FUTURE READY NEBRASKA

Digital Equity in Nebraska

CARES Act (ESSER, GEERS)

- CARES Act
  - Local Education Agency Resources ($59 million)
  - Statewide ($6.5 million)
  - GEERS ($16.4 million)

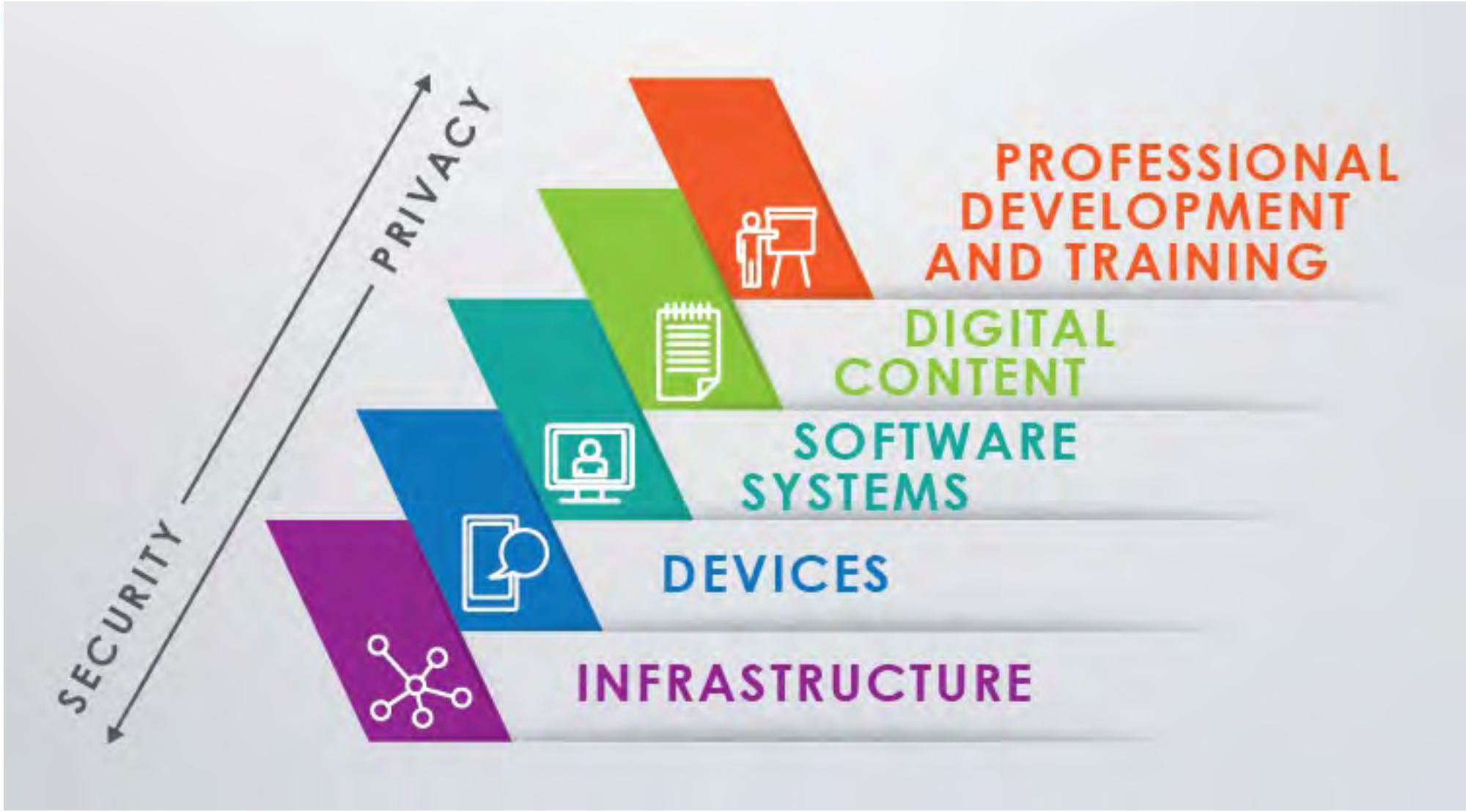
- Governor's Emergency Education Relief (GEER) Fund
  - Addressing the digital divide and related issues to support remote learning for students in K-12 schools
  - Focus on providing equitable access to technology for all students and improving parity in access to all schools
  - Can include hardware purchases for use of school students and improving access to reliable, high-speed internet for students
  - Some flexibility will be reserved to address additional COVID-19 issues

CARES Act (ESSER, GEERS)

NDE May 2020 Statewide Survey about CARES Act priorities

- Enhance **technology infrastructure (e.g., broadband, devices, platforms, data privacy, etc.)** for students and families.
- **Build supports for planning for possible interruptions upon returning to school and student and staff reentry.**
- Ensure student nutritional needs are met.
- **Provide professional learning to support an inclusive remote learning environment and engagement, along with best practices for different student groups.**
- Create or expand mental, behavioral, and social emotional supports (**e.g., telehealth**).

Hierarchy of Digital Learning Needs



Infrastructure (Broadband, Internet)

- Estimated ~40,000 students without sufficient educational broadband access at home

- **Project Options:**
  - Mobile Cellular Hotspots
  - Homework Hotspots at Community Institutions
  - Working with Local Internet Providers
  - TV White Space (TVWS) [470-698 MHz]
  - Wireless Education Broadband Services (EBS) [2.5 Ghz]
  - Low Earth Orbiting (LEO) Satellite Service

- Likely a combination of options locally

Technology Equity Support

- **Infrastructure**
  - Digital Equity Data Collection
    - Home Internet Access
  - Digital Equity Month (September)
    - Webinar Thursday, September 17, 2020
  - Request For Quote (RFQ): Internet Service Providers
- Devices
  - Digital Learning Profile and Plan data collection

Technology Equity Support

Survey Question	Response Options
Can the student access the internet on their primary learning device at home?	•**Yes** •**No - Not Available** •**No - Not Affordable** •**No - Other**
What is the primary type of internet service used at the residence?	•**ResidentialBroadband** (e.g., DSL, Cable, Fiber) •**CellularNetwork** •**SchoolProvidedHotSpot** •**Satellite** •**Dial-up** •**Other** •**None**
Can the student stream a video on their primary learning device without interruption?	•**Yes - No issues** •**Yes - But not consistent** •**No**
What device does the student most often use to complete school work at home?	•**Desktop/Laptop** •**Tablet** •**Chromebook** •**SmartPhone** •**None** •**Other**
Is the primary learning device a personal device or school-provided? Is the primary learning device shared with anyone else in the household?	•**Personal - Dedicated** (one person per machine) •**Personal - Shared** (sharing among others in household) •**School Provided - Dedicated** •**School Provided - Shared** •**None**

Contact Information

Dean Folkers

- Dean.Folkers@Nebraska.gov
- P: 402-471-4740
- @NDE_CIO

Nebraska Department of Education


NEBRASKA DEPARTMENT
OF EDUCATION

Nebraska Rural Broadband Task Force

HOMEWORK GAP

RBTF – Teacher Survey 2019

July 2019 - 21,443 Nebraska teachers surveyed with 6,919 responses (32%)

- 77% of teachers agreed if all students had broadband internet access at home, it would positively impact student learning/achievement
- 48% of teachers agreed that the absence of home internet access for some students affects the level or amount of homework assigned
- 64% of teachers reported using digital resources for a minority (25%) of their homework assignments
- 37% of teachers estimated that 21% to greater than 40% of students do not have home internet access.

https://ruralbroadband.nebraska.gov/reports/2019/RBTF2019appendix10.pdf

Homework Gap

- Accessible
- Affordable
- Adequate

NDE Data Collection – Digital Equity

- *learning device at home?*
- *learning device school-provided?*
- *learning device shared with anyone?*
- *type of internet service?*
- *stream a video without interruption?*

Synchronous Video using Zoom:

- For gallery view and/or 720p HD video: 1.5Mbps/1.5Mbps (up/down)
- Sending 1080p HD video requires 3.0 Mbps (up/down)

Other Data Collection

Requested locations from local districts with a Homework Gap

Created maps for preliminary network designs and estimates

Engage community and local providers for potential solution and partnerships

2018-2019 **District Snapshot**

Grand Island Public Schools

Schools in District	22
State Board District	6
Educational Service Unit	10
Legislative Districts	35, 34

