City of Waterloo, IA

BROADBAND ASSESSMENT AND FEASIBILITY ANALYSIS

JUNE 2022

AGENDA

Project Background

- Project Information
- Timeline
- Backbone Plan
- Fiber to the Home Plan
  - Consumer Survey Results
  - Buildout Concept by Phase

Business Model and Deployment Options for Consideration

- Review Business Models
- Review Supporting Financials
- Project Phasing

Recommendations & Next Steps

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Project Background

Broadband Study Project Kickoff
January 2020

Broadband Study Delivered
February 2021

Fiber Backbone Design Started
April 2021

Fiber FTTP Design Started
August 2021

100% Design Completion
August 2022

Policy Participation Only	Infrastructure Provider
Government Services Provider	Lit or Dark Open-Access Provider
Retail Service Provider – Business Only	Retail Service Provider – Business & Residential

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Project Background

Project Goals

- Develop a Fiber Backbone to support City municipal operations, including utility operations, traffic, public safety and future Smart City initiatives.

- Develop a Plan to deliver next-generation Fiber to the Premise/Home services enabling high-speed access to every home and business throughout Waterloo.

Project Opportunities

- Utilize one-time ARPA funding to support broadband deployment in select areas of the City where access, affordability and reliability are of concern

- Explore partnership with neighboring municipalities to simplify the deployment of retail services leveraging their core network and content

- Leverage additional funding opportunities, including potential EDA award, and upcoming Infrastructure funding programs

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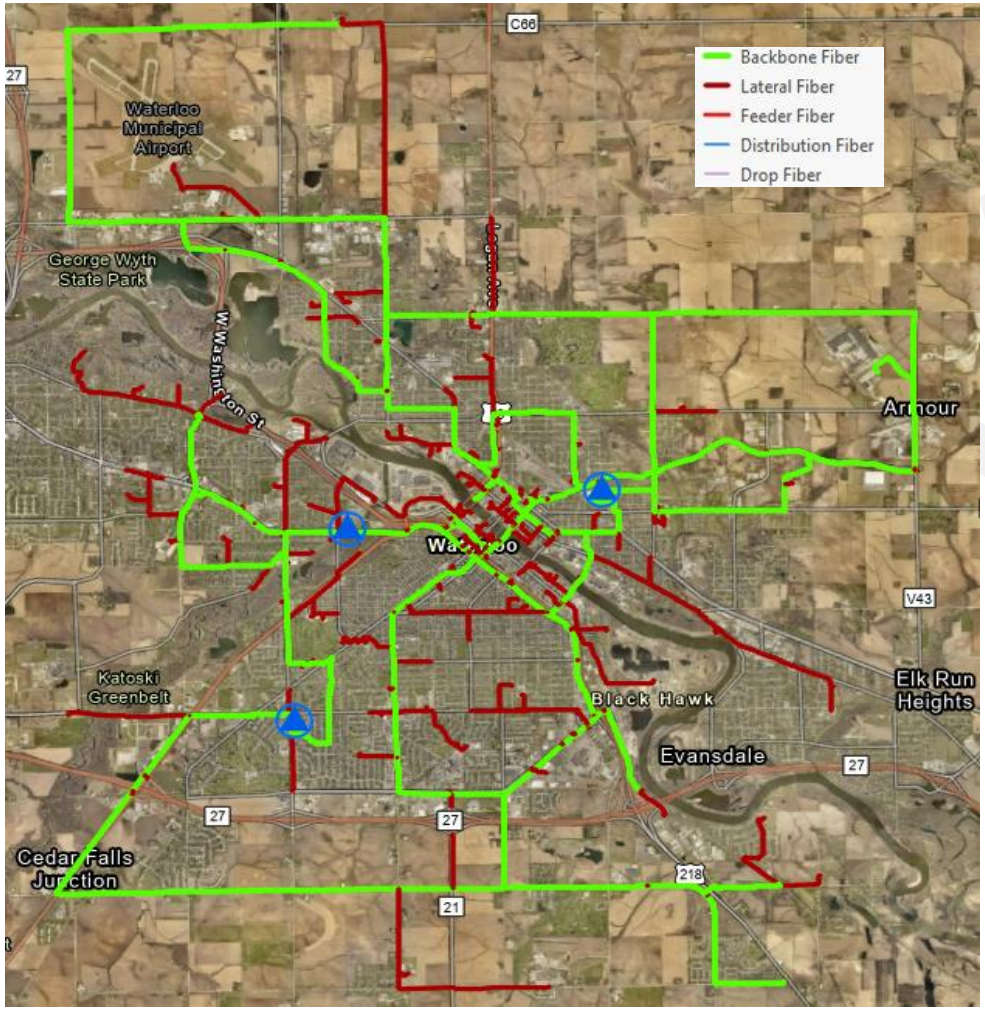
Project Background

