another 20 year or longer value. Even with new wireless, new LTE, new 5g, the backhaul depends on fiber. Maintaining a robust fiber system as a community will continue to be a wise investment for Dublin and any other city. He would recommend the City keep building fiber. However, there are places that Dublin will always have difficulty building to in our city because of rock and natural areas. 5g and some of those other options will be useful in getting around and through some of the more difficult spots. He would never depend completely on fiber for the entire community simply because of topology. He believes the City should invest in 5g for our own experiments. When it does become more standard, we need to be prepared.

Mr. McDaniel added that the discussion at the Statehouse that never occurred with the 5g bill was that every 5g device has to backhaul over fiber optic. It does not work like WiFi. Every 5g device must be backhauled over fiber.

Mr. McCollough added that an appropriate location for 5g might be Historic Dublin where digging is not desirable. Getting fixed wireless into some of the businesses in HD is important and not having fiber laid through the historic bricks is desirable.

Ms. Fox stated because of the expense and time to build it, what are the other ways to create income from this plan to take the fiber to the neighborhoods? This would help to pay back the costs of the infrastructure.

Mr. McCollough responded he does not believe this is an insurmountable economic model that requires more. Someone would need to charge an amount that can pay for the infrastructure build out. If placing fiber on top of pavement is feasible and in six months, 150 homes could be reached and it is reliable, this would be a good option. Perhaps a company would lease this from the City or would have a profit such that the City can pay down whatever is used to invest in that, then we would have a multi-year plan to present to Council. Council would want to review any proposed

economic model for this. He does not know of any revenue opportunities just from investing in fiber yet.

Ms. Fox stated if fiber could be placed above ground and the conduit was available to all of the providers, leasing to them would bring the profits.

Mr. McCollough stated that would be a best case scenario where multiple providers went over new fiber that the City installed and that the City gained an economic benefit from that in some way.

Mr. Dunn added that this concept has been much discussed among cities and people in the broadband business. The problem primarily is that the incumbent former monopolies – cable and phone companies – will not participate. What they will do is drop pricing and then the providers end up as new entrants into the market. This has been tried, but has not worked yet. It is a great concept, but the incumbents are fearful of it. Currently, the incumbent providers have a lot of captive customers.

Ms. Fox stated that it would be desirable for people to be able to compare their speeds and rate their satisfaction with these providers.

Mr. McCollough stated that in the big picture, there are community advantages to having a City-owned fiber network that reaches into homes that may go beyond just profit. If Dublin builds fiber to connect the homes, and the current carriers cut their prices in half and connect to double the homes Dublin does, it is still a win. There are secondary and tertiary advantages to our economy that may not manifest as profits. With Dublin connection for businesses, the expectation was not for revenue, but for businesses and jobs that are taxable. It has been a very big winner. If the next benefits come in the form of tech workers and knowledge workers who work from homes and their access is ubiquitous, the advantages are not necessarily going to be in cash.

Vice Mayor Amorose Groomes suggested staff put together a series of RFPs or estimates on what costs might be to enable this. She believes this is one of the most important things the City can do. Connectivity is going to be very powerful and people will make choices of where to live and other things based on the City's connectivity and speed. Given Mr. McCollough's expertise, he likely has several options in mind to address this problem. Perhaps multiple RFPs would be useful to get information. Extending the fiber to the Schools was very useful as it brought the fiber to other areas of the City.

Mr. McCollough responded that staff's desire was to have Council's input at this work session and come back with that kind of structure. There could be an RFP asking how a responder would do the entire project. But he is thinking more of a study, as there is data needed to move this forward. Would Council consider funding some resources to assist staff with this work?

Vice Mayor Amorose Groomes stated she would prefer they do analysis versus a study. Analysis implies a faster pace, while study generally takes a longer period of time. If we wait until we have all of the answers, it is not worthwhile to ask the question.

Ms. De Rosa noted that if Council indicates that the goal is to be the smartest city in the U.S. by 2022 or 2023, couldn't we get a provider to indicate how they would go about this – connecting all the houses by 2023 through broadband, 5g or whatever?

Mr. McDaniel stated that tonight's discussion has moved beyond what staff had expected. He appreciates that Council is anxious to consider this concept of getting fiber to the homes in some fashion. He asked that Council allow time for staff to develop a strategy about how to go about this. Putting an RFP out would be useful as a start. He agrees that more assistance would be needed for IT to do this work in addition to the current workload. This could be funded via contingency funds and would not require additional appropriations. He suggested that staff return

with a recommendation of how to advance this – whether it is an RFP or other. He wants to think through an RFP versus a study, and perhaps the RFP serves as a study the way it is rolled out. Mr. McCollough commented that one concern is that a vendor when asked how to do this through an RFP may want to own this, if all of the ideas are theirs. A vendor could come forward who already has a smart city plan that meets this goal using their proprietary network delivery system. They would attract more customers, beat out their competition, the City pays them to do it – and they keep the profit.

