

# Infrastructure Plan

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## The Development of the following Plan was made possible through partnership with –









SECTION 1

Vision Statement





## Every Detroiter will have affordable, reliable, and abundant digital access and opportunities by 2032.

Public utility models are properly applied to the construction, operation, and delivery of essential infrastructure and services. These institutions exist to support essential functions critical for societal success. Applying these same frameworks to digital access will result in maximum service for least cost in contrast with the current market in Detroit, which lacks adequate competition to achieve the affordability, ubiquity, and service levels required to connect everyone. With historic funding available to solve specific problems, Detroit will apply these existing institutional authorities to the construction, maintenance, and operation of a municipal automated open access fiber optic infrastructure for private service competition to every address in Detroit as the cornerstone of a broader digital equity strategy.



SECTION 2

# **Executive Summary**





Detroit is suffering a digital access crisis. A lack of ubiquitous access coupled with a lack of affordability and unacceptably low levels of digital literacy are driving unconscionable outcomes.

This is not hyperbole. Consider the following –

### **EDUCATION**

The COVID pandemic has widened preexisting opportunity and achievement gaps, hitting historically disadvantaged students hardest, and affecting a disproportionately larger percentage of Detroiters in comparison with the rest of the country. In math, students in majority Black schools and low-income schools ended the year with between six-seven months of unfinished learning. High School students have become more likely to drop out of school, and high school seniors, especially those from low-income families, are less likely to go on to postsecondary education. The pandemic had an impact on not just academic achievement, but also the broader health and well-being of students, with more than 35 percent of parents very or extremely concerned about their children's mental health. (1)

As the pandemic forced many classrooms online, a survey performed by the Michigan Association of Intermediate School Administrators found that at least 300,000 Michigan students lack internet access, or a computer at home. The survey of the state's 56 intermediate school districts in early April 2020 found that unconnected students tended to be concentrated in either rural or low-income areas. A lack of connectivity is a major issue in the Detroit Public Schools Community District, which is Michigan's largest school system, educating about 51,000 students in K-12. (2)

Research has also shown that relying on subsidies and wireless devices does not effectively address the gap. Michigan State University's Quello Center found that the quality of home Internet access has an impact on outcomes. Students who do not have access to the Internet from home or are dependent on a cell phone perform lower on a range of metrics, including digital skills, homework completion, and grade point average. They are also less likely to attend a college or university. This deficit in digital skills compounds many of the inequalities in access and contributes to lower standardized test scores, and being less interested in careers related to science, technology, engineering, and math. (3)



While scholastic achievement was lower for every student in 2020-21 due to the pandemic, Detroit's children were disproportionately impacted because: (4)

- 34% had a family member who got sick or died during the 2020 21 school year,
- 38% do not have an adequate device to school at home,
- 30% do not have an adequate connection, and,
- 50% live below the poverty line. (5)

#### **HEALTH**

Telehealth usage surged early in the pandemic as people sought safer ways to access health care. Overall telehealth utilization for office visits and outpatient care was 78 times higher in April 2020 when compared with February of that same year. Telehealth utilization has since stabilized at levels 38 times higher than before the pandemic. Investments in virtual care and digital health have skyrocketed to a level 3 times greater than the levels seen in 2017. Virtual healthcare models and business models are evolving and proliferating, moving from purely "virtual urgent care" to a range of services enabling longitudinal virtual care, integration of telehealth with other virtual health solutions, and hybrid virtual/in-person care models, with the potential to improve consumer experience/convenience, access, outcomes, and affordability. (6)

Highlighting the essential importance of digital access, the Pew Research Center found that as of April 2021, most of those seeking COVID-19 vaccines had gone online to make appointments for themselves or others. (7)

The Centers for Disease Control (CDC) experts examining *Trends in the Use of Telehealth During the Emergence of the COVID-19 Pandemic* found that telehealth could have multiple benefits during the pandemic by expanding access to care, reducing disease exposure for staff and patients, preserving scarce supplies of personal protective equipment, and reducing patient demand on facilities. (8) Policy changes made to support increased telehealth access because of the pandemic will continue to drive adoption after the pandemic.

A National Bureau of Economic Research study from April 2020 found that people having reliable high-speed Internet at their homes appears to be crucial for them to stay at home. Research results suggest that the digital divide appears to explain much of the inequality we observe in people's ability to self-isolate. (9)

A pre-pandemic study of older adults living in Detroit discovered that Detroiters are dying at two and half times the rate of older adults who live in the rest of Michigan. The initial 2000 analysis found that the death rate for 50- to 59-year-olds was 122 percent higher in Detroit than the rest of the state, and 48 percent higher than in 60- to 74-year-olds. Researcher, Dr. Smitherman stated in an August 14<sup>th</sup>, 2020, interview: "This is a very fragile and vulnerable population. Now, you pour coronavirus on top. What happens health-wise? It's like pouring rocket fuel on a fire. If you look at racism at the bottom, causing and driving disease epidemic, now you pour coronavirus on it. It's extraordinarily devastating... Unless we have some public policy changes,



we're going to have this same trend many decades to come." (10) A 2020 Wayne State School of Medicine research study found that negative health outcomes are often tied to a lack of access, including digital access.

Now, more than ever, digital access, including reliable broadband Internet, must be recognized as a social determinant of health. Disparities in access should be treated as a public health issue because they affect "the health of people and communities where they live, learn, work and play." (11)

#### **EMPLOYMENT**

A Pew Research Study in 2015 found that 54 percent of Americans had gone online to look for information about a job, and 45 percent had applied for a job online. (12) Across U.S. metropolitan areas, we find that workers age 25–54 with a broadband enabled computer participate in the labor force at a much higher rate than workers without access. (13) The U.S. Bureau of Labor Statistics found that all industries have increased telework for some or all their employees due to the coronavirus pandemic. (14) Those without digital access are effectively locked out of these opportunities, emphasizing the essential nature of digital access for American job seekers and employees.