Fiber Backbone Plan

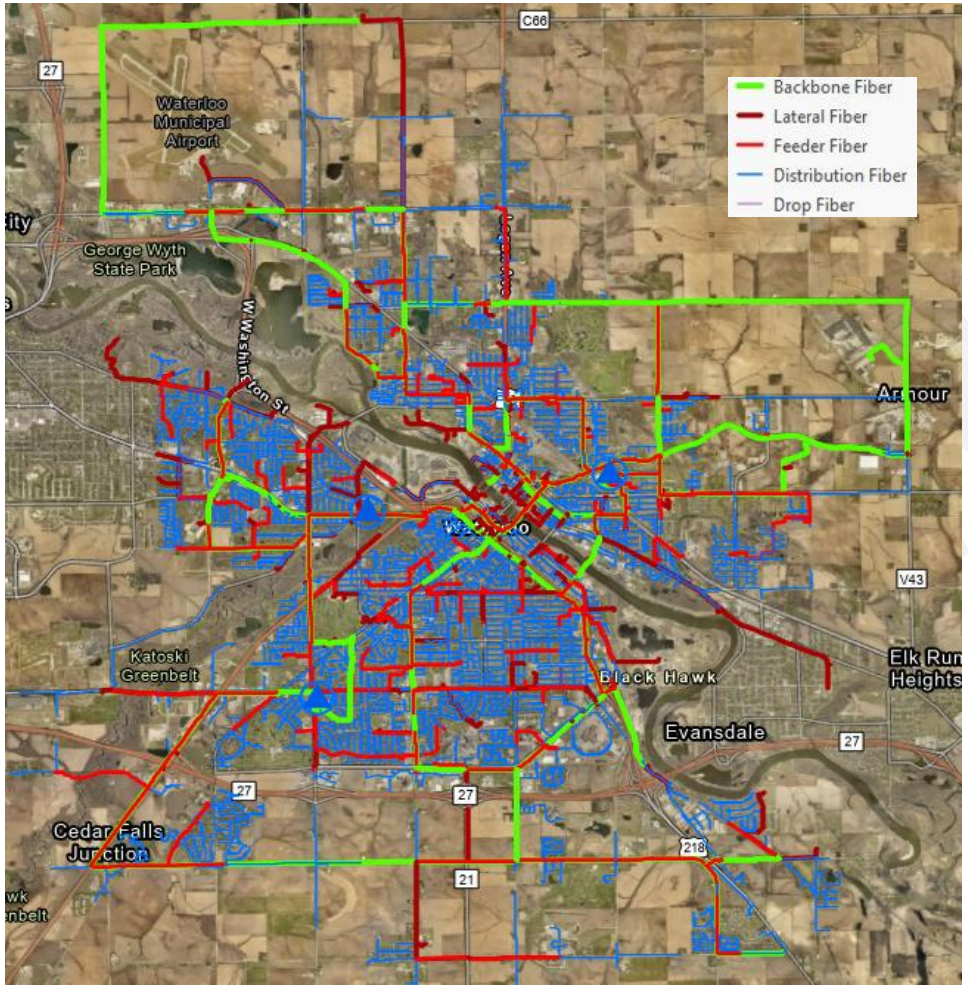


Backbone Cost Element	Description	Current Cost Estimate
Design	Design, Engineering, Permitting Preparation	$922,049
Construction	UG Construction of Conduit and Fiber	$23,000,000
Construction Contingency	Contingency	$2,300,000
CEI and Project Management	Construction Management, Inspections Services	$1,200,000
	Fiber OSP Construction Total:	**$27,422,049**
Core/Edge Network Equipment	Core Network Switches/Routers	$500,000
Site Equipment	Premise CPE, rack, battery backup ($3k per site)	$984,000
Facilities	Data Center Renovation/Preparation or Pre-Fab	$300,000
Software	Network Management Software, Fiber Management	$75,000
	Fiber Backbone Project Total:	**$29,281,049**

[1] Backbone design was contracted by the City in 2021 and is underway.
[2] Estimated $1.9M of construction is for costs associated with UG construction of critical/difficult crossings.

Project Background

Fiber to the Premise Plan



FTTP Cost Element	Description	Current Cost Estimate
Design	Design, Engineering, Permitting Preparation	$3,854,000
Construction	UG Construction of Conduit and Fiber	$46,250,000
Backbone FTTH Adder	Additional FTTP conduit included in Backbone segments	$4,000,000
Contingency	10% Construction Contingency	$5,250,000
CEI and Project Management	Construction Management, Inspections Services	$2,400,000