Demographics

Student Membership
9,883
Peers 3,805
State 325,984

Teachers
682
Peers 250
State 23,702

Program Participation

English Learners
13%
Peers 7%
State 6%

Free/Reduced Lunch
68%
Peers 54%
State 45%

Gifted
6%
Peers 10%
State 13%

Special Education
16%
Peers 16%
State 15%

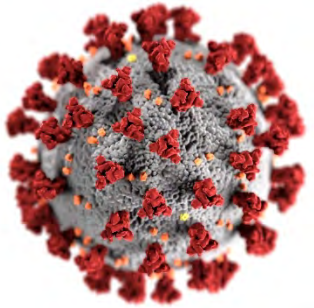
Metrics

Attendance Rate
94%
Peers 95%
State 94%

Grand Island Public Schools

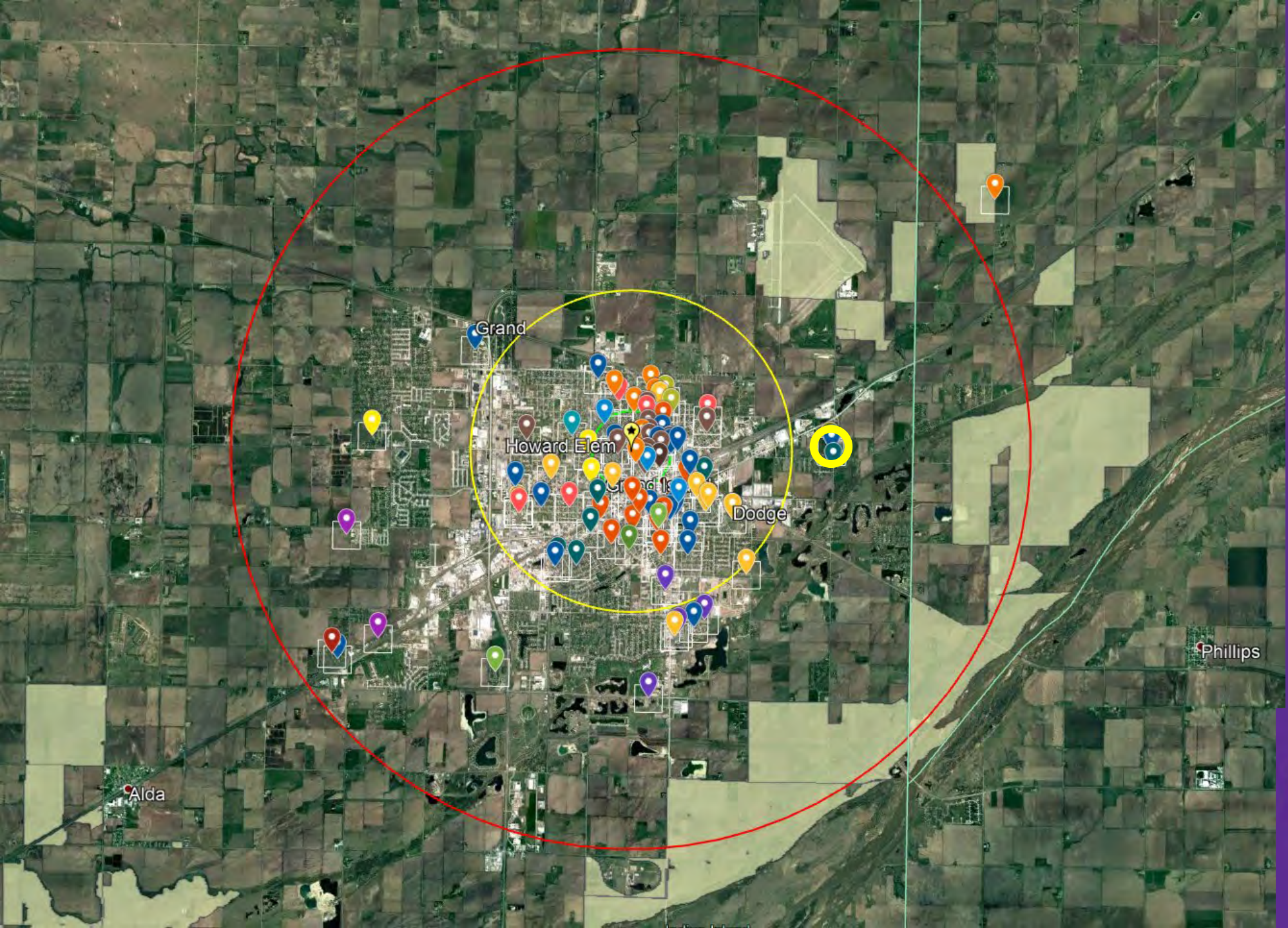
Grand Island PUBLIC SCHOOLS

Grand Island Public Schools



- 120+ student homes without Internet
- During COVID-19 shutdown
  - Purchased 120 mobile hotspots
  - Desired a plug-and-play solution
  - Concerned with:
    - ongoing monthly costs
    - tracking hotspot inventory
    - bandwidth for multi-student homes when using synchronous video (Zoom)

Grand Island PUBLIC SCHOOLS

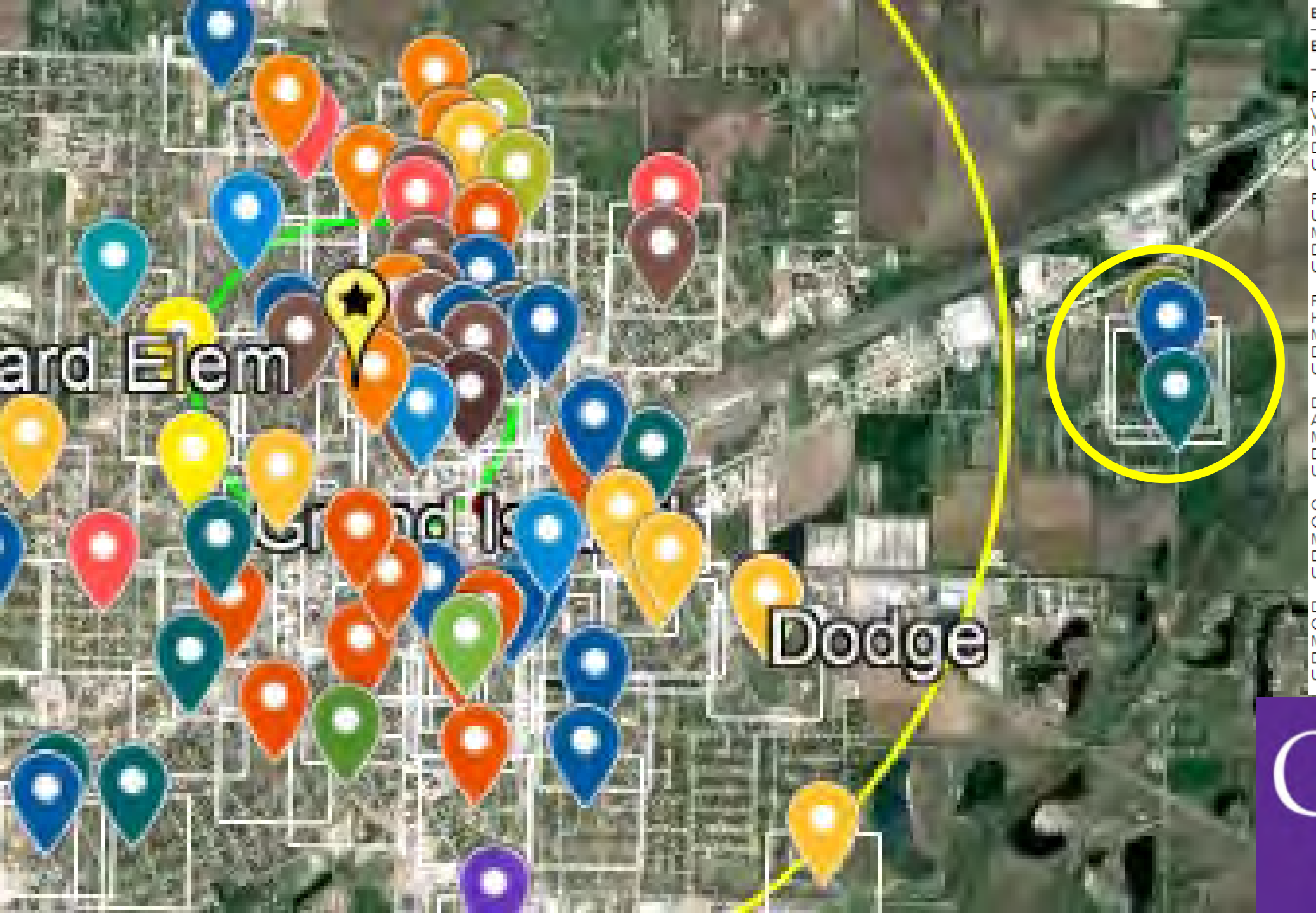


Yellow = 2 mile radius
Red = 5 mile radius

Small Yellow = NE Broadband Map Census Block 3071

Highlighted areas = Rural Digital Opportunity Fund Phase I Auction eligible areas