Ms. De Rosa clarified that is not what the City would ask. The RFP would be sent out and indicate the City has the fiber backbone and is interested in a party who would want to do the rest of the connection to the homes. As Vice Mayor Amorose Groomes stated, the City can study this for a while or we can put the RFP out and receive responses from a variety of vendors. They are already out doing this. There is enough activity in the marketplace now that she believes good responses would be received to an RFP

Mr. McCollough agreed. He cautioned that he is in contact with these vendors regularly and they may have a different view of what Council is asking for – even though the intent is clear on our part.

Ms. Fox stated that it seems his questions are broader than what the RFP and a particular provider could give to us. Staff may be looking for a broader study on the best methods to get the fiber to the home, and then issue an RFP for this. Is that correct?

Mr. McCollough responded not necessarily. What he is looking for could be combined in a single offering. Perhaps we seek an understanding of how many homes, the take rate and what people would be willing to pay. We could add the question of how a vendor would do this. This could all be included in the RFP. There are ways to approach the market and ask for information as well as some of those things.

Ms. Fox wants to understand what a study would provide versus an RFP, if a study is the preference.

Mr. McCollough clarified his preference is not a study per se. What staff wants to do is come back to Council, having received this feedback and guidance, share with Council what staff believes is needed in order to get the answers to our questions, and then make sure it is acceptable to Council.

Ms. Alutto stated that an analysis is fine and coming back to Council with what staff believes would be the best approach makes sense. She pointed out that what she considers to be the additional fully loaded costs, as mentioned previously tonight, need to be included. As part of that analysis and as part of that approach, it is important to understand the costs – short-term, medium and long-term – whether it is maintenance, political capital, the potential for lawsuits, etc. She wants these items built into the approach taken, as they are important. Information on the possibilities for accomplishing this connection to homes – whether a phased approach or at one time – is also needed. We need to approach this in the most fiscally responsible way and she wants to have information about all of the potential costs.

Mr. McCollough agreed.

Ms. Alutto noted that the risk analysis is important so that Council can determine what their level of risk aversion or acceptance is. Some of these costs are hard to quantify, but should factor into decision making.

Mayor Peterson stated that is clear that Council wants to investigate a solution. If more time is

needed to develop a framework for what the solution might look like, that is acceptable. There is unanimous support for this as something Council wants to do. Does staff have adequate guidance? Mr. McDaniel responded affirmatively. He appreciates the opportunity to explore this so that Dublin can be "that city" as Council has envisioned.

Mayor Peterson asked for information about Dublink.

Mr. McDaniel responded it is a conduit system – a series of conduits that are on average twelve 1.25 inch conduits throughout the commercial area of Dublin. Of that 12 conduit system, one of those was dedicated to the City in exchange for allowing the company to build those in the City right-of-way. It is a pipe and within that goes the fiber optic cable.

Mayor Peterson asked about how the fiber would go from the curb to the house.

Mr. McCollough shared a sample of the fiber. There are six pair – 12 strands.

Mr. McDaniel stated that one piece of glass will carry as much as a huge quantity of copper line.

Mr. McCollough stated that if optics or boxes are on both sides of one fiber, 100 gigabits of speed could be provided. The original Dublink was 96 strands and now we have 432 strands. Going to the Schools is 24 strands, and only a pair is needed to connect to many locations. The proposal is if you could lay that fiber flat across a shared-use path and put a resin on top to protect it, that would be a means to get from the curb up to the home. It would still require some digging.

Vice Mayor Amorose Groomes stated that if this could be done, it would reduce the visual clutter throughout the City.

Mayor Peterson asked if the weather would impact the fiber installed this way.

Mr. McCollough responded this is emerging technology and it is important not to over promise.

There is not an economic model at this time to reach homes. A new method is needed to do this. Google fiber is the only major investment made in the home connection to date.

Mayor Peterson asked if the technology inside a home must change to accommodate the fiber connection.

Mr. Dunn responded that a box will be needed.

Mr. McCollough stated that the equipment on the inside of the house must support those speeds. The more robust fiber is needed along areas like 33, but for homes and apartment buildings a new fiber could likely be used.

[A slide was shown displaying the conduit and 96 fiber. The middle picture is the 12 conduit system. On the right is the directional boring along the right-of-way. These generations still exist and are still deployable in this way, but the next generation of fiber would likely be suitable for the home connection.]

