Contents

1. Introduction
2. Summary of Findings
3. Access in Ector County
4. Access for ECISD Students
5. Perceptions of Rural Households
6. Perceptions of Local Leadership
- Appendix
Introduction
The purpose of this project is to explore what options are available to improve broadband access to residents of Ector County.

Baseline Assessment

Home Connectivity Landscape

Solution Analysis & Roadmap
The purpose of this report is to provide a snapshot of the current state of home connectivity in Ector County.
Why broadband?

- Having broadband provides households with an estimated $1,850 annual economic benefit.
- Thirty percent of tourism transactions in the US are made online.
- Small businesses using social media are 3x more likely to have recently hired than those that do not.
- It is estimated that one percentage point increase in broadband access could create or save about 12,000 jobs statewide.
- On average, farmers getting connected see a 6% increase in revenue.
- In a community of 20,000, home-based businesses and online sales can account for $2.4 million, annually.
- On average, teleworkers save nearly $500 annually on car maintenance and fuel.
- Telemedicine adds an estimated $522,000 to rural economies and reduces hospitalizations.
- Small businesses with websites have higher annual revenues than those that do not.
- Broadband access can increase home values by an average of 3.1%.

Image source: Connected Nation
What is broadband?

Access

Broadband access refers to the infrastructure that enables a high-speed internet connection.

Adoption

Broadband adoption is the choice made by a resident, business, or institution to embrace and use broadband and its related technologies.

Use

Broadband use is a result of having the skills necessary to utilize and leverage broadband and related technologies across sectors.

Source: Connected Nation
What is broadband access?

FCC: a connection of at least 25 Mbps download speed and 3 Mbps upload speed, (the Commission’s current benchmark)

Image source: Connected Nation
What broadband speeds enable what functions?

- 1 Mbps: Basic, 1-2 users. Suitable for learning tools (e.g. LMS), email.
- 5-15 Mbps: Average, 3-4 users. Suitable for Zoom or Skype call, stream HD content.
- 25 Mbps: Fast, 4-5 users. Suitable for concurrent HD streaming, posting, browsing, etc.
- 40 Mbps: Suitable for streaming 4K content or play competitive online games.
- 100 Mbps: Suitable for concurrent streaming 4K content, playing games and downloading very large files.
- 200+ Mbps: Suitable for heavy file sharing.

Source: Broadband Now, Zoom, Skype, Netflix
The findings in this report were formulated from interviews with Ector County community members, publicly available data, published studies and research, a survey of ECISD teachers, and other community data and resources.

Answers to key questions are summarized in the following section, and then detailed further with supporting data and evidence in subsequent sections.
We thank the following individuals for sharing their insights into the development of this report.

<table>
<thead>
<tr>
<th>Name</th>
<th>Position/Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feliz Abalos</td>
<td>Attorney at Law Business Community Member</td>
</tr>
<tr>
<td>James Beauchamp</td>
<td>President MOTRAN</td>
</tr>
<tr>
<td>Wesley Burnett</td>
<td>Director of Economic Development Odessa Development Corporation</td>
</tr>
<tr>
<td>Danelle Campbell</td>
<td>Information Technology City of Odessa</td>
</tr>
<tr>
<td>Chris Cole</td>
<td>ODC Board Member SouthWest Bank</td>
</tr>
<tr>
<td>Paul Donovan</td>
<td>PSP Advisor ExxonMobil Global Services</td>
</tr>
<tr>
<td>Renee Earls</td>
<td>President/CEO Odessa Chamber of Commerce</td>
</tr>
<tr>
<td>Sondra Eoff</td>
<td>Business Community Leader Odessa Marriott &amp; Convention Center</td>
</tr>
<tr>
<td>Dustin Fawcett</td>
<td>Vice President MOTRAN</td>
</tr>
<tr>
<td>Eddie Landrum</td>
<td>Geographic Information Officer City of Odessa</td>
</tr>
<tr>
<td>Toby Lefevers</td>
<td>Director of Information Technology ECISD</td>
</tr>
<tr>
<td>Christina Masick</td>
<td>Chief Information Officer Spring Branch ISD</td>
</tr>
<tr>
<td>Theodore McDonald</td>
<td>Network Hardware Manager ECISD</td>
</tr>
<tr>
<td>Ashley Osborne</td>
<td>Director of Instructional Technology ECISD</td>
</tr>
<tr>
<td>Jason Osborne</td>
<td>Chief Innovation Officer ECISD</td>
</tr>
<tr>
<td>Mike Parrish</td>
<td>Chief Technology Officer City of Odessa</td>
</tr>
</tbody>
</table>