	Fiber OSP Construction Total:	**$61,754,000**
Facilities	Data Center Renovation/Preparation or Pre-Fab	$900,000
General Equipment and Vehicles	General Tools and Equipment	$383,000
Core Network Equipment, Software, etc.	Hardware, Software and Storage	$4,521,600
Fiber Drops to Premises	Based on Estimated Uptakes 35% Single-Family; 35% MDU, 35% Business	$18,816,612
	Fiber FTTP Project Total:	**$86,375,200**

[1] Backbone design was contracted by the City in 2021 and is underway.

[2] Estimated $4M of construction includes additional duct for FTTP to be included in the backbone route. Not needed if build is for backbone only.

Project Background

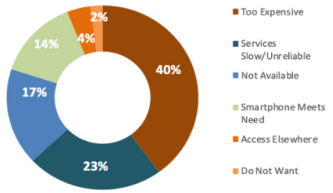
Consumer Survey

Broadband Survey Overview April 2022

2,727
SURVEY PARTICIPANTS

98%
HAVE BROADBAND

The top reason why **2%** of respondents do not have broadband is because it is **too expensive.**



COVID-19 PANDEMIC

During this time, 83% of Waterloo's citizens said that their **needs for broadband access have increased.**

Providers in Waterloo

MEDIACOM | CFU | RISE BROADBAND | VIASAT
CENTURYLINK | T-MOBILE | HUGHESNET | OTHERS

Median Speed

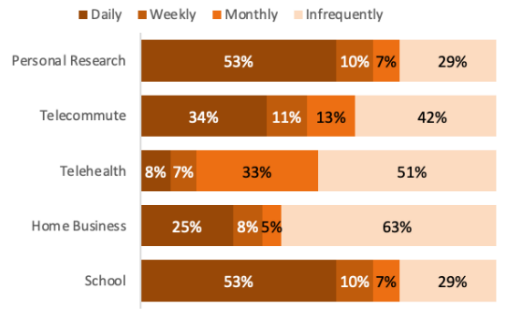
75.26 Mbps
DOWNLOAD SPEED

22.42 Mbps
UPLOAD SPEED

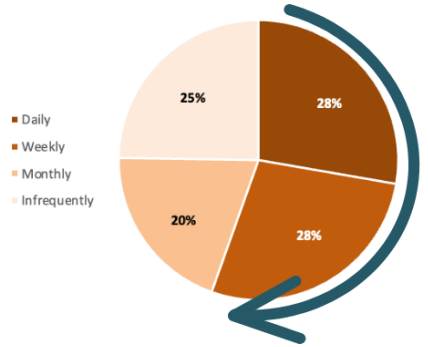
Average Price
Per Expected Download Speed