Ms. De Rosa asked what the City spends each year on road maintenance.

Mr. McDaniel responded that the City spends on average \$6 million per year on this.

Ms. De Rosa noted that fiber is the infrastructure of the future and it is important to think about it as we do other infrastructure going forward.

Mr. McDaniel stated that staff began speaking 20 plus years ago about the fiber as the new infrastructure. It is as important or more important than the other infrastructure that the City provides – water, sewer, roads, telephone, etc.

Vice Mayor Amorose Groomes stated that she, too, is focused on the return on investment for the City in all of its projects. This one is abundantly clear. She supports study and analysis, but believes these emerging technologies will soon take off.

Ms. Alutto agreed. City CIOs and IT Directors have long engaged in battles with City Managers,

City Councils or Mayors in regard to considering connectivity a utility. That is a difficult leap for community leadership to make. The fact that Dublin is having this conversation and expressing this support of the initiative says a lot about our city, our leadership and our staff. This is a utility and is a lifeline for many people. The technology to draw in 1099 workers and those not working in a standard office is critical. It should be treated as a utility.

Mr. McCollough stated that staff does not want to return to Council without solid information.

Some of the information needed the City does not currently have. The City's typical survey tools will not be suitable for this purpose. A solid third-party analysis of the market would be needed.

Ms. De Rosa acknowledged that the studies presents a "chicken and egg" problem. We can only hope to get the best possible information, recognizing the market changes that occur frequently.

Mr. McCollough responded that delivering a solid product to Council is staff's goal.

Mayor Peterson noted it is clear that Council is supportive of this. What time is needed to complete this initial work?

Mr. McDaniel estimated that he believes information can be provided to Council in the summer. He thanked Council for the time spent this evening.

The meeting was adjourned at 7:45 p.m.

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Clerk of Council



# BROADBAND

CITY COUNCIL WORKSHOP

April 15, 2019



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## AGENDA

1. How does Dublin, Ohio compare at a regional, national, and global level relative to internet speeds and capacity?
2. What challenges does broadband access/speed pose for the future of technology and work?
3. What does the City of Dublin have relative to broadband?
4. What has prohibited or otherwise caused Dublin to hesitate deploying Dublink further that it currently has?
5. How have some other cities addressed their broadband situation?