*Continued next page...*
We thank the following individuals for sharing their insights into the development of this report. (cont’d)

Lorraine Perryman
Former Odessa Mayor
Community Member

Ray Perryman
President & CEO
The Perryman Group

Heather Potts
Director of Information Systems
ECISD

Casey Ritchie
Chief Technology Officer
Education Service Center 18

Rick Roach
Information Technology
City of Odessa

Josh Seidemann
Vice President of Policy
The Rural Broadband Association

Brad Shook
Chief Technology Officer
UT Permian Basin

Shawn Shreves
Chief Technology Officer
Midland College

Ed Shelton
Precinct 1 Ector County
Commissioner Ector County

E.J. Von Schaumburg
Vice President, Epiphany
Broadband Technology Expert

Steve Wentz
Independent Consultant
Former CTO of Pasadena ISD

Lisa Wyman
Senior Vice President
CC Federal Credit Union

Adrian Vega
Executive Director
Education Partnership
Summary of Findings
Lack of broadband access in Ector County is a crisis. Local leaders, before embarking on a solution, are looking for answers to key questions...
This report attempts to answer these questions.

- Is there community support for a solution?
- What is the core problem for rural households?
- Who doesn't have access?
- What types of service exist now?
- How do people feel about their service?
- What are the barriers to access?
- What % of residents work from home?
- What % of students lack access?
At all levels of the community, there is broad recognition of the problem around rural connectivity in Ector County – and support for a solution.

The problem is a lack of affordable high-speed options for residents in Ector County.
Coverage data suggests that even at the lowest broadband speeds, there are gaps in Ector County. At speeds of 100 Mbps or more, there are extensive gaps.

Rural Ector County is predominantly served by Fixed Wireless and Satellite broadband providers. These are generally considered the slowest and least reliable of broadband options.
Most internet-subscribing households in West/South Odessa (75%) are dissatisfied with their current internet service. Nearly every survey respondent (99%) is interested in more choices for internet service at home.

In West and South Odessa, more than half of respondents without broadband say it is not available where they live, while more than a third say the available service was too expensive.
Nearly half of respondents in West and South Odessa (49.7%) said that they telework, at least occasionally. (This is higher than the average percentage of other counties that reported.)

One out of 5 ECISD students rarely or never has reliable internet access at home. These students are located all over the county - not only in specific, remote pockets.
The key barriers to access for Ector County households are availability and cost.

Even those with access in rural areas are extremely dissatisfied with the quality of their current service.

The Ector County community supports a long-term solution to the problem of rural home connectivity.
“Today, I heard that the reason some of my students don't have a good wifi connection at home is because there is not a cell tower in their neighborhood... I have several students who have been losing cell service, and have lost our class meeting calls. Some have no service at all, but they have cell phones that work when they are out and about. This is a very frustrating thing for me as an educator, and I feel like my hands are tied. That's not even taking into consideration the feelings of the kids whose education is being threatened by the issue.”

ECISD Teacher
“An aggressive and focused response is imperative to both maintain the infrastructure of the local sector and secure the full potential of Odessa and the entire Permian Basin as the epicenter of efforts to meet future global energy needs.”

The Perryman Group
May, 2020
Access in Ector County
In 2017, almost a quarter of residents did not have access to fixed high-speed broadband.

Deployment of Fixed 25 Mbps/3 Mbps and Mobile LTE 5 Mbps/1 Mbps Services (Data as of December 31, 2017)

<table>
<thead>
<tr>
<th></th>
<th>Population Evaluated</th>
<th>% of Population with Fixed 25 Mbps/3 Mbps</th>
<th>% of Population with Mobile 5 Mbps/1 Mbps</th>
<th>% of Population with Fixed &amp; Mobile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ector County</td>
<td>157,087</td>
<td>76%</td>
<td>100%</td>
<td>76%</td>
</tr>
<tr>
<td>Texas</td>
<td>28,303,961</td>
<td>93%</td>
<td>100%</td>
<td>93%</td>
</tr>
</tbody>
</table>

Federal Communications Commission
2019 Federal Broadband Report
In 2017, only 16% of residents in rural areas had access to fixed high-speed broadband.

Americans with Access to Fixed 25 Mbps/3 Mbps and Mobile LTE 5 Mbps/1 Mbps Services - Segmented by Urban and Rural Areas (Data as of December 31, 2017)

<table>
<thead>
<tr>
<th></th>
<th>Urban Areas</th>
<th>Rural Areas</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Population Evaluated</td>
<td>% of Pop. With Fixed 25 Mbps/3Mbps</td>
</tr>
<tr>
<td>Ector County</td>
<td>134,305</td>
<td>86%</td>
</tr>
<tr>
<td>Texas</td>
<td>23,645,434</td>
<td>97%</td>
</tr>
</tbody>
</table>

Federal Communications Commission
2019 Federal Broadband Report
As of January, 99%+ of Ector County households are served by fixed broadband (per CN, FCC).