$92.11	$88.74	$108.78
25 Mbps	100 Mbps	1 Gbps
$3.68/Mbps	$0.89/Mbps	$0.11/Mbps

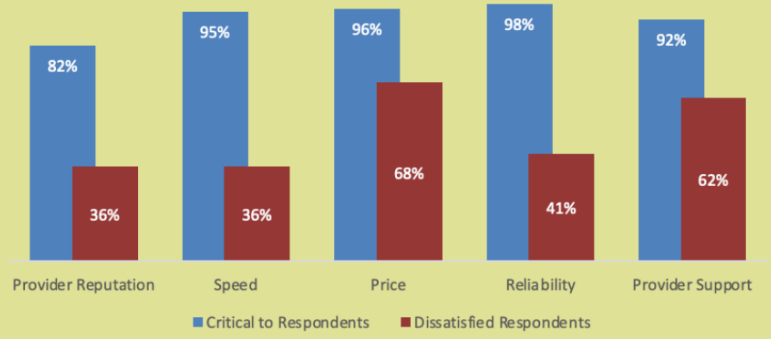
Frequency of Broadband Use per Residential Activity



How often does your internet slow down?



56% of the citizens experience a noticeably slow internet multiple times a week to daily.



Most citizens consider speed, price, reliability and provider's reputation and support to be of critical importance to them.

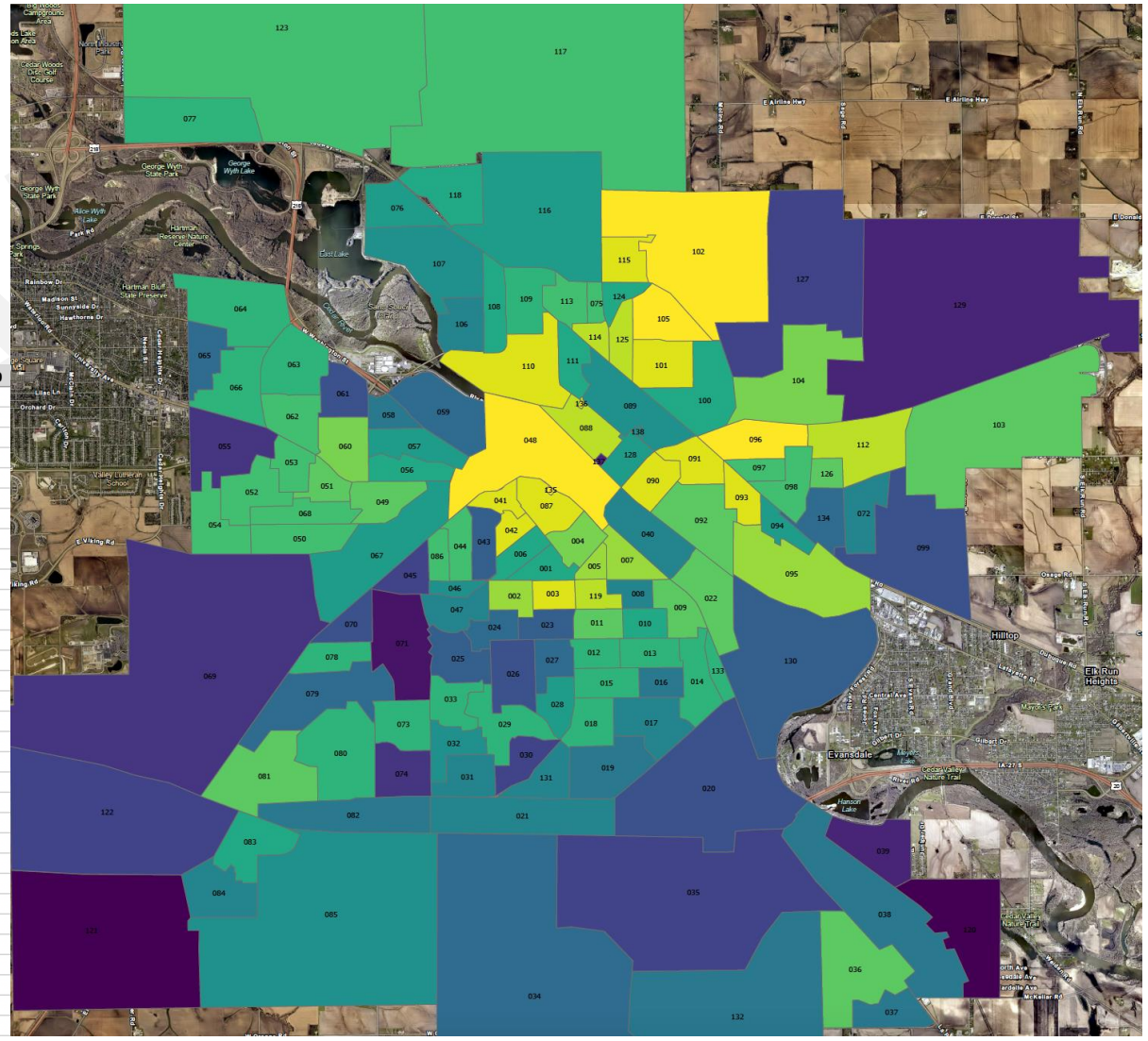
Over half of them are dissatisfied with the price and provider support they are currently receiving.