# DUBLIN BROADBAND SPEEDS

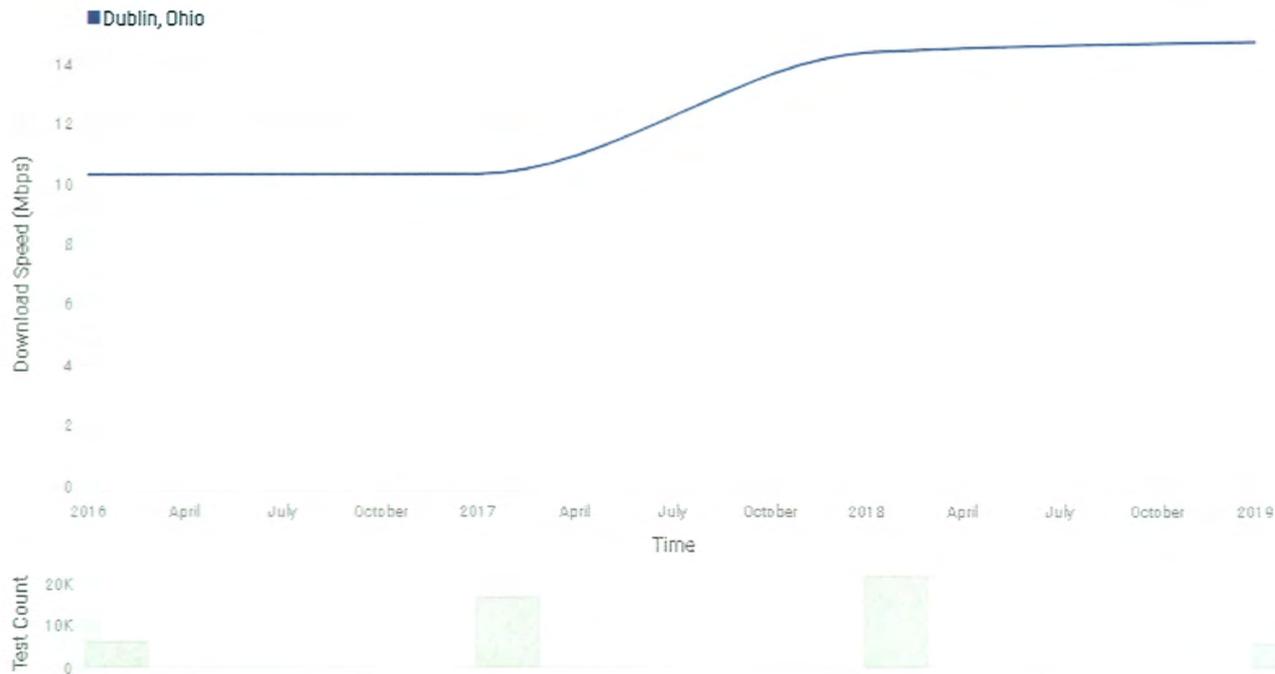
OFFICE OF THE CITY MANAGER



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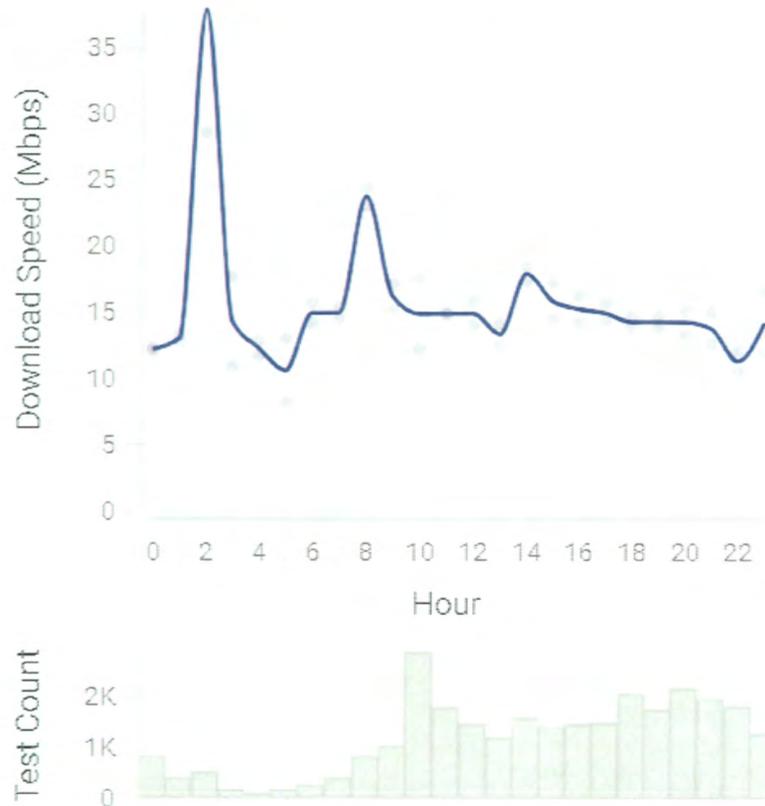
# ANNUAL AVERAGE DOWNLOAD SPEEDS