The COVID-19 pandemic will leave a lasting imprint on society, but whether it includes the fortification, or the eradication of systemic inequities depends on substantive changes in policies and practices that will support long term change. Because Detroit suffers with a disproportionately higher percentage of negative outcomes due to digital access inequities, taking ownership of digital access policy and establishing a plan is crucial to changing current outcomes for Detroiters.

The COVID-19 pandemic represents a watershed moment for digital access policy by furnishing incontrovertible proof that digital access is an imperative for modern societal success. Continuing to institutionalize systemic digital access inequities in the face of public support for change is unacceptable.

### **PUBLIC OPINION**

The coronavirus has driven normal everyday life online and changed our use of the internet, cementing a shift in public opinion for digital access. In June 2021, *Consumer Reports* conducted a nationally representative multi-mode survey of 2,565 adults administered by NORC at the University of Chicago. The survey found that three out of four Americans feel that municipal/community broadband should be allowed because it would ensure that broadband access is treated like other vital infrastructure such as highways, bridges, water systems, and electrical grids, allowing all Americans to have equal access to it. (15)



A 2021 Education Superhighway report found that 18.1 million unconnected households (46.9 million people) have access to Internet service but cannot afford to connect to even low-cost broadband plans, making the affordability gap the largest portion of the digital divide. (16)

Low income and elderly populations and people of color disproportionately lack broadband access. Studies show that 43 percent of adults with incomes below \$30,000 a year report not having home broadband services, in comparison to 7 percent of adults with household earnings of over \$100,000 a year. (17)

The Open Technology Institute's "The Cost of Connectivity 2020" report found that municipal networks offer faster, more affordable service. (18)

There is both public support and empirical evidence to plan and implement a policy shift towards open access municipal infrastructure. While Detroit's digital divide serves as a microcosm of a larger national challenge, it is far more prevalent and pervasive in Detroit, preventing an unacceptable portion of the population in Detroit from accessing or participating in the rise of digital opportunities. This makes Detroit the right place to demonstrate a transformational solution to the digital divide.

### **PUBLIC FUNDING**

Unprecedented public funding is available for communities to close their digital divide. Over \$128 billion in new public funding has been allocated for broadband improvements, with the majority directed to capital improvements. (19) Additionally, the Universal Service Fund provides \$9 billion per year using regulatory frameworks and Congress has authorized four additional programs to administer over \$13 billion more, effectively doubling the support offered under the Federal Communications Commission's Universal Service Programs. (20) Detroit's digital access policy will assure that any public monies result in public infrastructure for the public good.

The Federal Communications Commission's Broadband Deployment Advisory Council Working Group for 'Increasing Broadband Investment in Low-Income Communities' has recommended public-private partnerships that leverage public capital resources and private sector broadband expertise as a potential solution, noting that it should be left up to 'individual communities to consider these recommendations, and other policies, that may help encourage broadband investment in their communities'. (21) Detroit policy aligns with these recommendations by providing a state of the art digital access infrastructure open to both our current broadband service providers as a no cost infrastructure upgrade, and to new providers desiring to serve the Detroit market with minimal upfront investment.



SECTION 3

Detroit Declaration





Detroit recognizes that persistent access barriers to universal availability, affordability and adoption are public domain concerns. Relying on private industry solutions to address these critical public needs alone has only delayed the development of effective solutions and exacerbated inequalities. Solutions to these insidious inequities will require informed public policies coupled with targeted public investments. Therefore, in the absence of effective private, federal, or state solutions, the City of Detroit hereby –

- Declares a citywide digital access emergency, and,
- Takes ownership of digital access needs in Detroit.



SECTION 4

Policy Statement





### In pursuit of digital access equity, the policy of Detroit is:

- 1. Focus on universal access and affordability for all Detroiters over all other digital access concerns.
  - a. Use public funds to invest in open public infrastructure to enable true competition and choice for private services.
  - b. Codify an open access fiber optic infrastructure utility in chapter 48 of the municipal code to hold and manage the infrastructure in a proprietary or enterprise fund for public benefit.
  - c. Leverage established municipal utility operational models for funding, construction, operation, and fees.
  - d. Leverage established municipal utility powers, tax exemptions, and liability benefits to drive costs down and service levels up.
- 2. Focus on elimination (cure) over amelioration (treatment) of root causes, favoring the use of public funding on investments in long term sustainable capital solutions, such as publicly owned digital access infrastructure, rather than short term unsustainable solutions, such as public subsidies made to private service providers.
  - a. Separate public infrastructure investment and operation from private service investment and operation in law, ordinance, and practice.
  - b. Recognize fiber optic media as the preferred infrastructure investment for fixed installations.
  - c. Establish Ethernet as the infrastructure communications standard.

#### 3. Create local value for Detroit.

- a. Improve property values through the installation of affordable fiber optic access to every address.
- b. The infrastructure itself will be directly available to Detroiters for their use without requiring a commercial service or internet provider.

#### 4. Leverage existing investments and institutions for support.

a. Seamlessly fold this new municipal utility operation into all existing city operations for the benefit of all by requiring in policy that all intracity connectivity be performed by the fiber optic utility. (Detroit currently spends \$2.3M annually to third party ISPs for connectivity. These costs along with phone service costs will drop over time with and service will improve as the city shifts to using its municipal infrastructure.)