<table>
<thead>
<tr>
<th>County</th>
<th>Number of Households</th>
<th>10 x 1 Mbps</th>
<th>25 x 3 Mbps</th>
<th>50 x 5 Mbps</th>
<th>100 x 10 Mbps</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ector</td>
<td>48,688</td>
<td>99.41%</td>
<td>99.31%</td>
<td>99.3%</td>
<td>93.03%</td>
</tr>
</tbody>
</table>

Source: Connected Nation Texas
Data as of January 31, 2020
There are some residential providers... but at what speeds?

All providers reporting service as of March, 2020 (FCC)

Source: https://broadbandmap.fcc.gov/#/
Availability of fixed service at speeds of at least 25 Mbps/3 Mbps
Availability of fixed service at speeds of at least 100 Mbps/10 Mbps
Finding: Coverage data suggests that even at the lowest broadband speeds, there are gaps in fixed broadband coverage in Ector County. At speeds of 100 Mbps or more, there are extensive gaps.
Broadband competition in Odessa is “above average” compared to other Texas communities.

There are 6.13 providers per census block, on average. Odessa ranks 102nd on the "most connected city" charts. Only 12.3% of the Odessa area are limited to one or fewer choices so far as broadband.

<table>
<thead>
<tr>
<th>Sample Internet Providers in Odessa</th>
<th>Type Of Internet</th>
<th>Odessa Coverage Availability</th>
<th>Fastest Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>NetWest Online</td>
<td>Fixed Wireless</td>
<td>100%</td>
<td>3 Mbps</td>
</tr>
<tr>
<td>ERF Wireless</td>
<td>Fixed Wireless</td>
<td>99.2%</td>
<td>0.768 Mbps</td>
</tr>
<tr>
<td>AT&amp;T Internet</td>
<td>IPBB and Fiber</td>
<td>IPBB: 86.8% Fiber: 2.3%</td>
<td>IPBB: 100 Mbps</td>
</tr>
<tr>
<td>EarthLink</td>
<td>DSL and Fiber</td>
<td>DSL: 86.8% Fiber: 2.3%</td>
<td>DSL: 100 Mbps</td>
</tr>
<tr>
<td>Viasat Internet (formerly Exede)</td>
<td>Satellite</td>
<td>100%</td>
<td>35 Mbps</td>
</tr>
<tr>
<td>HughesNet</td>
<td>Satellite</td>
<td>100%</td>
<td>25 Mbps</td>
</tr>
<tr>
<td>Sparklight</td>
<td>Cable</td>
<td>78.8%</td>
<td>1,000 Mbps</td>
</tr>
</tbody>
</table>

Source: https://broadbandnow.com/Texas/Odessa
Outside of Odessa, there are less choices and much slower speeds.

There are seven internet providers offering residential service in Goldsmith, according to broadbandnow.com (zip code 79741).

Here are the internet providers and their details:

<table>
<thead>
<tr>
<th>Internet Providers in Goldsmith</th>
<th>Type Of Internet</th>
<th>Goldsmith Coverage Availability</th>
<th>Fastest Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>NetWest Online</td>
<td>Fixed Wireless</td>
<td>100%</td>
<td>3 Mbps</td>
</tr>
<tr>
<td>ERF Wireless</td>
<td>Fixed Wireless</td>
<td>100%</td>
<td>0.768 Mbps</td>
</tr>
<tr>
<td>AT&amp;T Internet</td>
<td>IPBB</td>
<td>91%</td>
<td>18 Mbps</td>
</tr>
<tr>
<td>EarthLink</td>
<td>DSL</td>
<td>91%</td>
<td>18 Mbps</td>
</tr>
<tr>
<td>Viasat Internet (formerly Exede)</td>
<td>Satellite</td>
<td>100%</td>
<td>35 Mbps</td>
</tr>
<tr>
<td>HughesNet</td>
<td>Satellite</td>
<td>100%</td>
<td>25 Mbps</td>
</tr>
<tr>
<td>Net Ops Communications</td>
<td>Fixed Wireless</td>
<td>11%</td>
<td>20 Mbps</td>
</tr>
</tbody>
</table>

Source: https://broadbandnow.com/Texas/Goldsmith?zip=79741
Outside of Odessa, there are less choices and much slower speeds.

There are 11 internet providers offering residential service to Pleasant Farms, according to broadbandnow.com (zip code 79766).

