**2012-2013**

# Building a Resilient Region:

## Virtual Highway

**Written by: Stacey Stockdill, Cheryal Hills, Pam Mahling, Kristi Westbrock,**

**Tony Mayer, Kevin Larson, Cathy Hartle, Bill Coleman, Michelle Adkins, & BJ Allen**

**With the Resilient Region Champions & Virtual Highway Task Force members**

*All 11 Resilient Region themes have included a recommendation or action step that requires connectivity, or assumes connectivity will have a positive impact.*

Region Five
DEVELOPMENT COMMISSION

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# WHO WE ARE

**We are a community-driven, university-assisted public/private partnership pursuing economic and environmental vitality in Cass, Crow Wing, Morrison, Todd and Wadena Counties.**

We successfully engaged more than 600 residents (3 times the projections of 200) in developing a multi-discipline, region-wide vision for the five county region of Cass, Crow Wing, Morrison, Todd and Wadena counties. Although focused on Economic Development, Housing, Land Use, and Transportation, the interdependence of these focus areas was always taken into consideration. This consanguinity is an especially critical factor in rural areas.

The 18-month planning process, supported by HUD/DOT/EPA Sustainable Communities Project, earned us the status of "high-achieving grantee," and led to the development of a comprehensive regional plan http://www.resilientregion.org/plan/ fully integrating 11 themes in the areas of:
1) housing,
2) connectivity/broadband,
3) energy,
4) natural resources & development patterns,
5) education & workforce development,
6) transportation,
7) economic engines,
8) health care,
9) changing populations,
10) government efficiency and effectiveness and
11) affordable housing.

**The Resilient Region Champions**
Over thirty individuals (from the public and private sectors), the "Resilient Region Champions," are now actively leading the implementation of the plans developed during this process. This implementation structure is based on a distributed leadership model, meant to be flexible and organic, able to expand and contract its level of activity as opportunities appear and are addressed.
- It is organized around the 11 themes.
- It has at least two champions per theme.
- It has more than 400 resource organizations.
- Theme champions meet once a month within their theme areas and 4-times a year across themes.

Therefore we have a unique, working model in place to improve the economic and environmental vitality and health of this region. The list of our champions is impressive. All of these individuals have stepped up to the plate to work on a region-wide basis to improve the economic and environmental conditions of our five-county region.

# Who We Are … Resilient Region Theme Champions & Task Force

**CHAMPION CHAIR:**
Tim Houle, Administrator, Crow Wing County

**EDUCATION AND WORKFORCE DEVELOPMENT**
Dr. Larry Lundblad (President)   Central Lake College (CLC)
Craig Nathan (Regional Director)Rural MN CEP
Cheryal Lee Hills (ED) Region Five Development Commission (R5DC)

**EFFICIENCY AND EFFECTIVENESS**
Don Hickman (Vice President) Initiative Foundation
Andrea Lauer, Mayor of Royalton
Tad Erickson (Community & Eco. Dev.Planner) R5DC

**TRANSPORTATION**
Tim Houle, (Engineer) Widseth, Smith, Nolting
Jarrett Leas (Engineer) Kadrmas, Lee & Jackson
Jake Huebsch (Trans.Planner) R5DC

**ECONOMIC ENGINES**
Greg Bergman (Director) SBDC
Rick Utech (ED) Todd Co. Eco. Dev. Corp.
Joe Schulte (Bus/Loan Developer) R5DC
Vicki  Chepulis (Grants Coordinator) Five Wings  Arts Council
Arlene Jones (Manager)  SPROUT Food Hub

**CONNECTIVITY**
Pam Mahling (Corporate Resource Specialist) WCTA
Kevin Larson (CEO)  CTC
Janelle Riley (CEO)   Syvantis Technologies
Stacey Stockdill, (CEO) EnSearch, Inc.
Merritt Bussiere (Extension) University of MN Extension

**ENERGY**
Bob Schaefer (Instructor) Central Lakes College (CLC)
Jason Edens (President) Rural Renewable Energy Alliance
Molly Zins (ED) U of MN Sustainable Dev. Partnership

**HEALTHCARE**
Jani Wiebolt (retired COO) Essentia SJMC
Tim Rice (CEO) Lakewood Health System
John Solheim (CEO)  Cuyuna Regional Medical Center
Bob McLean (COO) Hunt Utilities Group
Adam Rees (CEO) Essentia Health
Mike Larson (COO) Essentia Health