- b. Implement joint powers and cost sharing agreements with any publicly funded entity either inside or outside the city whenever possible.
- c. Use already established public assistance infrastructures, such as Connect 313, to provide municipal fiber optic utility training, support, and devices to improve adoption and digital literacy.

### 5. Establish fiber optic utility fees that provide for sustainability based on capital and operational cost recovery, not excessive reserve funding or profit.

- a. Fees shall be based on infrastructure costs which are agnostic to services consumed or provided.
- b. Fees shall be established, published, charged, and collected using already established municipal utility infrastructure, assets, and systems.

#### 6. Use the infrastructure as a platform for equity and innovation.

- a. Establish models and funding to provide a basic level of connectivity for all at no cost.
- b. Develop and implement *Customer Affordability Programs* like the existing Detroit Water and Sewerage Department for the Fiber Optic Department.
- c. Encourage innovation through fee structures that focus on infrastructure costs agnostic to bandwidth.
- d. Seek to create and improve the digital opportunities available to all Detroiters.

Achieving digital equity will require Detroit to develop strategy and policy around more than digital access. Therefore, this Digital Access Policy and Strategic Infrastructure Plan represents only an important and crucial first step in the development of a broader plan focused on eliminating the digital divide in Detroit. The Detroit plan is not a replication, but an evolution that will transform costs and services. While the first step in any paradigm shift is often hardest, this is the right first step because only by owning the infrastructure can Detroit provide the necessary foundation to assure access and equity outcomes. It is also the right public investment because it avoids favoring any single private provider by eliminating monopoly infrastructure capital costs for both incumbent and new providers, while at the same time not preventing any provider from using Detroit's new infrastructure or continuing to use private infrastructure.

The supporting document that follows this plan provides the details and data necessary to support these public policies so that they may serve as a living call to action for all Detroiters to invest in a public open access digital infrastructure solution to create opportunity, achieve equity, drive success, and deliver digital opportunities and prosperity for all.



SECTION 5

# Future of Digital Access





### **Digital Opportunity Rising**

### Digital Opportunity Rising means Detroit will build tomorrow's network today.

Tomorrow's networks will be about more than the internet. Today's public internet has created virtually unlimited global digital opportunities, sometimes at the expense of local opportunities as shown by the following examples:

- Local schools maintain local campus networks, but they were unable to use that network to connect their students at their homes during the pandemic without a third-party Internet Service Provider (ISP) that adds both cost and complication for the school and students.
- Local health care providers offer telehealth services that require both the health service provider and the patient to connect across the global internet using a third-party ISP adding cost and creating security and service level concerns.
- Innovators are forced to build unsustainable small-scale research and development networks separate from the available internet infrastructure to research and develop innovative platforms, like clean energy (transactive energy) or connected vehicle technologies, because today's internet infrastructure cannot meet platform needs for flexibility, privacy, security, and reliability.

What if Detroit's schools could stretch their already existing campus network across Detroit's public fiber to connect directly with their students at home without the cost and complication of a third-party ISP? What if Detroit health care providers could provide digital care that was local, never leaving the local fiber system or exposed to the global internet? What if Detroiters who live and work within city limits could seamlessly connect a home office to a corporate office across a private network that could be provisioned with a click of a mouse? What if Detroit's innovators could research and develop solutions in crowd sourced living labs by using the same local infrastructure as everyone else?

These types of functionalities are fundamental for the network of tomorrow. This is the infrastructure researchers and scientists recognize we need. (22) It is the infrastructure Detroit will build today as an investment in the future of Detroit. Today's use cases in Detroit will include, but are not limited to the following:

- Multiple Internet Service Provider (ISP) options and the ability to switch ISP's in 30 seconds without calling customer service or requiring another installation to improve choice, competition, and affordability.
- Online provider marketplace where residents and businesses can choose from a host of other services.



- Zero cost infrastructure upgrade from legacy copper networks to a next generation fiber optic system for incumbent operators.
- Direct school campus access from home for students at fiber speeds without requiring an internet subscription.
- Point-to-Point private networks to make it easy and seamless to work from home.
- Direct digital health care connectivity for providers and patients at fiber speeds without requiring an internet subscription or exposing any data to the public internet.
- A Beta marketplace where innovators can connect with crowd sourced prosumers who
  want to participate in the development of tomorrow's digital platforms like transactive
  energy (clean energy) or connected cars.
- Wireless back haul connectivity at fiber speeds necessary for mobile providers, networks, and applications.
- Basic lifeline and public safety connectivity for every address with a fiber optic utility connection.
- City services networks for internal city operations and delivery of public services to residents and businesses.
- Transactive energy (clean energy integration) networks to connect devices, consumers, and providers.
- Remote control networks to enable precise control of remote devices as platforms develop.
- Connected cars wireless backhaul.
- City security surveillance network to aid law enforcement.
- Internet of Things (IoT) sensors, actuators, and devices in private point-to-point networks rather than communicating across the public internet.

To support these transformations, Detroit has identified and will focus on the following critical digital access infrastructure elements:

- **Fiber Optic:** The best infrastructure to deliver fixed last-mile digital access is fiber optic. Once fiber optic cable is installed throughout the city, upgrading the network will only require the transmitters at each end to be changed, yielding multiple performance increases at low costs for decades to come. Fiber will enable the next generation of applications that depend on high-throughput, low-latency, high-reliability connections. There is an identifiable "speed chasm" between fiber and everything else that is only going to grow more pronounced over time.
- Ethernet: Digital access runs on Ethernet. Ethernet sits at the base of the network stack, and it is these standards and protocols that run today's global internet. Ethernet drives continued cost reduction, and adoption across multiple layers of applications. Bundled



with the robust capacity of fiber optic cable, Ethernet standards provide the ability to securely create both public and private networks on the same fiber, along with the ability to prioritize one network's traffic over another for the benefit of public safety or other critical functions in the event of a disaster or attack.