Grand Island PUBLIC SCHOOLS



Block 3071

Broadband Options: (6)

Fixed Wireless
Viaero Wireless
Maximum Advertised Speed
Download: 15
Upload: 5

Fixed Wireless
UNITED STATES CELLULAR CORPORATION
Maximum Advertised Speed
Download: 2
Upload: 2

Fixed Wireless
Hamilton.net, Inc.
Maximum Advertised Speed
Download: 25
Upload: 1.5

DSL
Allo Communications
Maximum Advertised Speed
Download: 7
Upload: 0.768

Cable
Charter Communications, Inc.
Maximum Advertised Speed
Download: 940
Upload: 35

DSL
CenturyLink, Inc.
Maximum Advertised Speed
Download: 3
Upload: 0.64

Grand Island PUBLIC SCHOOLS

2018-2019 **District Snapshot**

Central Valley Public Schools

Schools in District 4
Educational Service Unit 10

Demographics

Student Membership
303

Peers 305
State 325,984

Teachers
37

Peers 29
State 23,702

Program Participation

English Learners
*

Peers *
State 7%

Free/Reduced Lunch
55%

Peers 47%
State 45%

Gifted
9%

Peers 14%
State 13%

Special Education
14%

Peers 14%
State 15%

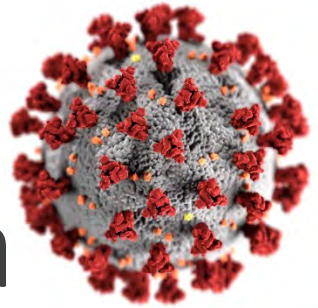
Metrics

Attendance Rate
95%

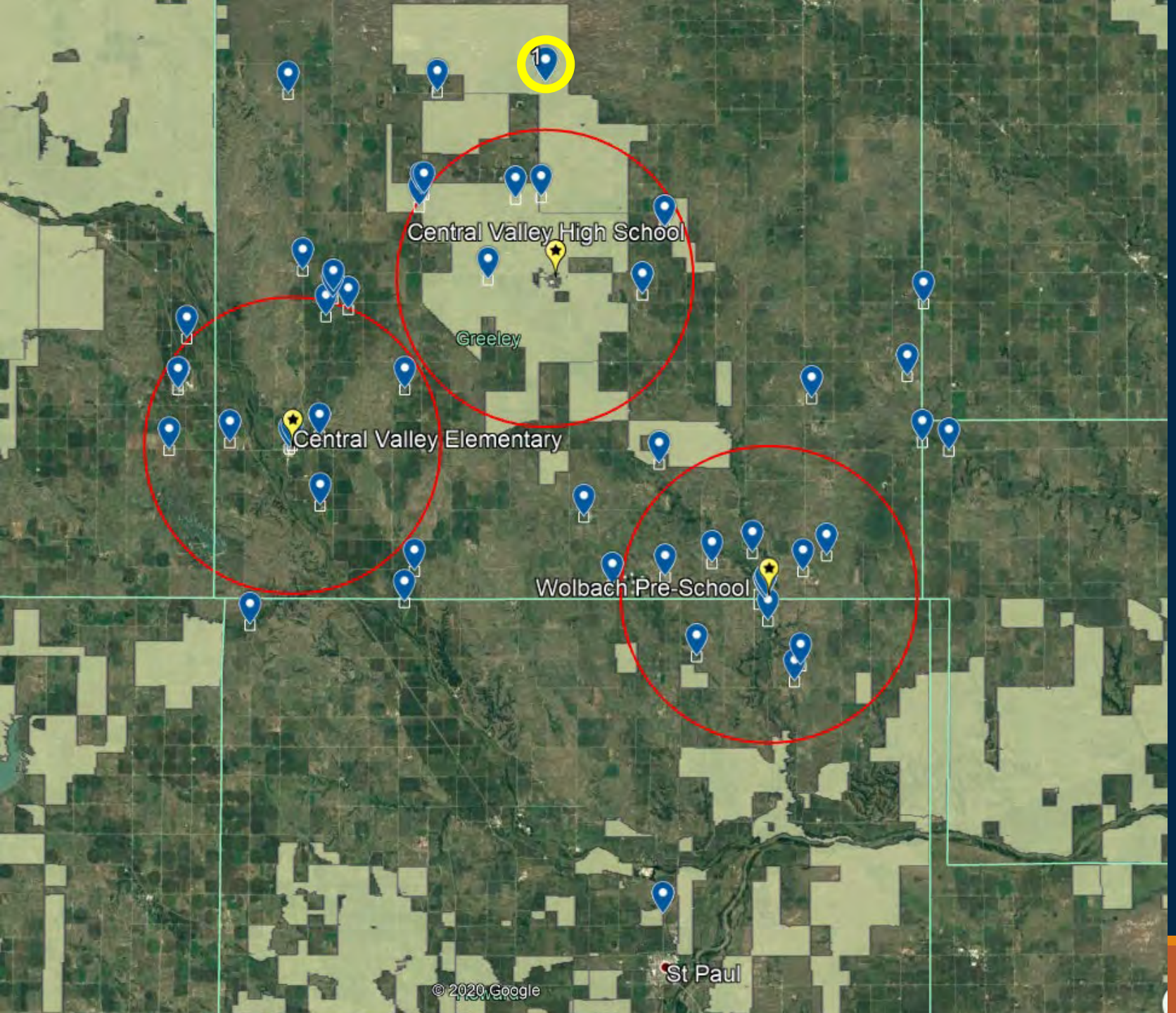
Peers 95%
State 94%

Central Valley Public Schools

Central Valley Public Schools
Greeley, Wolbach, North Loup & Scotia

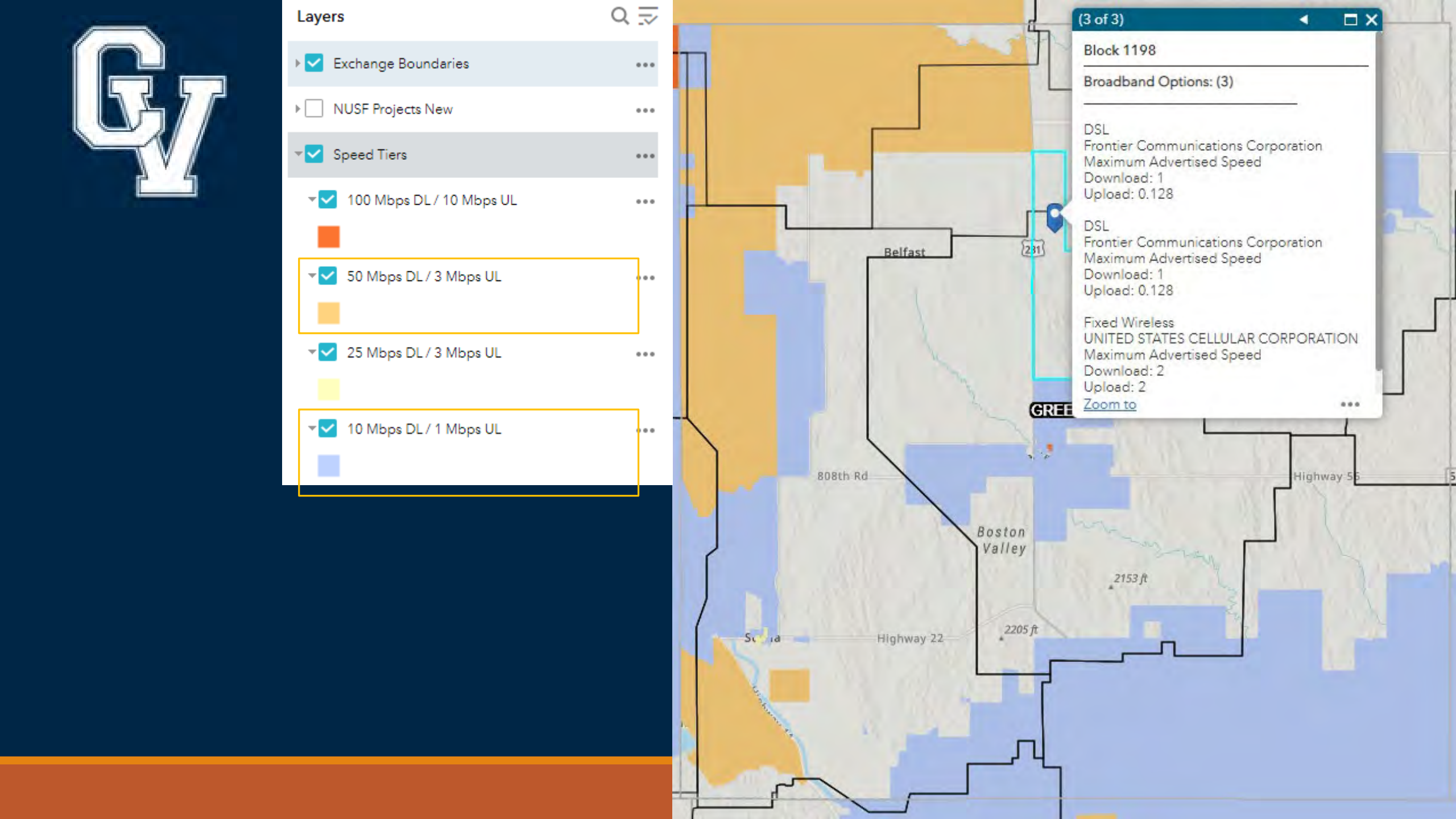


- 56 homes and 118 individuals (students and teachers)
  - inadequate or no internet access
- During COVID-19 closure relied heavily on printed instructional packets
- Concerned with:
  - Large geographic area
  - Enough bandwidth for educational tools



Small Yellow = NE Broadband Map Census Block 1198

Highlighted areas = Rural Digital Opportunity Fund Phase I Auction eligible areas


Layers
Exchange Boundaries
NUSF Projects New
Speed Tiers
100 Mbps DL / 10 Mbps UL
50 Mbps DL / 3 Mbps UL
25 Mbps DL / 3 Mbps UL
10 Mbps DL / 1 Mbps UL
(3 of 3)
Block 1198
Broadband Options: (3)
DSL
Frontier Communications Corporation
Maximum Advertised Speed
Download: 1
Upload: 0.128
DSL
Frontier Communications Corporation
Maximum Advertised Speed
Download: 1
Upload: 0.128
Fixed Wireless
UNITED STATES CELLULAR CORPORATION
Maximum Advertised Speed
Download: 2
Upload: 2
Zoom to
Belfast
231
808th Rd
Highway 56
Boston Valley
2153 ft
2205 ft
Highway 22

Meet the (Spectrum) Bands

Friendly Name	Spectrum Frequencies	Licensed or Unlicensed	Range	Notes
TV White Spaces	Below 700 MHz	Unlicensed	3-5 miles	These frequencies lie in between TV station signals. Much more TVWS spectrum is available in rural markets than urban.
Wi-Fi	2.4 GHz	Unlicensed	150-300 ft + through walls	The original Wi-Fi spectrum band - now is highly congested and limited to 20 megahertz channels, which limits the bandwidth. When anchors want 100 Mbps/Gig connections, a wider channel is needed.
Educational Broadband Service (EBS)	2.5 GHz	Licensed	8-10 miles	Urban EBS licenses were awarded to educational entities 25 years ago, which often then leased them to Sprint. In 2019, the FCC decided to give Tribes in rural areas an opportunity to obtain these licenses but did not give the same chance to schools. FCC plans to auction the remaining rural EBS licenses in 2021.
Citizens Band Radio Service (CBRS)	3.5 GHz	Both	2-3 miles	CBRS is very valuable for 5G. FCC just closed this auction, but we do not know the winners yet. Unlicensed portion of CBRS (GAA) is already available for use.

Speed Vs. Distance

Grand Island Public Schools

120+ student homes without Internet

Accessibility not the issue

Seeking a wireless solution to replace existing hotspots

- CBRS frequency is the target for bandwidth and range
  - 5/5Mbps per student or 10/10Mbps per home

Central Valley Public Schools

- 56 homes inadequate or no internet access
- Engage local providers for possible solutions and available service options at the bandwidth needed
- Research/test a wireless solution
  - TVWS or 900MHz for needed desired range
  - Multiple tower locations and heights
    - Contacting local Coop, tower owners or consider constructing their own

Questions

Ron Cone

rcone@esu10.org

Northeast Nebraska Tribal Broadband Wireless Project

Presented to the Rural Broadband Taskforce

September 11, 2020

Michael Oltrogge, Ph.D.

President

Nebraska Indian Community College