**AFFORDABLE HOUSING/HOUSING**
Lynn Hunt (Chair) Resilient Living Council
Jennifer Bergman (ED) Brainerd HRA
Colleen Faacks (ED)  Mid-MN Builders Association
Janie Weston (ED) Greater Lakes Association of Realtors
Deanna Hemmesch (ED) Central Minnesota Housing Partnership
Amy Hunt McLain (Board) Resilient Living Council

**CHANGING POPULATIONS**
Mary Sam (Dir. of Intercultural Services/Diversity/Tribal Relations)
Central Lakes College (CLC)
DeAnn Barry (ED) Brainerd Lakes Area Senior Center
Dan Frank (Community Specialist) Initiative Foundation

**NATURAL RESOURCES AND DEVELOPMENT PATTERNS**
Todd Holman (Regional Director) The Nature Conservancy
John Sumption (President) Sumption Environmental
Phil Hunsicker, Author – Conservation Design Score Card

Mel Rademacker—R5DC, Support

**A multi-sector Public/Private Virtual Highway Task Force ... <u>Including the Resilient Region Champions listed to the left and the following:</u>**

Tri-county Hospital; Brainerd Lakes Area Economic Development Corporation; Community Development of Morrison County; City of Staples Community Development;  Wadena Economic Development Corporation; the Brainerd Lakes Chamber; Good Samaritan Society; West Central Telephone Association (WCTA) and Consolidated Telephone  Company (CTC). We will also coordinate our work with the BLAEDC and Brainerd Lakes Area Chamber of Commerce High-Tech Sector Task Force and the CLC/MSCU High Tech IT Task Force. We have letters of support from: Commissioner Mary Tingerthal (Minnesota Housing Fund), Warren Hansen, (CEO, Greater Minnesota Housing Fund - GMHF), and Bernadine Joselyn (Blandin Foundation) with the loan of their broadband expert, Bill Coleman.  Advocates for improved broadband access come from ALL local units of government within the region (65 Cities & 5 Counties);  hundreds of private sector companies;  27 school districts', 2 community colleges (CLC &  Minnesota STATE Community Technical College) and the 600 residents who worked on the creation of the regions "Resilient Region Plan. ". The University of Minnesota has committed to research support of this work.

**We represent 40,500 (seasonal and year-round) residents, 24,877 K-12 students (49% eligible for free or reduced school lunches), more than 401,605 northbound cars loaded with visitors (continuous traffic monitors August 2009), and 500 businesses.**

# THE VIRTUAL HIGHWAY PROJECT: Needs & Issues

**Issue:** Our rural region has limited access to high speed internet. The so-called "digital divide" is evidenced throughout our region, with some locations serving virtually unlimited access to the internet, while in other areas there is little or no access available. This limited, inconsistent connectivity negatively impacts Health Care Delivery (tele-health), Business (tele-work) and Educational (online learning) opportunities.

**Tele-health -** The Veteran's Administration is already using telehealth, serving 119,535 veterans last year and providing significant savings to the administration. Veterans without broadband must use costly transportation and spend entire days traveling to receive the same care. Local healthcare providers would like to attain similar savings and service opportunities by providing tele-health services; however,

"I did not realize that when I want to use the new technologies to provide health in the home – in some parts of our five-county region – there won't be the infrastructure there to enable me to reach this market. I had just assumed I would turn to the telcos for this." *(President/COO of Regional Hospital)*

Further, it is not well understood whether or not building the infrastructure required will alleviate the problem, or if there are other overriding issues. There are those who have asked, "If We Build It, Will They Log On? [because] establishing relevance in rural America is uncertain." (*Horrigan, 2009*)

According to Janelle Riley, President of Syvantis Technologies,
**Tele-Work -** "The Horrigan study in 2009 asking, 'If we build it, will they log on?' is outdated. The technologies utilized by small businesses have changed dramatically since 2009. In 2009, only 2% of small businesses utilized cloud computing. By the end of 2012, 52% of small businesses employed cloud solutions. Every government program or foundation grant requires online applications. IRS forms and instructions are now online. High speed infrastructure is no longer an option for small business in rural areas. It is a necessity."