Project Background

Determining Priority Areas

- Route Distance
- HHP Counts
- Total LCP Cost
- Avg. Cost Per Foot
- Avg. Cost per HHP
- HUD Low/Mod
- Surveys by LCP
- Download and Upload Speeds
- 100/20 Speeds

LCP	Route	HHP	Total Cost	Cost per Ft	Cost per HHP	HUD Low/M	QT	DSPD AVG	UPSD AVG	100x20
DIST-001	11,934.35	235	$ 292,861.65	$ 24.54	$ 1,246.22	1	15	113	46	Yes
DIST-002	11,497.48	248	$ 261,877.25	$ 22.78	$ 1,055.96	2	25	143	16	No
DIST-003	8,732.32	255	$ 219,665.02	$ 25.16	$ 861.43	1	28	85	14	No
DIST-004	16,857.87	299	$ 465,946.96	$ 27.64	$ 1,558.35	1	11	96	14	No
DIST-005	7,831.01	160	$ 178,457.51	$ 22.79	$ 1,115.36	1	10	97	33	No
DIST-006	14,726.89	293	$ 360,385.89	$ 24.47	$ 1,229.99	1	10	192	31	Yes
DIST-007	7,086.28	169	$ 224,372.31	$ 31.66	$ 1,327.65	1	9	26	6	No
DIST-008	8,516.95	239	$ 241,397.15	$ 28.34	$ 1,010.03	2	19	106	39	Yes
DIST-009	17,290.79	253	$ 429,703.46	$ 24.85	$ 1,698.43	1	34	57	19	No
DIST-010	19,534.77	225	$ 410,055.70	$ 20.99	$ 1,822.47	2	19	93	19	No
DIST-011	11,710.75	253	$ 257,352.05	$ 21.98	$ 1,017.20	1	35	103	18	No
DIST-012	12,642.09	258	$ 289,971.72	$ 22.94	$ 1,123.92	3	36	87	16	No
DIST-013	20,651.20	259	$ 413,913.31	$ 20.04	$ 1,598.12	2	29	98	40	No
DIST-014	13,281.83	158	$ 277,453.60	$ 20.89	$ 1,756.04	2	13	99	24	No
DIST-015	17,848.21	241	$ 361,699.70	$ 20.27	$ 1,500.83	3	24	134	17	No
DIST-016	9,206.12	248	$ 224,437.36	$ 24.38	$ 904.99	2	16	128	31	Yes
DIST-017	18,336.43	386	$ 443,437.76	$ 24.18	$ 1,148.80	1	40	112	21	Yes
DIST-018	16,646.32	218	$ 338,965.06	$ 20.36	$ 1,554.89	2	28	99	12	No
DIST-019	25,599.20	576	$ 618,629.26	$ 24.17	$ 1,074.01	1	24	113	23	Yes
DIST-020	28,298.08	232	$ 738,720.80	$ 26.10	$ 3,184.14	1	22	138	35	Yes
DIST-021	8,849.91	43	$ 191,302.96	$ 21.62	$ 4,448.91	3	2	127	12	No
DIST-022	12,125.13	135	$ 318,585.01	$ 26.27	$ 2,359.89	1	4	124	15	No
DIST-023	13,027.54	185	$ 264,360.43	$ 20.29	$ 1,428.98	2	27	138	61	Yes
DIST-024	10,485.93	230	$ 243,359.27	$ 23.21	$ 1,058.08	2	25	112	21	Yes
DIST-025	26,902.51	244	$ 534,171.38	$ 19.86	$ 2,189.23	5	41	74	13	No
DIST-026	19,855.33	257	$ 442,223.15	$ 22.27	$ 1,720.71	2	25	126	23	Yes
DIST-027	15,190.94	254	$ 316,367.48	$ 20.83	$ 1,245.54	2	29	136	23	Yes
DIST-028	21,576.63	251	$ 416,901.53	$ 19.32	$ 1,660.96	2	25	68	21	No
DIST-029	21,549.20	414	$ 445,410.76	$ 20.67	$ 1,075.87	2	42	98	17	No
DIST-030	10,336.72	120	$ 274,729.19	$ 26.58	$ 2,289.41	1	20	142	32	Yes
DIST-031	22,844.50	274	$ 423,429.33	$ 18.54	$ 1,545.36	4	38	46	16	No
DIST-032	14,385.58	247	$ 269,953.00	$ 18.77	$ 1,092.93	4	26	76	17	No