- Software Centric: Today's existing telecommunications networks are hardware centric. Hardware centric means that the network functions and limitations are defined by the electronics or signaling equipment. Hardware centric networks require the installation of new or additional electronic equipment to support new functions or networks because they lack the ability to define them in software. Software centric networks are commonly used in data centers to uncouple the networks and functions from the underlying hardware. This allows any number of new networks or functions to be delivered via software changes rather than hardware changes. Software centric networking provides for service separation, security, and innovation much faster and at lower costs.
- Automation at the Edge: An example of the transformative power of 'automation at the edge' can be seen in the rise of the smart phone. Prior to the smartphone, cell phones were single purpose, hardware centric without any 'automation at the edge'. Today's smartphone benefits from ever expanding services and applications because it successfully uncouples these opportunities from the hardware and provides the ability to automatically install and operate any number of new applications and services right from your phone. Today's phone and cable networks use automation within the core of the network to help reduce operational costs for the operator, but this 'automation' is not available at the edge of these networks today. Detroit's automated open access fiber optic system will provide this functionality through online portals and marketplaces for residents, businesses, providers, and operators.

A fully connected and enabled system, as envisioned in this plan, is very much like our street system. It requires vision, planning, and investment to realize, and it will take time to materialize. It requires Detroit to 'buy into' the desired 'smart future' before all can fully utilize it. The pandemic has proven that this essential infrastructure is like investing in our streets, water, or wastewater systems, waiting until it is needed is too late.

Because this investment will be made by all Detroiters for the future of Detroit, this plan focuses on delivering the forgoing use cases using the outlined critical elements to leapfrog Detroit into a position of national leadership in next generation, robust, reliable, affordable, digital access that is available to all Detroit in support of our local institutions, industry, businesses, and residents. Detroit's plan will restore the power of the local network within the global internet infrastructure.



SECTION 6

Key Findings





### **Summary of Key Findings**

### Detroit's primary objectives are to -

- 1. Make digital access affordable and available for all Detroit residents, and
- 2. Create a long term (50+ year) solution rather than incrementally improving the problem over time.

### There are four primary tools to achieve this -

- 1. Use of public funds to invest in open public infrastructure.
- 2. Enable true competition and choice for private services with an open access fiber optic infrastructure utility.
- 3. Leverage established municipal utility operational models for funding, construction, operation, and fees.
- 4. Leverage established municipal utility powers, tax exemptions, and liability benefits to drive costs down and service levels up.

#### What will this cost?

To make sense of the cost, we need to understand what Detroiters are paying today -

### Internet Spend in Detroit Today

Average monthly cost of home internet connectivity in US today \$68.38



Number of Premises (Home | Businesses)

247,000

Average Monthly Internet

\$68.38

**Annual Internet Spend** 

\$202,678,320

20 Year Internet Spend

\$4,053,566,400

This assumes 65% of the 380,000 homes in Detroit have a wired connection

https://www.newamerica.org/oti/reports/cost-connectivity-2020/

### The Path to \$50 Digital Access

Projected Residential Services Monthly Costs	100% Buried
Infrastructure Costs	\$22.86
Maintenance and Operations Costs	\$15.92
ISP Services Costs [1,000 x 1,000 Mbps]	\$9.99
Monthly Total	\$48.77

#### **Key Drivers**

- Shift to utility model.
- Use public financing.
- Providing traditional open access functionality to providers and subscribers.

#### **Impact**

Average of approximately \$20 in saving with a twenty times (20x) improvement in service level.

### The Path to \$40 Digital Access

Projected Residential Services Monthly Costs	100% Buried
Infrastructure Costs	\$22.86
Maintenance and Operations Costs	\$15.92
ISP Services Costs [1,000 x 1,000 Mbps]	\$0.00
Monthly Total	\$38.78

#### **Key Drivers**

- Eliminate the traditional ISP without requiring any outside subsidy by using Open Access innovations to provide essential connectivity where:
  - 1. Schools stretch their campus networks into the home at no cost.
  - 2. Libraries stretch their internet connectivity into the home at no cost.
  - 3. The city provides a Lifeline plan.
  - 4. ISPs offer Lifeline Plan (Detroit could require some free offerings as part of market participation).

Note: This would provide direct fiber access between the school and the home for a student. This model will result not only in a completely different cost model, but a different user experience as a local fiber optic school operated network could be used for remote campus or virtual classroom applications. The same could be true for extending a library network.



### The Path to \$30 Digital Access

Projected Residential Services Monthly Costs	100% Buried
Infrastructure Costs	\$13.53
Maintenance and Operations Costs	\$15.92
ISP Services Costs [1,000 x 1,000 Mbps]	\$0.00
Monthly Total	\$29.45

#### **Key Drivers**

- Federal Grants
- State Grants
- Philanthropic Contributions
  - 1. Targeted Grant Utilization \$180 million or 20% of infrastructure cost in grant funding.
  - 2. City-wide Grant Utilization \$360 million or 40% of infrastructure cost in grant funding.
- Eliminate the traditional ISP without requiring any outside subsidy by using Open Access innovations to provide essential connectivity where:
  - 1. Schools stretch their campus networks into the home at no cost.
  - 2. Libraries stretch their internet connectivity into the home at no cost.
  - 3. The city provides a Lifeline plan.
  - 4. ISPs offer Lifeline Plan (Detroit could require some free offerings as part of market participation).