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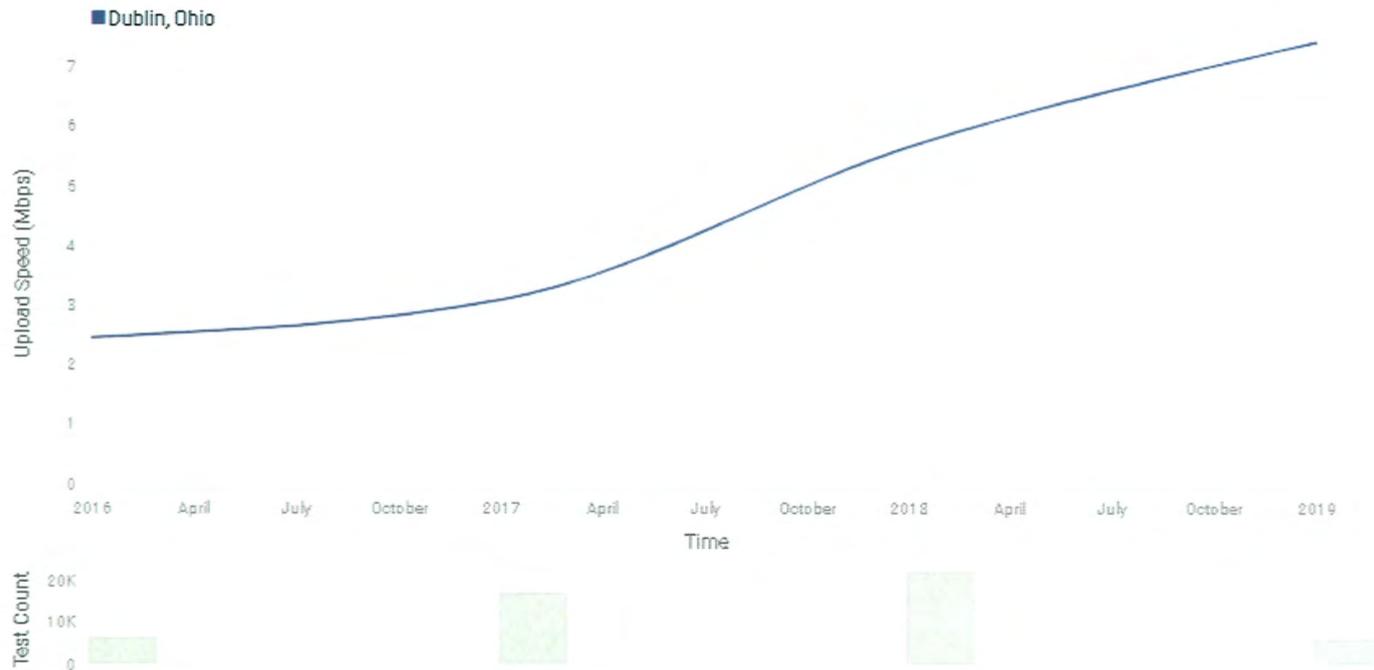
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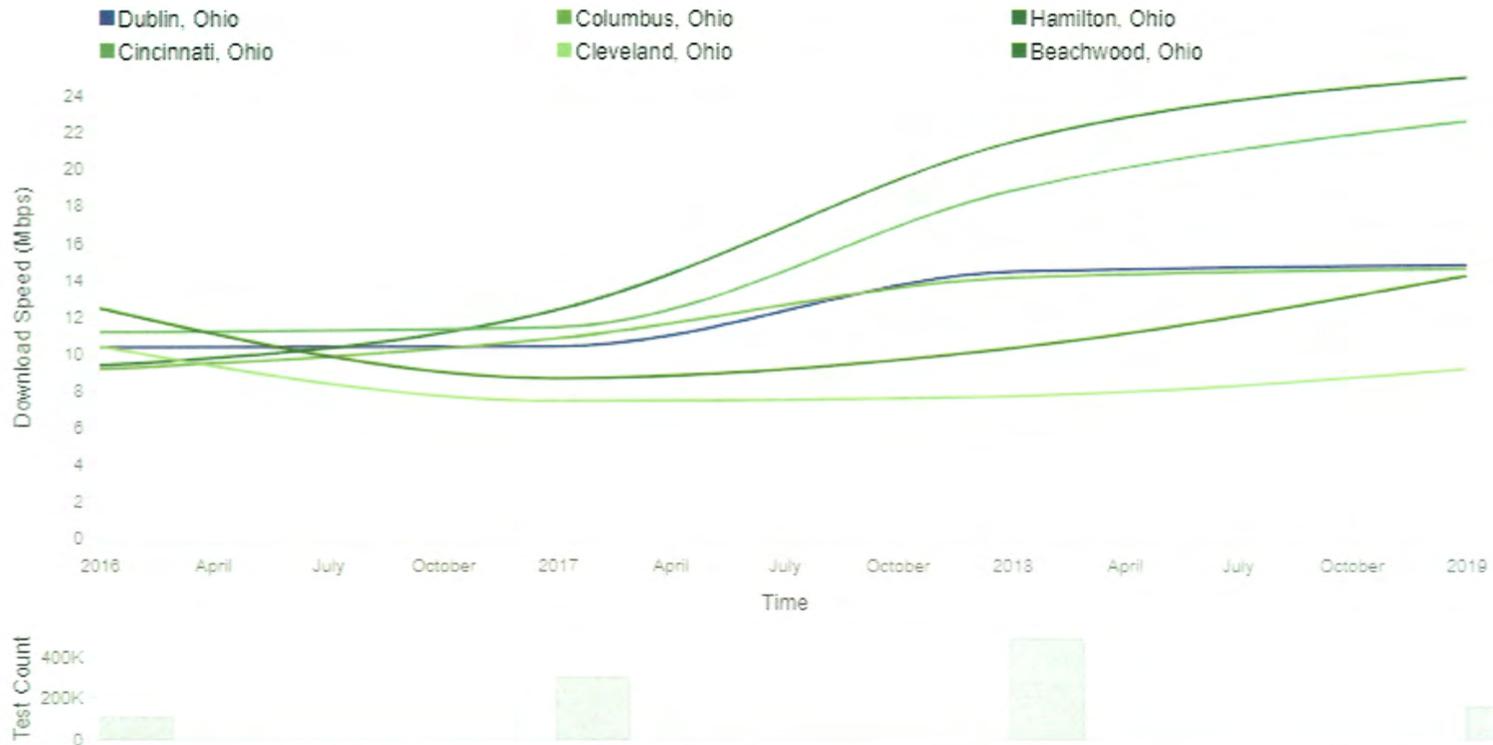
# ANNUAL AVERAGE UPLOAD SPEEDS