Nebraska Indian Community College

- Tribal Colleges
  - All Tribal colleges are open enrollment institutions
  - Most of the TCU's were chartered by one or more Tribal nation
  - Provide access to higher education
  - Assist in preservation and revitalization of our Native Languages, histories and culture.
  - Increase economic opportunities within the boundaries of the reservations served
- Two TCU's in Nebraska, 36 accredited TCU's Nationwide, and 2 developing.
- Associate and certificate degree granting institution in northeast Nebraska.

Nebraska Indian Community College con’t

- “The Nebraska Indian Community College provides quality higher education and lifelong educational opportunities for Umo^{n}ho^{n} (Omaha), Isanti (Santee Dakota) and all learners.”
- Founded by the three land based Tribal nations in Nebraska (Umo^{n}ho^{n}, Santee and Winnebago).
- Currently are “owned” by the Umo^{n}ho^{n} and Santee Nations.
- 4 campus locations – Macy Campus, Santee Campus, South Sioux City Campus and Pawnee Nation College Campus in Oklahoma
- Small institution serving around 250 students per year with an averaged full-time enrollment of 150
- Prior to Covid, 80% of our coursework was conducted via on campus interactive video conferencing connecting our three campus locations.
- NICC serves two of the poorest areas of the state.

The state of conditions in in March, 2020

In March, 2020 the majority of NICC's student body did not have technology access nor reliable internet access at home other than a smart phone from month to month. Over 80% of the college's students qualify for PELL funding.

The Santee Nation's reservation was served by at least two internet providers however costs were prohibitive.

The Omaha Nation's reservation was serviced by more than one internet provider on the far west side of the reservation. The east side of the reservation was serviced buy one known provider.

The affordability and basic broadband access is a huge deterrent for low income learners on the Omaha and Santee reservations.

NICC transitioned to remote learning as did most of the K-12 institutions.

Northeast Nebraska Tribal Broadband Wireless Project

The project is set up as an educational broadband wireless project so that all K-12 and NICC's students within the boundaries of the Omaha and Santee Reservations gain access and maintain access to the internet for remote and other learning opportunities.

Partners


NEBRASKA INDIAN COMMUNITY COLLEGE
NICC


HERITAGE FOR PEACE


GRR
PBIS
Bancroft-Rosalie


REDROVER Ltd.


NETWORK
NEBRASKA


SANTEE WARRIORS


UMONHON
NATION
SCHOOL

Timeline of events

- February – FCC Released the open period for the 2.5 GHz Rural Tribal Broadband spectrums
- March – Covid-19 – Coronavirus – Nearly all institutions of education transitioned into an online learning mode.
- March – April – Outreach occurred to Network Nebraska, area K-12 schools, the Omaha Nation, the Santee Nation, Red Rover, the American Indian Higher Education Consortium, and other consulting companies. – Ordered the base station equipment – placed the orders for the end user equipment.
- May – placed the orders for the end user equipment – sample MOU formulated.
- June – Applied for and received Special Temporary Authorizations (STA's) from the FCC to turn the systems on when operational. The STA's are valid until December 15-20, 2020.
- July – Waiting on equipment – laptops ordered. Final FCC applications submitted. The Santee Reservation application is straight forward. The Omaha Nation application requested a waiver to include the entirety of the Bancroft-Rosalie School district with the support of the Omaha Nation, the Bancroft-Rosalie's schools and the Village of Bancroft.
- August – September – Base Station installs
- September – As of September 4, 2020 20 base stations have been installed, operational and passing traffic. As of last Friday, 20 families are being served by the project. Some areas are not able to receive full strength signals. The college and one school district is planning to erect some towers to get the base station equipment higher so that it can reach further with a stronger signal.