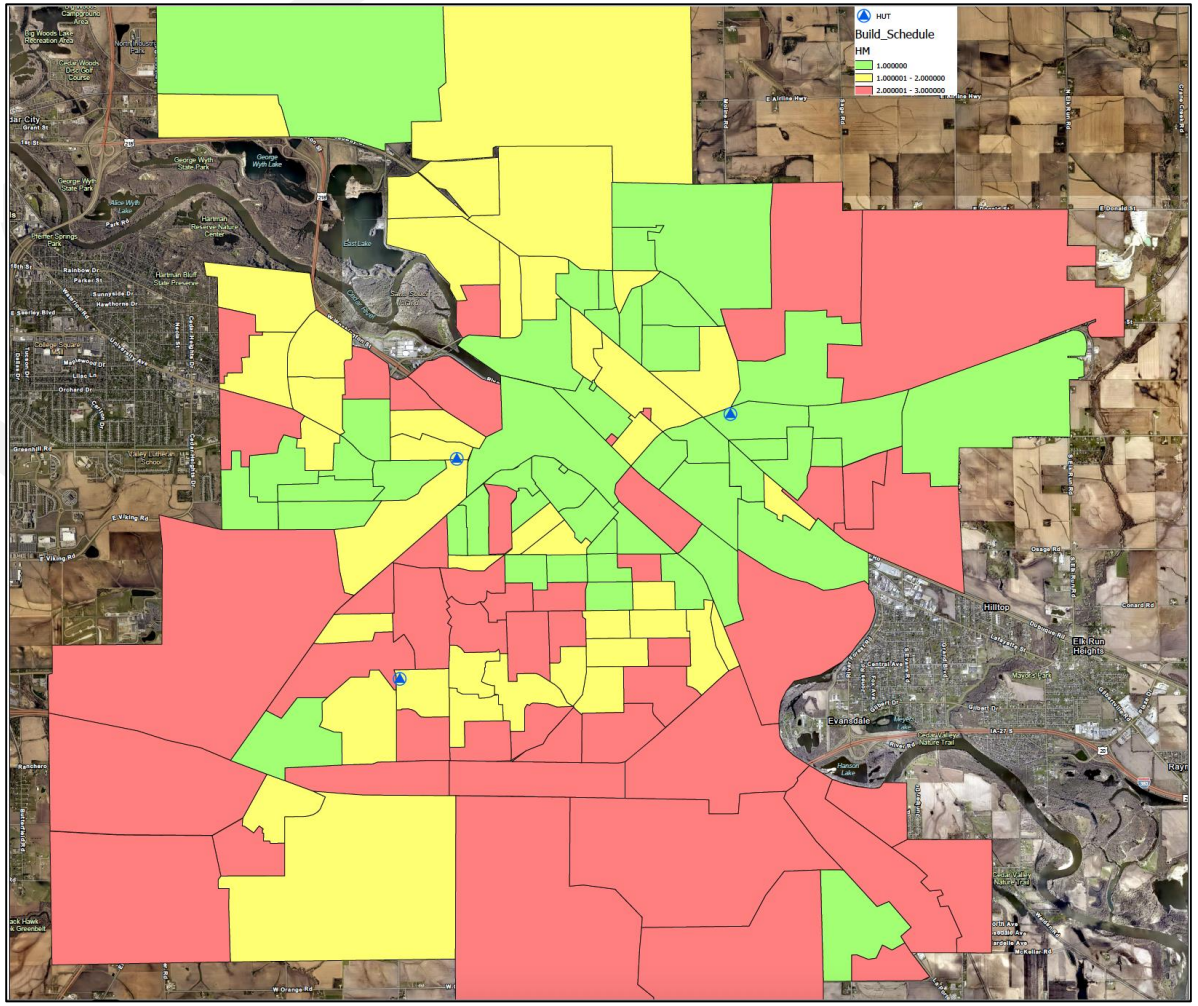


Project Background

Buildout Concept by Phase with OSP Costs

Phase 1	10,970 HHP	$14.71 M	Green
Phase 2	9,326 HHP	$14.60 M	Yellow
Phase 3	8,897 HHP	$16.60 M	Red