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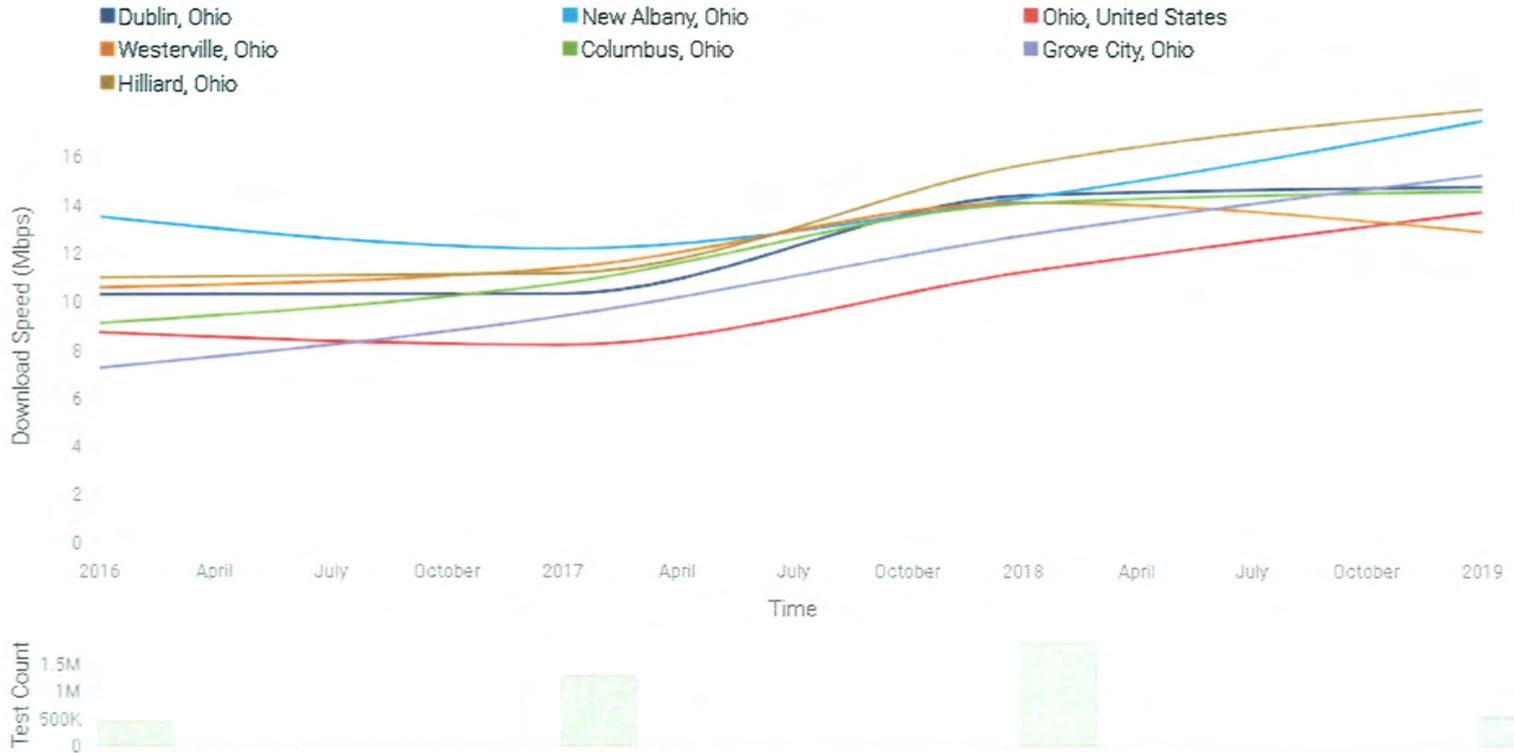
# STATEWIDE COMPARISON