### The Path to No Cost (\$0) Digital Access

Projected Residential Services Monthly Costs	100% Buried
Infrastructure Costs	\$13.53
Maintenance and Operations Costs	\$15.92
ISP Services Costs [1,000 x 1,000 Mbps]	\$0.00
Monthly Total	\$29.45
Affordable Connectivity Program	- \$30.00

#### **Key Drivers**

- Affordable Connectivity Program \$30.00 subsidy program funded through the FCC for qualifying applicants.
- The ACP could effectively reduce the cost for a qualifying household to zero for the term of the need or the program. The City of Detroit will need to complete the process to become an approved provider for the Affordable Connectivity Program (ACP).

### **Cost Comparison**

Below is a comparison of per Mbps cost of service using the standard packages and advertised cost published on each providers website.

Network Provider >>>	xfinity	<b>З</b> АТ&Т	Fiber Utility
Cost Per Mbps – Plan 50	<b>\$1.18</b> 50/5 Mbps Plan	<b>\$1.20</b> 50/5 Mbps Plan	<b>\$.05</b> 1000/1000 Mbps Plan
Cost Per Mbps – Plan 100	<b>\$.79</b> 100/10 Mbps Plan	<b>\$.60</b> 100/10 Mbps Plan	<b>\$.05</b> 1000/1000 Mbps Plan
Cost Per Mbps – Plan 300	<b>\$.30</b> 300/12 Mbps Plan	No Offering	<b>\$.05</b> 1000/1000 Mbps Plan
Cost Per Mbps – Plan 600	<b>\$.17</b> 600/15 Mbps Plan	No Offering	<b>\$.05</b> 1000/1000 Mbps Plan
Cost Per Mbps – Plan 900	<b>\$.12</b> 900/18 Mbps Plan	No Offering	<b>\$.05</b> 1000/1000 Mbps Plan
Cost Per Mbps – Plan 1200	<b>\$.10</b> 1200/20 Mbps Plan	No Offering	<b>\$.05</b> 1000/1000 Mbps Plan

Note - These key findings are detailed in the <u>financial and technical addendum</u> attached to this digital access policy and strategic infrastructure plan.



SECTION 7

Frequently
Asked
Questions



### Is there really a 'digital access emergency' in Detroit? Unequivocally, YES.

While the gaps in internet affordability, availability, and reliability don't feel like a crisis for the connected, these barriers are a crisis for the unconnected. Today's technology-based interactions link and mediate our culture, the economy, and society. Connectivity expands opportunities and enlarges possibilities when it is affordable and available to all. People are diminished and condemned to negative outcomes beyond their control by existing barriers to digital access in Detroit. The city must recognize digital infrastructure as essential infrastructure and require it to be extended to every Detroiter at prices they can afford. Industry cannot not take this step. More than a generation of Detroiters has already suffered these systemic injustices and we MUST change the digital access standard for Detroit immediately by declaring digital infrastructure as essential by providing universally available and affordable access to all through the creation of a municipal utility for the benefit of both providers and subscribers.

### What does it mean for Detroit to declare such an 'emergency'?

The inequities in digital access inside Detroit directly threatens the property, health, welfare, education, employment, and economy of its citizens. By publicly declaring a 'state of emergency for digital access,' Detroit will implement policies and procedures to address this crisis for the safety and protection of all citizens. Specific, expedited procurement and construction practices may be implemented as needed to protect health, safety, and property until the emergency is abated.

### Is the Detroit plan legal under Michigan law?

Yes. The public health and general welfare of the people of the state are declared to be matters of primary public concern by law. (See: Article IV § 51) Detroit has the authority to adopt resolutions and ordinances relating to its municipal concerns, property, and government, subject to the state constitution and law. (See: Article VII § 22 and Michigan Section 117.4j) Detroit also has the authority to 'acquire, construct, own, operate, improve, enlarge, extend, repair, and maintain public utilities and borrow money, levy taxes, or make other arrangements for the financing of public utilities to the maximum extent permitted by law...' (See: Detroit Section 9-508) The law also provides authority to a 'public entity to provide telecommunication services' under certain provisions. (See: Michigan Section 484.2252) This authority is NOT necessary under this plan, as Detroit will not offer any 'telecommunications services' as defined in law, but rather a digital access infrastructure as a 'public utility facility' as referenced in statute, defined by city policy, and codified in ordinance. 'Telecommunications services' will require a provider outside of the utility infrastructure to deliver telecommunication service functions like network service, content, data, information, addressing, routing, and service delivery endpoints as these are not part of the 'public utility facility'. In short, Detroit's fiber optic utility is no more a 'telecommunications service' than a road would be considered the same as a delivery service like UPS or FedEx. Instead, both the road and city fiber are the public infrastructure that serves as the platform for private service delivery and competition at affordable prices.

#### Why fiber optic infrastructure?

Fiber's durability, lower maintenance costs, and reduction in hardware than other media result in a better up-front investment with long-term payoffs. Any public capital investment in infrastructure must also consider its usefulness and capacity to handle the projected growth of consumption. For years without fail, data consumption has continued to rise as more applications and services require greater amounts of capacity. The only real choice for long term investment is fiber because only fiber will still be useful 50 years from now.

#### Won't fiber cost too much?

A misperception often pushed by those interested in maintaining the status quo, those who want to forestall universal fiber is the "high cost" of fiber and the prevalence of cheaper alternatives. Fiber is affordable public infrastructure. Up-front cost for wireless solutions may be less expensive but the life cycle of wireless infrastructure is 5-10 years and effective wireless solutions depend on fiber optic backhaul. Further, the capacity of fiber optics is exponentially greater than wireless capacity. To put it in perspective, consider the costs associated with other public infrastructure projects. Using a \$15 million dollar investment, a city could build ¼ mile of light rail, or make 3 miles of bridge repairs, or mill and resurface 12 miles of a 4-lane road, or replace 15 miles of water pipes and meters, OR build 87 miles of an underground, urban, fiber network.