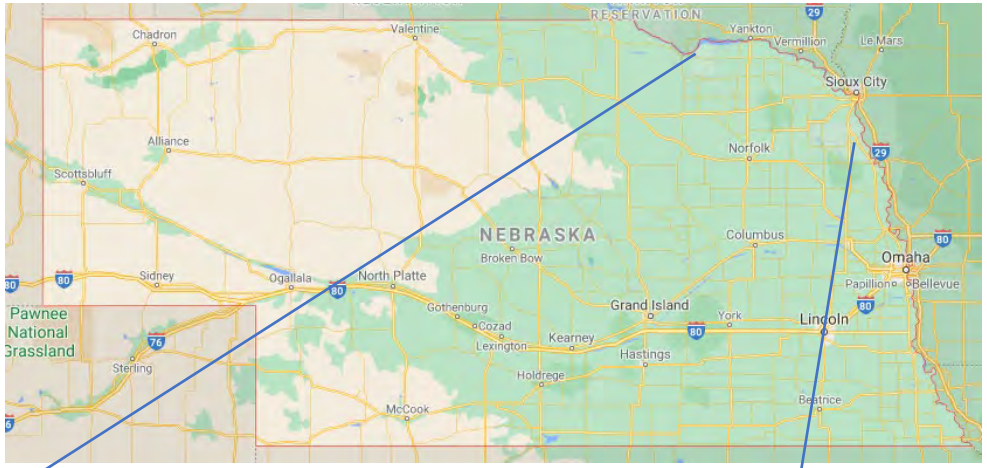
Basic Project Set up

- The college, via the Omaha and Santee Nations, will maintain the FCC license.
- The college paid for the base stations and the majority of the base station installation costs via CARES act funds. The college will be paying for the end user equipment and installation costs for our college students. The college will have overall control of the cloud core.
- Umo^{n}ho^{n} Nation, Bancroft Rosalie, Walthill, Pender and Santee are the base station locations and will maintain internet connectivity. The students at each of the schools have the capability to utilize no cost internet services. The schools provide the installation and their end user equipment for their students.
- All parties will be signing an official MOU in the future. The MOU has been reviewed by legal counsel however it is not finalized. All parties have agreed from the beginning that this project will do whatever makes sense to serve all of our students. (For example, a student living in Walthill but attending Umo^{n}ho^{n} Nation will have their needs met by the Walthill base station and vice versa.)

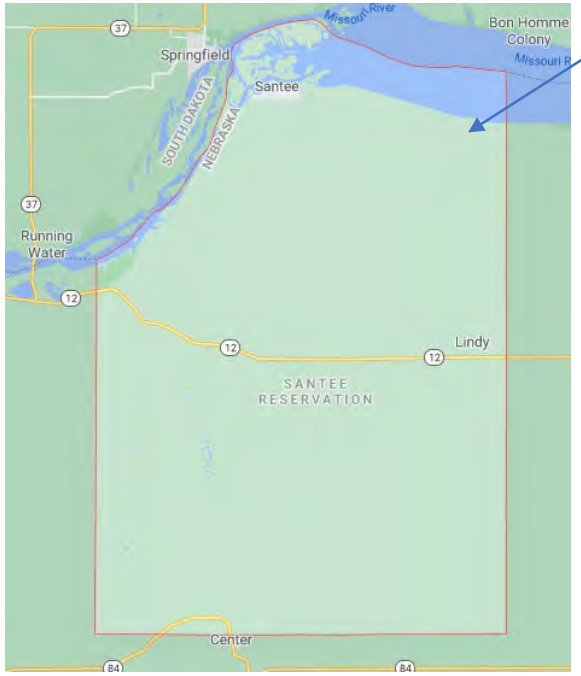
FCC's 2.5 GHz Rural Tribal Window

- Window open dates February through September 2, 2020.
- This window is a unique opportunity for Tribes in rural areas to directly access unassigned spectrum over their Tribal lands, subject to buildout requirements.
- Buildout Requirements: 50% of the population must have access within two years; 80% of the population must have access within 5 years.