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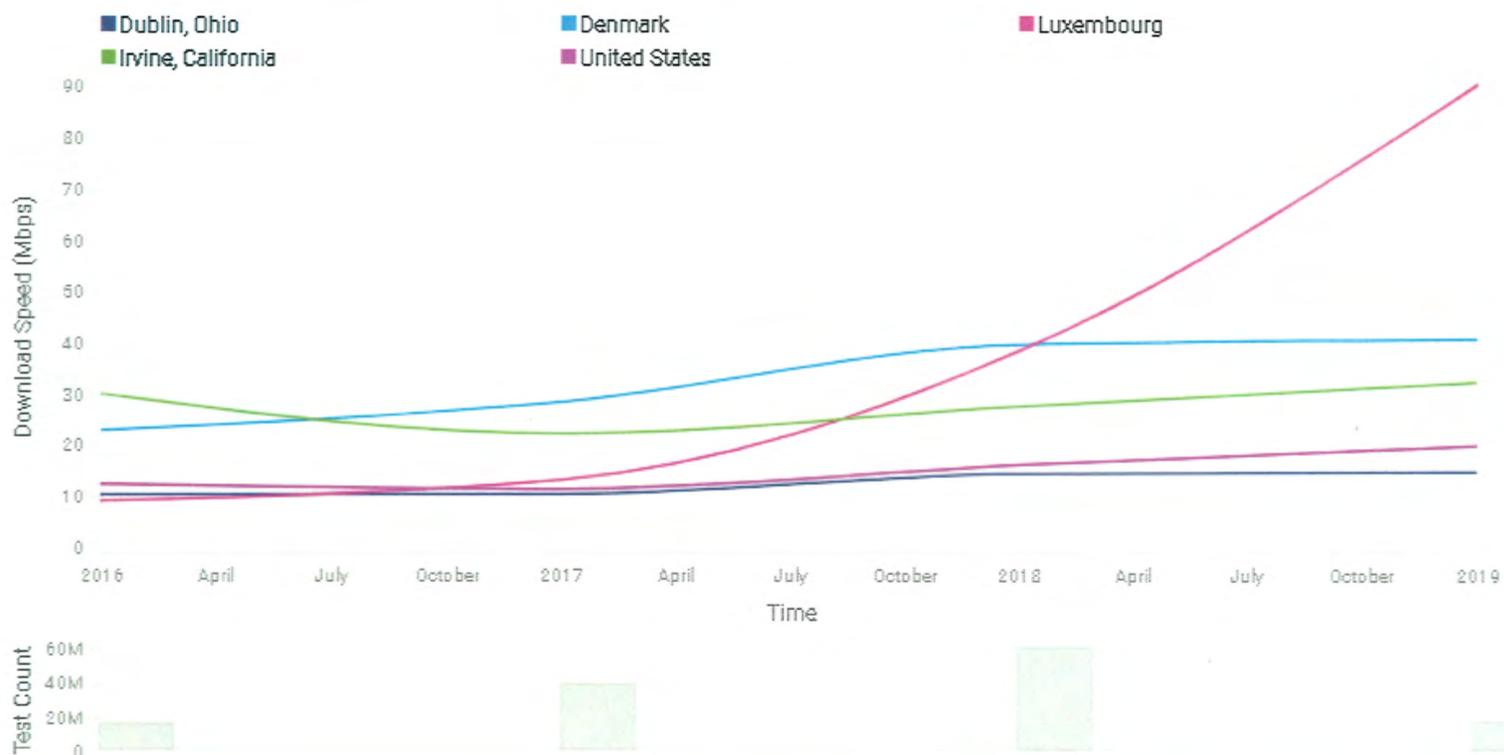
# REGIONAL COMPARISON



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# INTERNATIONAL COMPARISON



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# NATIONAL AVERAGE

## Country speeds

Fixed Broadband Speeds  
Q2-Q3 2018 United States

Download Mbps

96.25

Upload Mbps

32.88



24,283,160  
Unique Users



66,695,645  
Samples



115,445,472  
Tests



3,232,473,216  
Data Points

SPEEDTEST

DOOLA



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# DUBLIN PROVIDERS

## Spectrum

City Coverage  
100.0%

Fastest Speed  
120 Mbps

### CABLE

- 89.99 Mbps is the average speed for Spectrum in Dublin.
- Spectrum has a customer rating of two and a half.
- Spectrum offers 3 plans.

[View Plans](#)

## Frontier COMMUNICATIONS

City Coverage  
12.2%

Fastest Speed  
24 Mbps

### DSL

- Frontier markets 5 plans.
- Current customers have rated Frontier at two stars out of five.
- Frontier does not leverage data caps in Dublin.

[View Plans](#)



City Coverage  
92.1%

Fastest Speed  
100 Mbps

### DSL

- Some AT&T Internet plans have data caps.
- Packages from AT&T Internet are DSL.
- 48.76 Mbps is the average speed for AT&T Internet in Dublin.

[View Plans](#)

## AT&T Fiber™

City Coverage  
7.6%

Fastest Speed  
1,000 Mbps

### FIBER

- Dublin has 4 plan choices through AT&T Fiber.
- Service by AT&T Fiber is limited to 7.58% of Dublin.
- AT&T Fiber has two and a half stars.