**Online Learning -** "Bandwidth and access to high-speed internet limits the opportunities for youth and adults in the CLC target area to fully participate in the online courses now available." (*Michael Amick, Dean CLC Academic and Technology Services*)

"… The Pierz School District is committed to providing students with skills and education to be successful in a rapidly changing technology-based society … The greatest challenge we face is the rapid advances and opportunities in online learning and web based resources and services … Our demand for streamed video and audio is growing enormously … the increasing demands on bandwidth will be a challenge." *(ISD 484 Technology plan)*
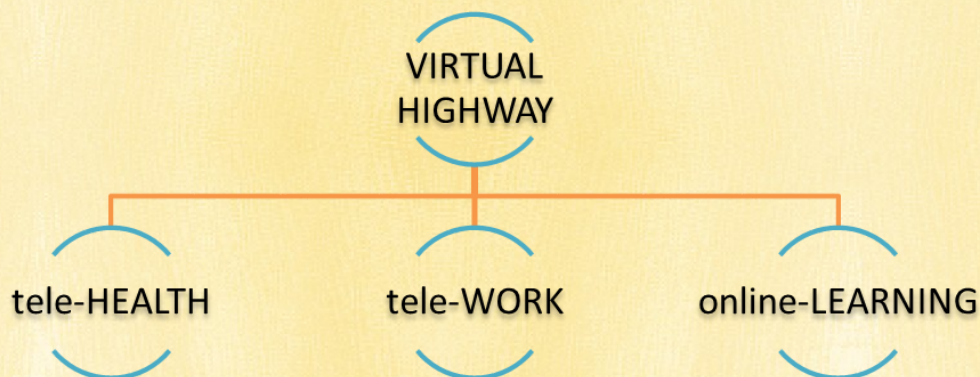
# VIRTUAL HIGHWAY PROJECT IS ALSO….

**A Minnesota Issue**

Our group is not alone in recognizing the importance of the virtual highway system. Some communities in Minnesota lacking broadband have attempted to build their own municipally-owned systems, but to date these projects have frequently failed due to incomplete business models, which often don't take into account the true cost of maintenance and service, and/or may have overly optimistic revenue projections.

The state of Minnesota is also aware of the importance of broadband as a 21$^{st}$ century infrastructure need, having set a goal of universal broadband throughout the state, and mandated a broadband task force study and report how this may best be achieved. At the most recent task force meeting August 13, 2013, the need for hard data from projects within the state to show the costs and benefits of broadband was expressed.

In addition, the Minnesota bill HF 997/SF 1061 was introduced mandating the development of a viable business model for the state's ARMER communications system.

**Clearly, more cost modeling information is needed on many fronts.**

Unfortunately, due to significant recent changes in the FCC Universal Service Fund and ICC funding mechanisms, time may be running out for many rural areas that are at risk of soon being abandoned by carriers (for example, AT&T recently stated and then retracted it's statement that there is no business case for deploying broadband to 25% of its service area—so stay tuned!). Therefore states will quickly need to find alternative methods to fund their un-served communities. Twenty-six states have already developed programs to address the gaps in order to remain competitive. As stated in the June 2013 independent white paper by Balhoff, M and Williams, B.,

> "…we cannot say strongly enough that the states have a very short fuse. They cannot wait until the FCC issues its CAF II Order to begin their analyses….the responsible answer is that **states must begin *immediately* to understand the policy issues, the economic problems, and the social risks associated with the choices that will have to be made…"** (Balhoff, M. J. & Williams, B. P. June 2013. *State USF White Paper: New Rural Investment Challenges.* Balhoff & Williams, LLC Retrieved August 16, 2013 from **http://www.balhoffrowe.com/pdf/BW%20State%20USF%20White%20Paper%20June%202013.pdf** .

**A National Issue**

The US Department of Agriculture Executive Order 12866, effective February 6, 2013, states:

> "As noted in the ERS study, rural areas with dispersed populations or demanding terrain generally have difficulty attracting broadband service providers because the fixed cost of delivering broadband service can be too high. **Yet broadband is a key to economic growth. For rural businesses, broadband gives access to national and international markets and enables new, small, and home-based businesses to thrive.** Broadband access affords rural residents the connectivity they need to obtain healthcare, education, financial, and many other essential goods and services." (Federal Register, Vol. 78, No. 25, retrieved August 16, 2013 from http://www.gpo.gov/fdsys/pkg/FR-2013-02-06/pdf/2013-02390.pdf).