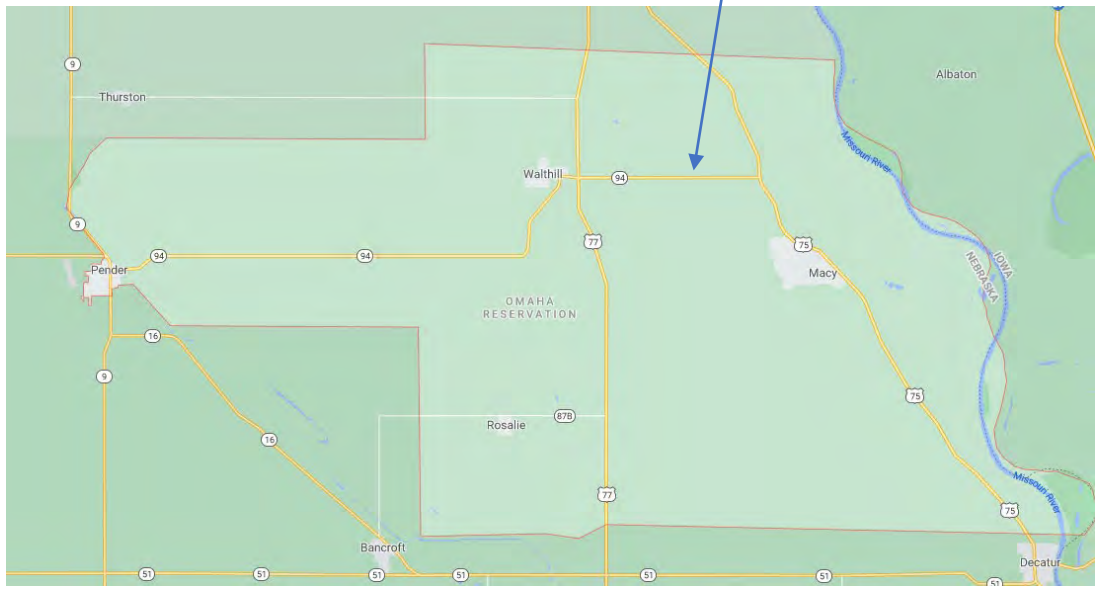
2.5 GHz Applications



Santee Reservation

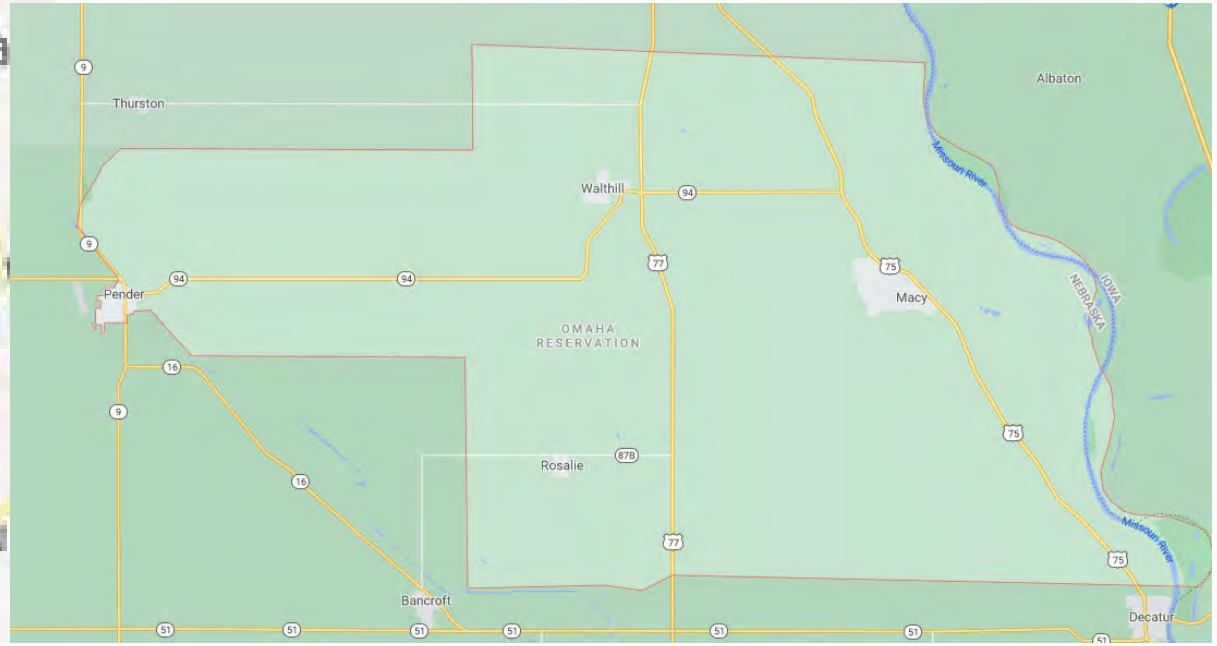


Omaha Reservation



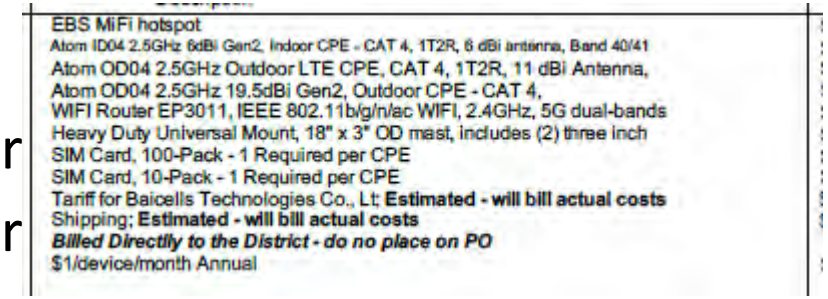
Expected Coverage on Santee Tribal Grounds

Expected Coverage on Omaha Tribal Grounds



Base Stations and End User Equipment

- Through conversations with Red Rover, Baicells equipment has been selected as the equipment for the base stations and the end user equipment.
- The base stations are located at fiber connection points.
- The end user equipment needed:
  - 0-1 mile from the base station MiFi hotspots
  - 1-3 miles from the base station antennae and router
  - 3-7 miles from the base station antennae and router



EBS MiFi hotspot
Atom ID04 2.5GHz 6dBi Gen2, Indoor CPE - CAT 4, 1T2R, 6 dBi antenna, Band 40/41
Atom OD04 2.5GHz Outdoor LTE CPE, CAT 4, 1T2R, 11 dBi Antenna,
Atom OD04 2.5GHz 19.5dBi Gen2, Outdoor CPE - CAT 4,
WIFI Router EP3011, IEEE 802.11b/g/n/ac WIFI, 2.4GHz, 5G dual-bands
Heavy Duty Universal Mount, 18" x 3" OD mast, includes (2) three inch
SIM Card, 100-Pack - 1 Required per CPE
SIM Card, 10-Pack - 1 Required per CPE
Tariff for Baicells Technologies Co., Lt; **Estimated - will bill actual costs**
Shipping; **Estimated - will bill actual costs**
Billed Directly to the District - do no place on PO
$1/device/month Annual

Lessons Learned

- We should have:
  - had the base station installers on-site sooner to evaluate each location in person before they were there to install. It would have eliminated unknown issues.
  - hired a crew to complete the installs on a semi-permanent basis to install the base station and end user equipment.
  - had each site and home site mapped exactly to determine other connectivity issues (however this was an option and getting a system that is mostly functional was and is far more valuable than having a plan to get a system functional next year.)

Thank you for your time.

Questions?

If you would like a copy of the presentation or have any other questions please contact:

Michael Oltrogge, Ph.D.
moltrogge@thenicc.edu
(402) 960-5176

eduroam for Nebraska

Nebraska Rural Broadband Taskforce

September 11, 2020 | Andrew Buker, Assistant VP, Infrastructure Services

University of Nebraska

What is eduroam?

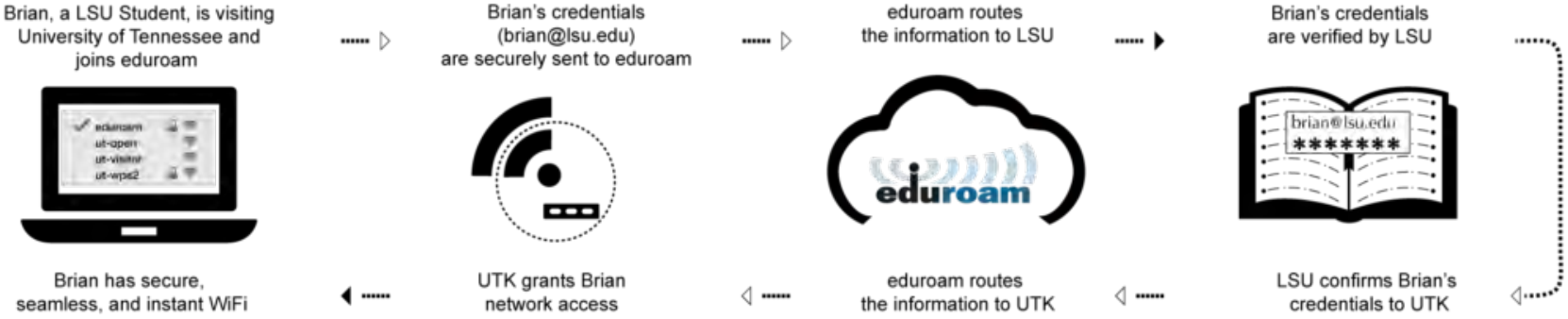
- eduroam (education roaming) is a secure, world-wide wireless network roaming access service developed for the research and education community.

- Allows students, faculty, and staff from participating institutions to obtain secure Internet connectivity across participating institutions by simply opening their laptop or turning on their device.

- eduroam is available in over 100 countries and more than 12,000 locations, from campuses to coffee shops.

How does eduroam work?

- Authentication is forwarded to the users' home institution for verification through a network of servers run by participating institutions and National Research & Education Networks (NRENs).



Is it safe and secure?

- eduroam is based on the most secure wireless encryption and authentication standards in existence today, far exceeding typical commercial hotspots.

- User credentials are never shared with another institution.

- Each participating institution can apply its own filtering and policies so long as users are clearly informed.

What could this mean for Nebraska?

- Network Nebraska will join an Internet2 program to allow all members to offer eduroam services.

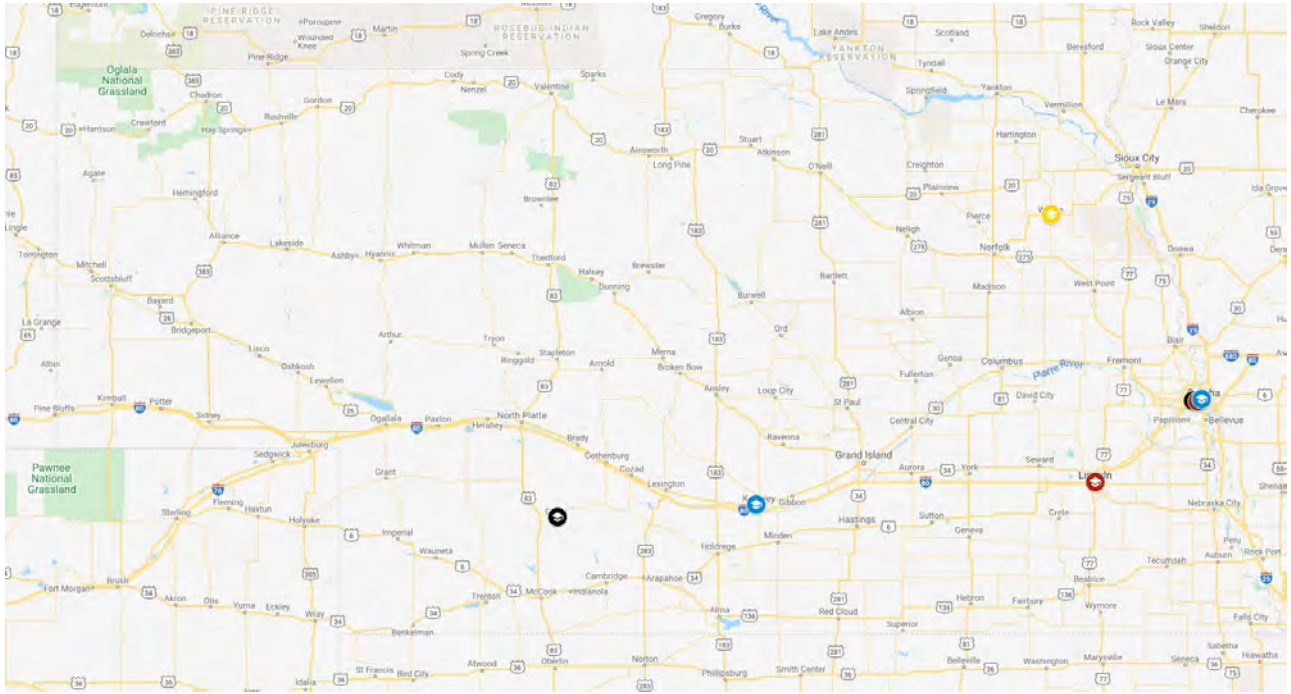
- NDE has secured $65,000 in CARES funding to cover first year costs.