### Why Open Access?

Open access provides an effective and scalable solution where multiple providers offer their services in a competitive ecosystem across shared physical infrastructure.

Open access infrastructure operates like our airports and physical road systems which provide shared infrastructure that is available to private companies to deliver services to end customers. Shared infrastructure makes sense when no new value is realized by having redundant infrastructure, which inevitably duplicates costs. Fiber optics have so much capacity that it no longer makes sense to deploy multiple infrastructures if a single infrastructure can enable competition between services providers.

Open access addresses that key digital access problem where there is a significant lack of competition as it ensures that residents and local businesses have multiple options for high quality services at the best possible price across the shared infrastructure. When people can easily switch away from their Internet Service Provider, the ISP has an incentive to provide better services at lower costs.

Publicly owned, open access infrastructure creates a vibrant and innovative market for digital services. Municipalities build the physical infrastructure (fiber-optic lines) and independent Internet Service Providers (ISPs) operate in a competitive market using the same physical infrastructure. In this competitive marketplace, ISPs compete for customers and have incentives to innovate rather than simply locking out competitors with a de facto monopoly.



#### What is Automated Open Access?

Automated Open Access uses software automation to eliminate the complexity of interacting with the system for subscribers, network operators, and service providers. In this model, the ISP is not responsible for managing the infrastructure and is moved to the cloud. Shopping for an ISP is a lot like shopping for anything else online. Subscribers can sign up for an ISP in 60 seconds. Switching ISP's also happens in real time. Once the infrastructure is in place, there is no need to call customer service or schedule a time for a service person to physically provision a service.

The difference between a manual Open Access system and an Automated system is that the automated approach seeks to create a true marketplace, lower the barriers to entry for all stakeholders, and use automation to lower the cost of operating expenses. Interacting with the system can be any time of the day or night. Also, automated tools available within the portal assist with testing and troubleshooting connectivity issues for the network operator, service providers, and subscribers.

While the automation eliminates the need to call to make changes, there will be dedicated customer service representatives available to assist as needed.

#### What about dark fiber models?

Dark fiber leasing models do not provide the same cost savings or scalability as automated open access systems. In dark fiber open access systems, only the fiber cable is owned by the open access operator, each service provider (ISP) must provide electronics throughout the system, including the device installed in the home. This effectively splits the capital investment between the open access operator and the service provider. As a result, there are significant additional capital costs incurred by each new provider entering the market and these costs get passed on to subscribers. Additionally, the system is only capable of supporting a finite number of providers based on the actual physical fiber count that is available. Other limitations include the fact that switching providers requires a new piece of equipment to be installed and it is not possible to receive services from multiple providers at the same time without multiple sets of equipment. Automated open access systems overcome all these deficiencies in software by providing 'virtual' fiber connections or 'virtual' networks using the same electronics and equipment for all providers. This eliminates the scale limitations associated with the physical fiber count, provides residents with the ability to switch or add providers in real time, and allows for the delivery of multiple services and providers on the same device and at the same time without any change in equipment.

### What about 5G or other technologies?

Wireless cannot serve as a foundational long-term investment, like fiber optic can. The fastest 5G 'to the home' technologies operate in higher frequencies using millimeter wave (microwave) spectrum to achieve speeds like the slowest fiber technologies. This type of installation requires fixed antennas placed on every home with a line of sight to access point antennas installed about every 600' throughout the neighborhood. Each radio antenna installation would still require a fiber optic connection and power. The typical life cycle for wireless technologies is 10 years, with an expected device life span of 5 years. Satellite technologies provide shared connections that



will never have the capacity to meet the needs of Detroit anytime soon. These factors make installing fiber to every address the right public investment.

#### Can Detroit afford this investment?

A factor related to affordability is financing. Private investment typically requires a 5-to-8-year return that includes profits and interest. Public investment typically requires a 20-to-30-year payoff with guaranteed low interest rates and no profits paid. In 2018 the Detroit Water and Sewerage Department (DWSD) launched a 5-year capital improvement program investing \$500 million in water and sewer lines using the same frameworks Detroit will apply to the construction and operation of this automated open access infrastructure. Consider that if all the direct COVID relief payments received by Detroiters since the start of the pandemic were directed to the plan outlined here, it would be enough to fund a fiber to every address in Detroit. The challenge, therefore, is not one of affordability, but priority.

#### Where will Detroit get the funding?

Unprecedented levels of Federal and State funding are being made available for broadband infrastructure over the next several years. This plan will put Detroit at the front of the line for these funds by providing a citywide fiber optic design with cost estimates to install fiber optic lines to every address in Detroit. It also allocates over \$10 million of Detroit's American Rescue Plan Act (ARPA) funding to an initial 18-month pilot project to prove costs and service. This early work will inform Detroit's applications and prove the benefits that would come from State and Federal infrastructure funding. While it is unlikely that grant opportunities alone will provide enough funding to reach every home and business, these funds are the key to affordability.