<table>
<thead>
<tr>
<th>Sample Internet Providers in Goldsmith</th>
<th>Type Of Internet</th>
<th>79766 Coverage Availability</th>
<th>Fastest Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>NetWest Online</td>
<td>Fixed Wireless</td>
<td>99.9%</td>
<td>3 Mbps</td>
</tr>
<tr>
<td>Net3 ISP</td>
<td>Fixed Wireless</td>
<td>99.2%</td>
<td>50 Mbps*</td>
</tr>
<tr>
<td>ERF Wireless</td>
<td>Fixed Wireless</td>
<td>93%</td>
<td>0.768 Mbps</td>
</tr>
<tr>
<td>Choice Broadband</td>
<td>Fixed Wireless</td>
<td>42.3%</td>
<td>20 Mbps</td>
</tr>
<tr>
<td>Viasat Internet (formerly Exede)</td>
<td>Satellite</td>
<td>100%</td>
<td>35 Mbps</td>
</tr>
<tr>
<td>HughesNet</td>
<td>Satellite</td>
<td>100%</td>
<td>25 Mbps</td>
</tr>
<tr>
<td>NetWest Online</td>
<td>Fixed Wireless</td>
<td>99.9%</td>
<td>3 Mbps</td>
</tr>
<tr>
<td>AT&amp;T</td>
<td>IPBB</td>
<td>12.3%</td>
<td>12 Mbps</td>
</tr>
</tbody>
</table>

Source: https://broadbandnow.com/Texas/Odessa?zip=79766
Finding: Rural Ector County is predominantly served by Fixed Wireless and Satellite broadband providers. These are generally considered the slowest and least reliable of broadband options.

“Fixed Wireless” uses radio links between stationary sites, usually with one side connected with fiber optics and serving as a “hub” for multiple wireless links.
In West and South Odessa, nearly one in four internet-connected households (23%) report paying more than $100 per month.

Source: ODC/Connected Nation
Current Cell Towers in Ector County

T-Mobile

AT&T

Source: ODC/MOTRAN
Current Cell Towers in Ector County

Sprint

Verizon

Source: ODC/MOTRAN
Region 18 ESC holds an FCC ULS license for use of the Educational Broadband Service.

Educational Broadband Service or EBS is used to describe a specific band/block of microwave frequencies, licensed to educational institutions or nonprofit educational organizations for uses that are designed to accommodate a variety of fixed, portable, and mobile services relating to education and instruction (nebsa.org).

If the County were to choose a wireless solution to expand home connectivity, a wireless spectrum/frequency would need to be identified and acquired to transmit the signal.
Access for ECISD Students
ECISD surveyed their teachers in May as to whether students had reliable internet access. The results account for 55%+ of all ECISD students, and all schools are represented.

The results of this survey are detailed on the following slides. We worked with Forecast5 Analytics (5Maps) to geo-locate students (anonymously) based on their estimated level of internet access. The purpose was to identify those areas of the County with inadequate service coverage.
One in 5 ECISD students rarely or never has reliable internet access at home.

Only 3 out of 5 ECISD students have a reliable connection at home (frequently or all the time), as estimated by their teachers in late May, 2020.

One in 10 ECISD students never has reliable internet access at home (as estimated by their teachers).
All ECISD Students Represented in this Analysis (by TEA Tier)

(55% of all students)

Source: ECISD Teacher Survey (May, 2020)
All ECISD Students Represented in this Analysis (by response)
(55% of all students)

Source: ECISD Teacher Survey (May, 2020)

How often does the student have reliable internet access?

- Never
- Rarely
- Sometimes
- Frequently
- Always
- Unknown
ECISD Students Who Never or Rarely Have Reliable Internet Access
(out of 55% of all students)

Source: ECISD Teacher Survey (May, 2020)
ECISD Students Who Never or Rarely Have Reliable Internet Access (by TEA Tier)

(out of 55% of all students)

Source: ECISD Teacher Survey (May, 2020)
ECISD Students Without Reliable Internet Access, Overlaid with 100 Mbps Fixed Internet Coverage (out of 55% of all students)

Source: ECISD Teacher Survey (May, 2020)
Source: Connected Nation
ECISD Students Who Never or Rarely Have Reliable Internet Access, Overlaid with 50 Mbps Fixed Internet Coverage

(out of 55% of all students)

Source: ECISD Teacher Survey (May, 2020)
Source: Connected Nation
Finding: Students without reliable internet access are located all over the county – not in specific, remote pockets.
Concentration of All ECISD Students Per Census Data (red dots)

Source: Census Tract data, PSC Analytics
ECISD Students (red) as Compared to the Availability of Fixed Services at Speeds of 100 Mbps or Better (green)