- Participating school districts will remain in control of their own policies and content filtering for compliance with CIPA, COPPA, and USAC E-Rate funding.

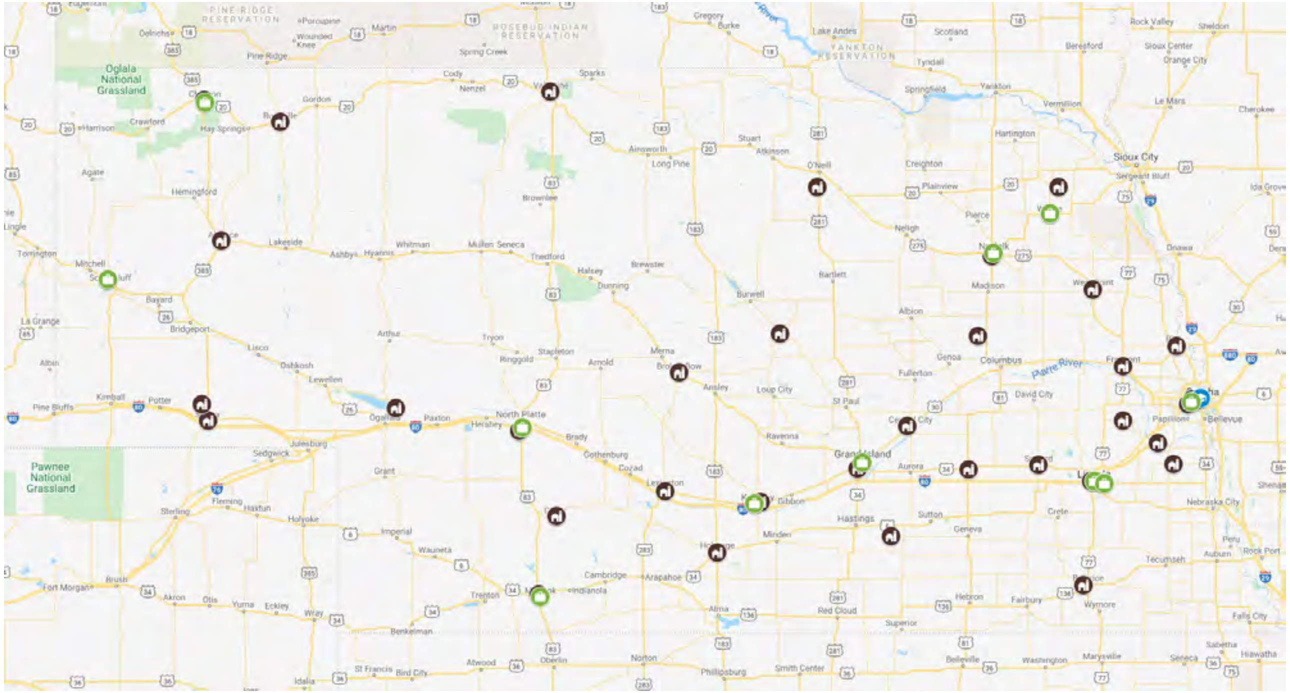
POTENTIAL ADOPTION MAPS

University of Nebraska

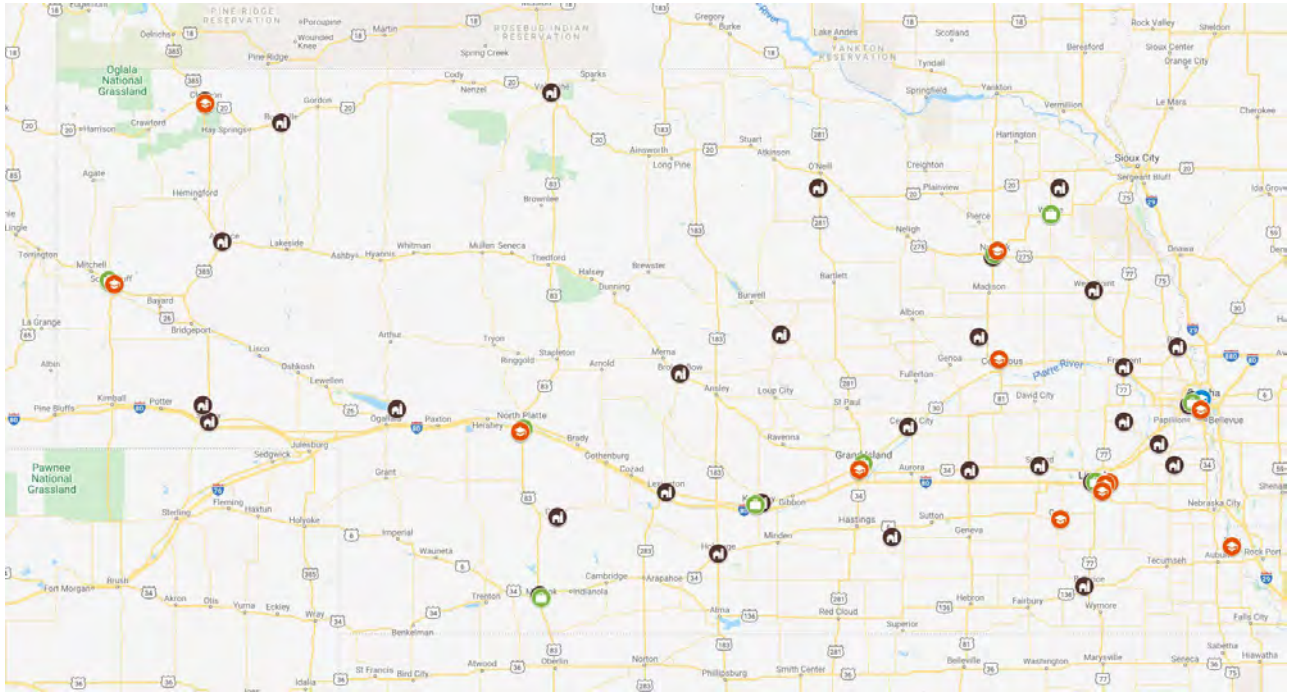
Current Nebraska eduroam Sites



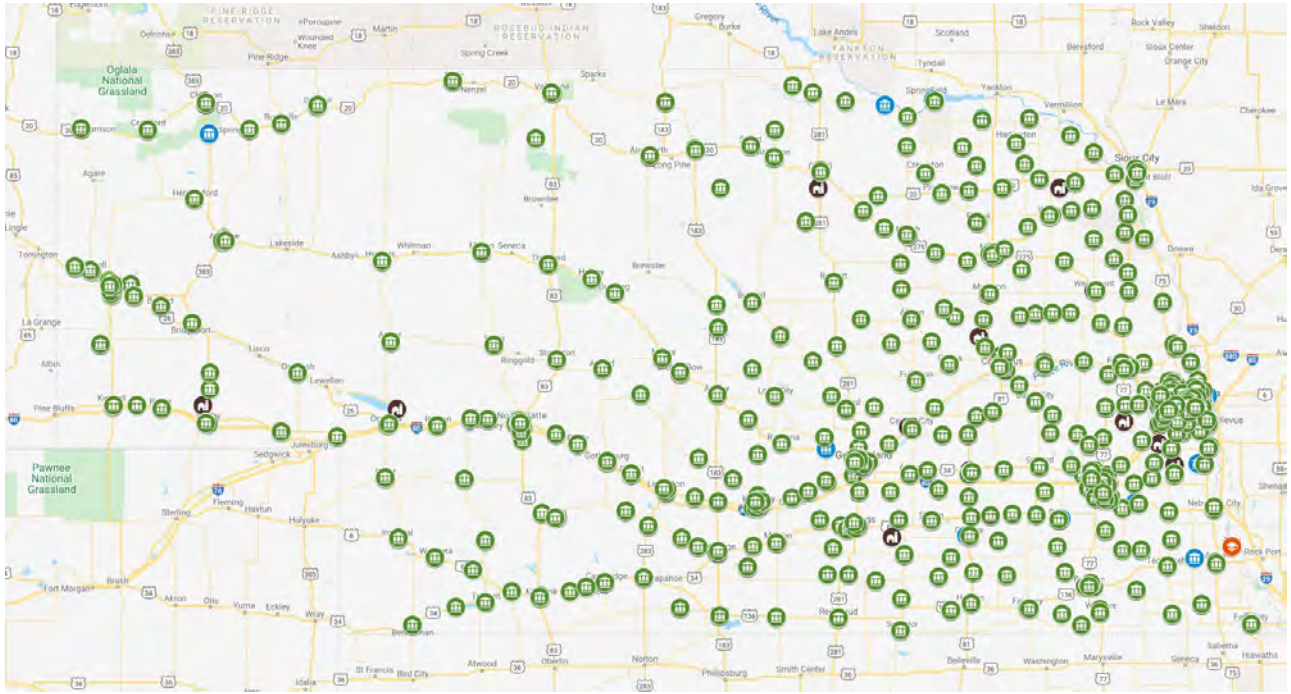
UNL Extension & NBDC Offices



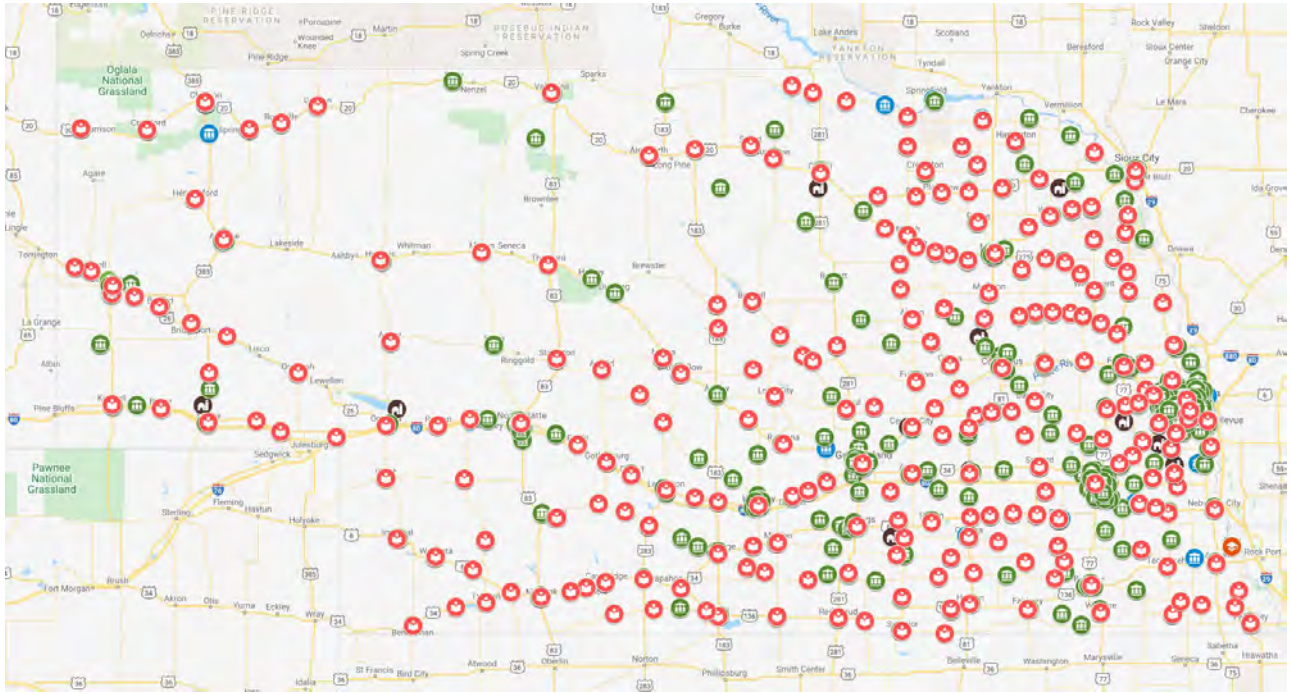
Nebraska Colleges & Universities



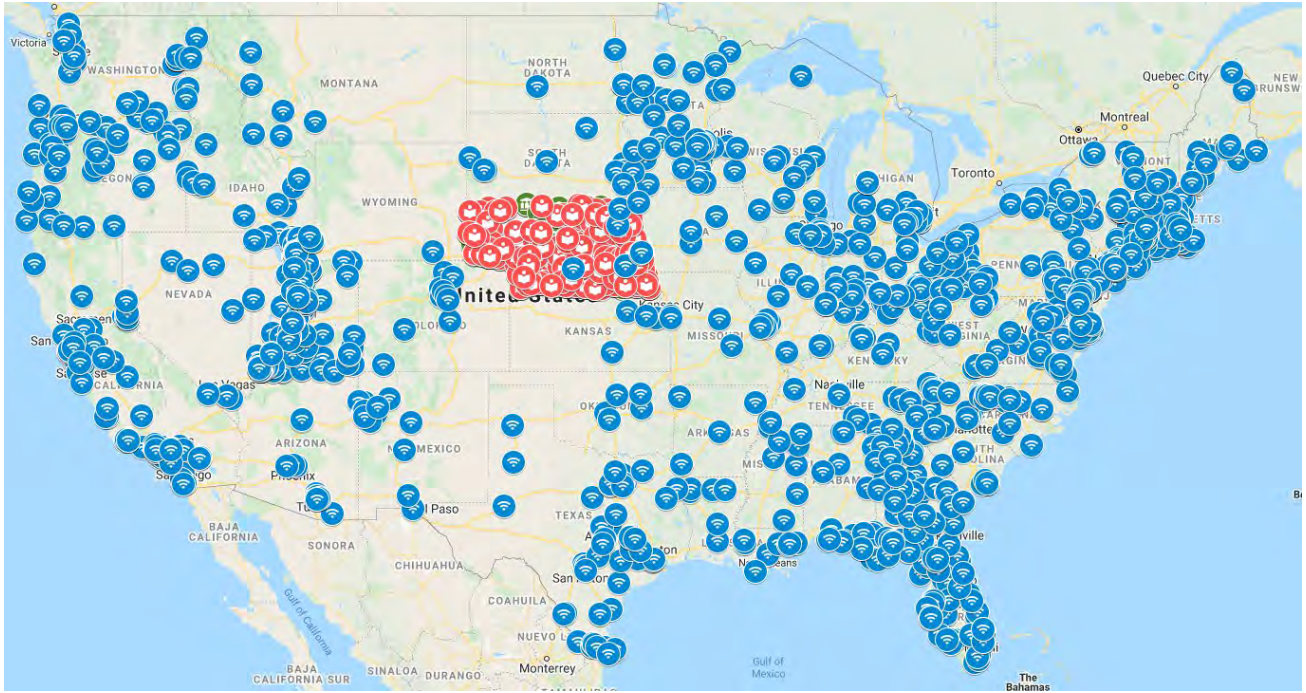
Nebraska K-12 Schools



Nebraska Public Libraries



Continental US eduroam Sites



How will this help?

- Student teachers from UNK can do their work and report on progress electronically without spending their time, or the IT department's time, connecting their devices to the school district network.
- K-12 teachers in the Norfolk school district taking classes at WSC are connected.
- Automatic connectivity for
  - educational professionals at meetings and conferences held at other educational sites.
  - education specialists traveling and working in schools across the state.
  - students traveling to other schools for academic and sport activities
- Students, faculty, and staff have access to eduroam hotspots throughout the state.

Next Steps

- NU enables eduroam at UNL County Extension offices and Nebraska Business Development Center locations.
- Internet2 and Network Nebraska continues to learn from the statewide pilot in Utah with the Utah Education & Telehealth Network (UETN).
- Network Nebraska, NDE, and the ESUs foster collaboration across the colleges and school districts to plan a statewide eduroam roll-out plan.
- Network Nebraska joins the Internet2 program as soon as it is available, tentatively in January 2021.