#### What will this cost me?

There will be no cost to anyone who does not request an installation or service using city fiber. This plan separates the costs for the final service into three (3) separate and distinct categories:

- 1. The cost of installation (capital costs)
- 2. The cost of operation (maintenance and operation of the fiber system)
- 3. The cost of service (provided via a private marketplace of services)

This plan will make the best use of available grant and low interest public bonds to drive the installation costs as low as possible with the stated goal of \$10-\$15 per month for this cost in areas most impacted by digital inequities. The city will create a new utility department that leverages the expertise of the city Information Technology (IT) Department and the Department of Digital Inclusion to manage operations with the stated goal of \$15-\$20 per month for this cost. It is expected that robust, reliable internet access will be available from multiple Internet Service Providers (ISPs) within the online marketplace with packages from \$5-\$25 per month depending on the specific service offered. *The goal of this plan is to make world class fiber optic connectivity available to every address in Detroit for \$30-\$40 a month.* Additionally, the city will develop and implement Customer Affordability Programs like the Water Residential Assistance Program (WRAP) and the Detroit Water and Sewerage Department (DWSD) 10/30/50 Payment Plan for those unable to pay their bill.



#### How will Detroit determine rates and charge fees?

Utilities are fundamentally different from other businesses because they are NOT allowed to charge whatever they want, or whatever the market will bear. Because a public utility model will be applied to the fiber optic system, rates will be determined based on the actual costs to maintain and operate the system, not on market rates. This public process requires utility rate changes to undergo a regular 'rate case' or evaluation of actual expenses compared to the rates being charged, resulting in adjustments as necessary with an emphasis on providing an essential service at the least possible cost. True public utilities also benefit from specific legal and liability protections, as well as access to low interest, long term funding for capital projects that result in lower operating costs when compared to private businesses.

#### What will this do to my property's value?

High-speed fiber Internet can add an average of 3.1% to your home value, according to a study conducted by researchers at the University of Colorado at Boulder and Carnegie Mellon University in 2015. The study used data from nearly half a million home sales between 2011 and 2013, U.S. Census data and data from the National Broadband Map to determine the effect of high-speed fiber-optic Internet on home prices. The median home value in the study was \$175,000. When high-speed fiber is added, this home sees an increase in value of \$5,437. The increase is approximately equivalent to the value of a fireplace or a little under half the value of a bathroom. Since the pandemic has only increased the need for reliable, robust, digital access, subscribers can be confident that any investment in fiber to a property will increase its value.

### What is a 'pilot project'?

The pilot project is a mini version of this plan that will serve to confirm the viability and outcomes of extending fiber to every address. The project will include the installation and operation of an automated open access fiber optic line to every address desiring an installation.

### Where is the 'pilot project'?

An area of approximately 2,000+ homes has been identified in the Hope Village area of Detroit for the pilot project.

### What is the purpose of the 'pilot project'?

The pilot project will mitigate risk and further inform the plan by validating cost models and demonstrating the ability of automated open access systems to fulfill key functional requirements to help Detroit access the substantial resources necessary to extend the fiber utility to every address.

### How was the 'pilot project' selected?

The Hope Village area was selected because of the critical need that exists in the area. The area suffers from barriers to affordability, lacks competition, and is plagued with unreliability. It also represents one of the most challenging areas for access, making it the ideal location to demonstrate the benefits that will arise from making digital access affordable and available to every Detroiter.



### Are Pilot Project properties receiving a benefit that will not be available to other Detroit properties?

While the economic frameworks employed by a utility benefit from averaging costs across many customers, they are prevented by law from discrimination, including free or preferential rates for some customers in comparison with others. In simple terms, this means that the economic benefits to the pilot project will be extended to future customers as the scale increases through cost averaging across all customers over time. This cost averaging over time is fundamentally different from typical business operations, and assures that economic benefits, like grants, are extended to all rather than a few. These utility models will be used in Detroit to drive affordable digital access to every Detroiter. Additional programs can and will be overlayed to provide economic assistance in support of digital equity for those that are economically disadvantaged.

#### When will the 'pilot project' start?

Requests For Proposals (RFPs) for pilot project procurement are being released in conjunction with the release and adoption of this Plan, with construction of the pilot project scheduled to start in May of 2022 with the first pilot participants being connected in August 2022. The pilot project construction is projected to take 18 months and be completed by 2023.

#### When can my property get a fiber optic connection?

This will vary by neighborhood. Detroit will prioritize the citywide buildout based on need and demand. There will be regular updates made available through the outlets maintained by Detroit. All properties will have access by 2032.

### What can I expect during the installation process?

A walkthrough of each property will be conducted as part of passing by or through each property only if the property owner requested the installation of a fiber line to the home or business. Mainline fiber is always installed in a city owned Right of Way (ROW) or public utility easement. The extension that crosses private property requires property owner permission, and the placement of all fiber and electronics inside the home or business will require property owner approval. The initial meeting will be scheduled in advance of the mainline cables being placed. The purpose of this meeting is to agree on the placement of fiber through the property and the placement of the electronics inside the building. If there is work desired within the home that cannot be performed by construction personnel due to cost constraints or complexity, a property owner may arrange the installation inside the building. Sometime after the mainline and extension or 'drop' to the property is installed, an installation will be scheduled where a technician will complete the fiber installation inside the building, set the equipment, and make sure that connectivity is complete. Detroit will provide multiple mechanisms and management systems to help property owners coordinate their installation, and any necessary property restorations that result from the construction process. These will include online, phone, and walkin solutions.

### How can I make sure I get a fiber installation?

Regular communications related to plan progress will be distributed through the city's regular communications channels. Detroit will also maintain a robust and exhaustive online site



dedicated to this effort. This site will include plan information, regular updates, maps, and forms to assure that all Detroiters benefit from this important process. Property owners will also be notified when construction is starting near their property via mail and door hangers that will include information on how to make sure a property is signed up to receive an installation.