LCP	Route	HHP	Total Cost	Cost per Ft	Cost per HHP	HUD Low/M	
DIST-002	11,497.48	248	$ 261,877.25	$ 22.78	$ 1,055.96	2	1
DIST-003	8,732.32	255	$ 219,665.02	$ 25.16	$ 861.43	1	1
DIST-004	16,857.87	299	$ 465,946.96	$ 27.64	$ 1,558.35	1	1
DIST-005	7,831.01	160	$ 178,457.51	$ 22.79	$ 1,115.36	1	1
DIST-007	7,086.28	169	$ 224,372.31	$ 31.66	$ 1,327.65	1	1
DIST-009	17,290.79	253	$ 429,703.46	$ 24.85	$ 1,698.43	1	1
DIST-011	11,710.75	253	$ 257,352.05	$ 21.98	$ 1,017.20	1	1
DIST-022	12,125.13	135	$ 318,585.01	$ 26.27	$ 2,359.89	1	1
DIST-036	21,703.79	441	$ 396,033.88	$ 18.25	$ 898.04	2	1
DIST-041	11,306.10	223	$ 298,388.42	$ 26.39	$ 1,338.06	1	1
DIST-042	10,921.86	230	$ 268,215.48	$ 24.56	$ 1,166.15	1	1
DIST-044	12,259.77	250	$ 270,017.38	$ 22.02	$ 1,080.07	2	1
DIST-048	6,787.01	250	$ 242,334.87	$ 35.71	$ 969.34	1	1
DIST-049	12,902.61	244	$ 271,137.10	$ 21.01	$ 1,111.22	3	1
DIST-050	14,522.22	215	$ 287,902.53	$ 19.82	$ 1,339.08	3	1
DIST-051	11,279.64	233	$ 288,169.82	$ 25.55	$ 1,236.78	3	1
DIST-052	13,903.55	219	$ 309,998.09	$ 22.30	$ 1,415.52	3	1
DIST-054	16,118.33	255	$ 323,327.59	$ 20.06	$ 1,267.95	3	1
DIST-060	22,132.22	285	$ 491,359.93	$ 22.20	$ 1,724.07	1	1
DIST-068	8,854.49	132	$ 179,537.96	$ 20.28	$ 1,360.14	3	1
DIST-075	4,597.90	118	$ 117,363.10	$ 25.53	$ 994.60	1	1
DIST-081	17,153.54	460	$ 390,605.35	$ 22.77	$ 849.14	2	1
DIST-086	9,115.57	185	$ 210,930.67	$ 23.14	$ 1,140.17	2	1
DIST-087	21,482.02	471	$ 618,279.79	$ 28.78	$ 1,312.70	1	1
DIST-088	11,268.93	165	$ 313,713.55	$ 27.84	$ 1,901.29	1	1
DIST-090	13,722.10	250	$ 360,935.86	$ 26.30	$ 1,443.74	1	1
DIST-091	16,302.73	249	$ 402,533.93	$ 24.69	$ 1,616.60	1	1
DIST-092	18,163.65	239	$ 432,329.04	$ 23.80	$ 1,808.91	2	1
DIST-093	12,472.99	234	$ 261,039.94	$ 20.93	$ 1,115.56	2	1
DIST-095	17,365.05	274	$ 352,500.72	$ 20.30	$ 1,286.50	1	1
DIST-096	12,956.82	299	$ 290,294.96	$ 22.40	$ 970.89	1	1
DIST-097	6,829.43	193	$ 161,239.78	$ 23.61	$ 835.44	1	1
DIST-098	6,428.18	250	$ 163,716.34	$ 25.47	$ 654.87	1	1
DIST-101	25,301.64	250	$ 496,465.53	$ 19.62	$ 1,985.86	1	1



Business Model Review

Retail Provider