Source: Census Tract data, PSC Analytics
Source: FCC data, Connected Nation
ECISD students (red dots) in Areas Without Access to Fixed Services at Speeds of 100 Mbps or Better

Source: Census Tract data, PSC Analytics
Source: FCC data, Connected Nation
ECISD students (red) in Areas Without Access to Fixed Services at Speeds of 25 Mbps or Better

Source: Census Tract data, PSC Analytics
Source: FCC data, Connected Nation
ECISD fiber optics network initiative in process
ECISD fiber optics network initiative in process
Perceptions of Rural Households
Customer experience data gathered in 2019 by the Odessa Development Corporation, MOTRAN and Connected Nation was used to inform this report.

A survey of 260 households in rural Ector County (West and South Odessa) and other publicly available data reveal the following insights about home connectivity in the area.
About 1 in 6 households in West and South Odessa report having no internet connection.

Source: ODC/Connected Nation
Households without a connection report there is none available, or it is too expensive.

Source: ODC/Connected Nation
Finding: In West and South Odessa, more than half of respondents without broadband say it is not available where they live, while more than a third say the available service was too expensive.
Respondent households with access most often subscribe to cable, fixed wireless or satellite.

Source: ODC/Connected Nation
Customer satisfaction is extremely low. Speeds are too slow and unreliable. People want choices.

Source: ODC/Connected Nation
About a third of respondents with mobile service use it as their primary connection.

Source: ODC/Connected Nation
Average number of devices in the home: 11.6

Source: ODC/Connected Nation
Finding: Most internet-subscribing households in West and South Odessa (75%) are dissatisfied with their current internet service. Nearly every survey respondent (99%) is interested in more choices for internet service at home.
Finding: Nearly half of respondents in West and South Odessa (49.7%) said that they telework, at least occasionally. (This is higher than the average percentage of other counties that reported.)
Perceptions of Local Leadership
In conversations with local civic and education leaders as well as economic development professionals in areas of similar size around the state, it was consistently noted that one of the most important improvements that could be made is to significantly enhance broadband availability. Universal broadband internet access to the extent possible would greatly enhance the ability for remote work and education during periods of time when social distancing may be required. In addition, it would increase efficiency in the workplace once the current situation has passed.

The need is especially acute in smaller and mid-sized metropolitan areas and rural regions, and future economic development could be negatively affected. It is also likely that in the post-COVID-19 environment, there will be greater emphasis on the use of virtual technology in education, corporate activity, and many other areas. Supporting investments in this crucial aspect of infrastructure can enhance recovery and growth potential in many ways.

The Perryman Group
May, 2020
“The pandemic has put a spotlight on inequities that have gone under the radar when face-to-face... Students will be further behind without connectivity.”

“This needs to be a community-wide effort.”

“The pandemic has taken the importance of connectivity to a whole new level - kids with no access at home are the ones most negatively impacted.”
“Remote work has made even the affluent realize this is important.”

“Most residents would say there’s not good options for internet.”
“Infrastructure is what will make us attractive to get businesses and talent into the city.”

“This would help Odessa to grow businesses.”

“The opportune time to do something from a collective standpoint is now.”
Appendix
About 500 families have not engaged with remote learning at ECISD in response to COVID.

As of week 5 in ECISD:

- **89%** of elementary school students fully engaged with remote learning
- **84%** of middle and high school students fully engaged with remote learning

*From Dr. Muri on Facebook Live 4/23*
## Broadband Availability Estimates by Technology Type (Ector County)

### Percent of Households Served

<table>
<thead>
<tr>
<th>Technology</th>
<th>10 x 1 Mbps</th>
<th>25 x 3 Mbps</th>
<th>50 x 5 Mbps</th>
<th>100 x 10 Mbps</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cable</td>
<td>93%</td>
<td>93%</td>
<td>93%</td>
<td>93%</td>
</tr>
<tr>
<td>DSL</td>
<td>41%</td>
<td>39%</td>
<td>36%</td>
<td>17%</td>
</tr>
<tr>
<td>Fiber</td>
<td>5%</td>
<td>5%</td>
<td>5%</td>
<td>5%</td>
</tr>
<tr>
<td>Fixed Wireless</td>
<td>31%</td>
<td>30%</td>
<td>24%</td>
<td>0.2%</td>
</tr>
</tbody>
</table>

Source: Connected Nation Texas
Data as of January 31, 2020
For questions about this report, please contact:

Kellie Wilks  
ECISD  
kellie.wilks@ectorcountyisd.org

David Irwin  
thru  
dirwin@gmail.com