#### How does 'automated open access' work?

Open access provides multiple options in broadband services, and internet for Detroiters to choose from. To obtain service, property owners will first need to complete a city fiber installation form. Once the installation is complete, a party responsible for payment of a monthly utility bill will need to sign up for utility fiber service, just like sewer and water. After signing up for service, a username and password are provided that will allow the recipient to log into Detroit's utility fiber system. This portal login information will be specific to that property and will include access to a marketplace of available services. Services can be selected and automatically provisioned in a matter of minutes with a click of the mouse. Changes in packages or subscriptions are just as easily accomplished automatically at any time of the day or night. There are also tools available within the portal to assist with testing and troubleshooting the property's connectivity, as well as contact information for assistance. The portal login can be accessed by plugging into any city fiber connection or through a web browser with an internet connection.

#### What does this mean for Detroit's incumbent providers?

Detroit recognizes and appreciates the historical investment already made by incumbent providers. Nothing in Detroit's plan will force these operators to abandon their current infrastructure and will not impose barriers to upgrading or extending their infrastructure if they desire to do so. This plan is neutral to those options while presenting opportunities for incumbent operators to upgrade their infrastructure at no capital cost by utilizing the new city fiber optic infrastructure. This opportunity is important to the incumbent phone operators as the twisted pair infrastructure they operate is decades old and often incapable of meeting the minimum requirement for broadband. It is equally important for the incumbent cable operators as they are private commercial operators that rely on franchise agreements to obtain access to Detroit's Rights of Ways (ROW) in which they install coaxial cable to deliver their service. These cable franchise agreements require that the operator is offering cable service, defined as channelized video content, for which access the city is adequately compensated. As system bandwidth is shifted from delivering channelized video to internet and data services, these operators will have no legal claim to continue accessing Detroit's ROW. This plan effectively solves this problem by providing cable operators with the ability to move their internet or data only customers over to the municipal fiber optic utility infrastructure with no capital costs incurred.

### What relationships are important to plan success?

There are numerous internal relationships that will be cultivated between this new fiber optic utility and other city departments and operations. This infrastructure will be installed to meet the digital communication needs of all other city departments, operations, and functions over time. This will be a requirement in both ordinance and policy.



There will also be numerous external relationships established and cultivated for the combined success of Detroit and any other public or tax supported entity. State law allows for and encourages tax supported entities to enter interlocal or joint powers agreements, and to utilize cost sharing to reduce costs and improve services for the taxpayers they serve. These relationships will be encouraged and cultivated in both ordinance and policy.

#### Has this been done anywhere before?

Ammon, Idaho was the first municipality in the country to install a municipally owned automated open access fiber optic utility approach in 2017. Ammon has received numerous awards and accolades for their revolutionary approach. Residential properties with a paid for Ammon fiber installation have the option of receiving 1 Gbps fiber optic internet service for less than \$30 per month with no data caps or contract. Today there are 40 other cities across the country actively planning for or in the process of implementing the 'Ammon Model'.

#### Is 10 years the right timeline?

Detroit's plan identifies some 380,000 locations that require a city fiber installation. This equates to an average of 38,000 installations per year or 146 installs a day or almost 20 installations every hour. This should inform plan urgency. Detroit has set 10 years as an acceptable maximum to connect residential, commercial, and other anchor institution properties but intends to define the areas of critical need and drive a sense of urgency that will deliver the most important results in these areas first.

### What if a costly upgrade to the system becomes necessary in the future?

This is not a new challenge for municipal utilities. For example, in 2018 Detroit launched a capital improvement plan for water and sewer. The cost for these improvements will be \$500 million. These improvement costs are averaged across all the system's customers and paid for over a period of time. It is these unique utility funding and rate mechanisms that help to maintain affordability even in the face of large capital improvements. These same frameworks will be used to maintain affordability if a costly system upgrade becomes necessary in the future. Additionally, fiber optic infrastructure is expected to have a 50-100 year lifespan.

### What can I do to support the plan?

Order a fiber installation at your property as soon as possible. Property owners can sign up their properties prior to the creation of an actual construction project in the area. This will assist the city in determining which areas have the most need and demand. Once a construction project is funded for your area, please make sure your property will receive an installation by completing the proper forms. Hard copy and online sign-up methods will be provided. Utility costs benefit from scale. As more property owners participate in the plan, costs will be lower for everyone.

### How can I voice my concerns about the plan?

There will be regular public meetings associated with plan implementation, even at a neighborhood level. Public input from Detroit residents at these meetings is welcomed and encouraged. For commercial or industry interests with concerns, please direct all inquiries to the



Department of Digital Inclusion: Joshua D. Edmonds, Director of Digital Inclusion, edmondsj@detroitmi.gov

### How will the infrastructure support equity?

For the first time ever, Detroit will have the ability to focus a digital access investment to facilitate inclusive prosperity, redress past harms, and advance local goals and priorities. Service subsidies do not effectively solve for these problems but are instead designed to only manage the problem. Detroit can include necessary structural reforms as part of plan execution, and will start by connecting those most disadvantaged first, something that hasn't been done historically by industry.

#### How will the infrastructure support innovation?

New and innovative services will have access to a robust digital infrastructure without incurring the high capital costs associated with building a new infrastructure. This will greatly accelerate the speed of innovation in Detroit while also exponentially reducing the cost of innovation.

### What are some examples of future services Detroit wants to be prepared for?

Digital access is already needed for distance learning and telehealth. New services on the horizon include connected vehicles and transactive energy. These industries are seeing enormous investment and services are evolving rapidly. An automated digital open access platform is well prepared for these innovations because secure dedicated networks can be created on demand for these new and innovative uses.



Appendix

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