City's muni/revenue bond and broadband services revenue - funded network, only connecting paying residential and/or business subscribers

Full City Control

100% City Revenue

Supports Local Waterloo Community

Utilize City's Strong Brand & Image

City & Utility Operations

Legal Authority

Partnership with neighboring cities for core services

Bond/Finance Entire Cost (Including Working Capital)

Construction, Management & Operations

Additional Staffing Required

Competition (Marketing & Customer Service)

Technological Risks - Uncertainties

Open Access

Competitively select retail ISPs to partially fund network build out, connecting paying residential and/or business subscribers

Reduces Operational Risk

Facilitates Cost Sharing and Competition

Expands High Speed Broadband City coverage

Less City Control

Loss of Revenue Opportunity

Possible Operating Cost

Unsure of Partner's CAPEX contribution

Unsure of Partner's service coverage

Partner Market Failure/Abandonment

Legal Risks

Key Decisions and Direction

- **What Business Model does the City Council Prefer?**
  1. Retail Model deployed under WCU to provide full retail services
  2. Open-access conduit and dark fiber system
  3. Build backbone, and wait and see of FTTP/FTTH

- **How should the City fund this project?**
  - ARPA allocations
  - Bond/Finance – General Obligation or Telecom Revenue
  - State and/or Federal Grants

- **If GO Bond financing is preferred, there is a mid-July deadline for referendum language**

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Recommendations & Next Steps

Finalize Design
August 2022

- PE Stamps
- Final Engineers Estimates
- Complete Design Package

Procurement of Construction and Materials
August 2022

- Release RFP for Fiber OSP Construction
- Release RFP for Materials
- Issue Contracts

Procurement of Project Components
January 2023

- Procure facilities and begin renovations
- Procure network equipment, software and services

Finalize Agreements for Services
January 2023

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QUESTIONS?

June 20, 2022