[View Plans](#)



City Coverage  
69.1%

Fastest Speed  
50 Mbps

### CABLE

- Existing customers rate WOW! at three out of five stars.
- WOW! speeds are higher than the weighted average by 35.7%.
- Plans do not include data limits.

[View Plans](#)

Dublin is the

**39th**

most connected city in Ohio ahead of Amlin, Hilliard, Lewis Center, Plain City, and Powell.

The "Connected" metric is a citywide average based on FCC data showing the density of broadband options at the census block level.



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## BROADBAND SPEED COMPARISONS

### Dublin, OH

5.7 mbps **Up**  
14.4 mbps **Down**

### Luxembourg

18.5 mbps **Up**  
38.4 mbps **Down**

### U.S. Average

4.9 mbps **Up**  
16.1 mbps **Down**

### Palo Alto, CA

5.5 mbps **Up**  
31.1 mbps **Down**

### Netherlands

10.8 mbps **Up**  
25.6 mbps **Down**



**QUESTIONS?**





## What challenges does broadband access/speed pose for the future of technology and work?

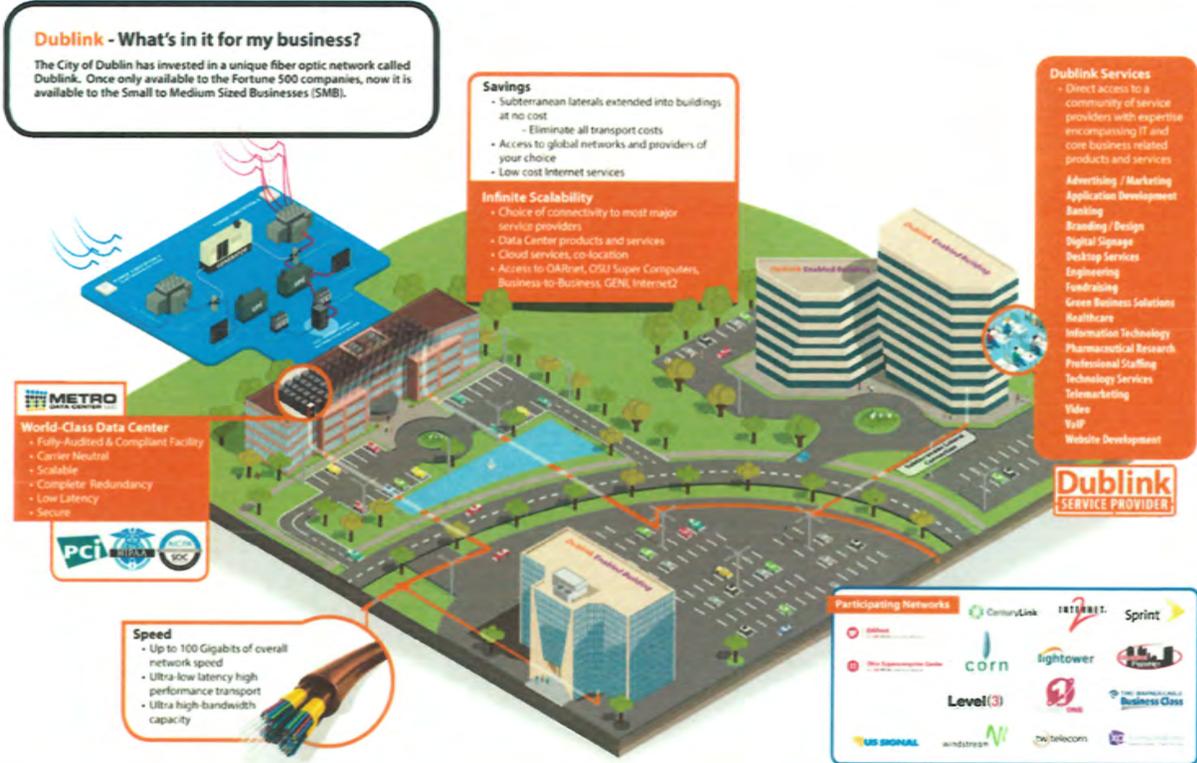
- Current and future trends
- Remote work
- Cloud computing
- Cybersecurity



EVERYTHING GROWS HERE.



# What does the City of Dublin have relative to broadband?





**What has prohibited or otherwise caused Dublin to hesitate deploying Dublink further that it currently has?**

**Greg Dunn**

Special Legal Counsel



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## How have some other cities addressed their broadband situation?



EVERYTHING GROWS HERE.