# ACCESS FOR THE COUNTIES OF CASS, CROW WING, MORRISON, TODD AND WADENA
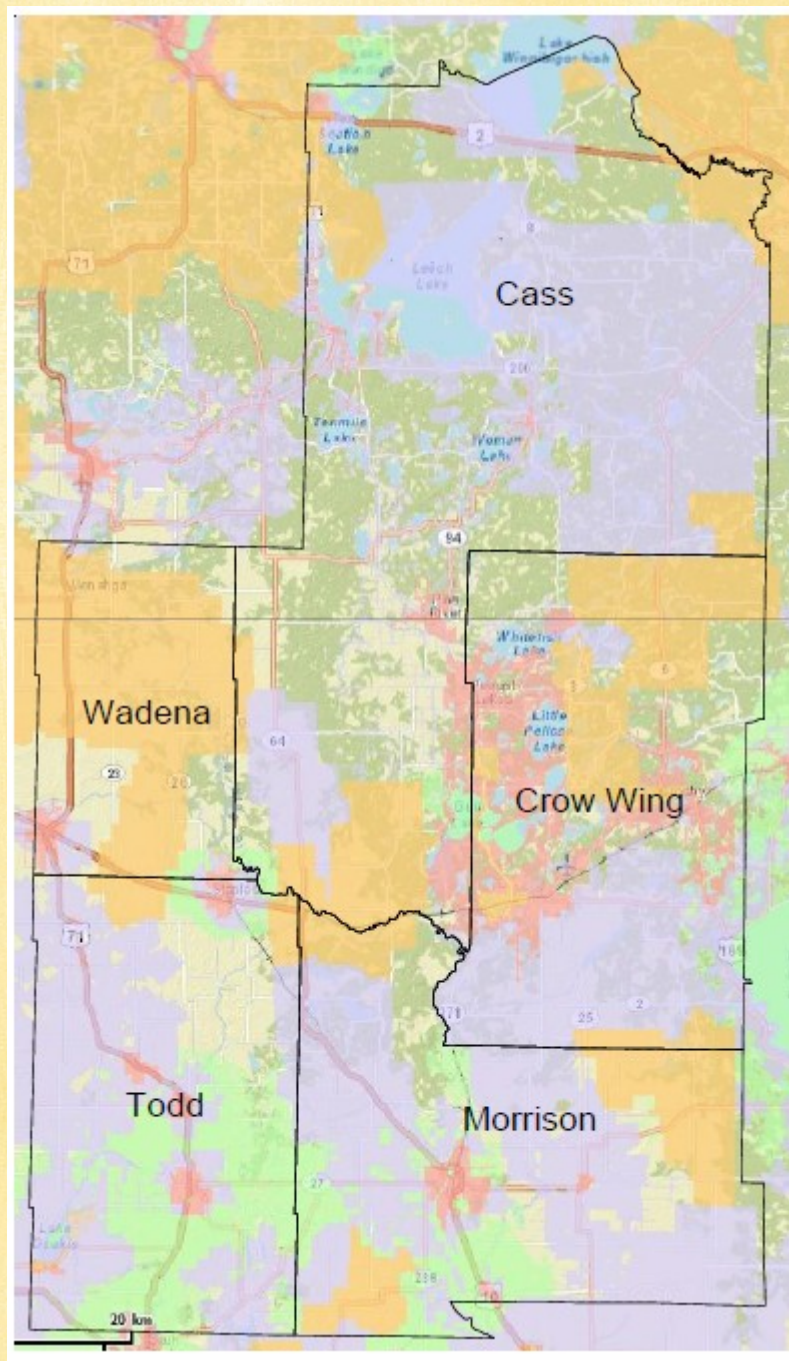


**ACCESS** 0

- Fiber Broadband Available*
- Cable Broadband Available*
- DSL Broadband Available*
- Fixed Wireless Broadband Available*
- Mobile Wireless Broadband Available*

**Optimal**    **Fiber Broadband**

**Cable Broadband**

**DSL Broadband**

**Fixed Wireless Broadband**

**Minimal**    **Mobile Wireless Broadband**
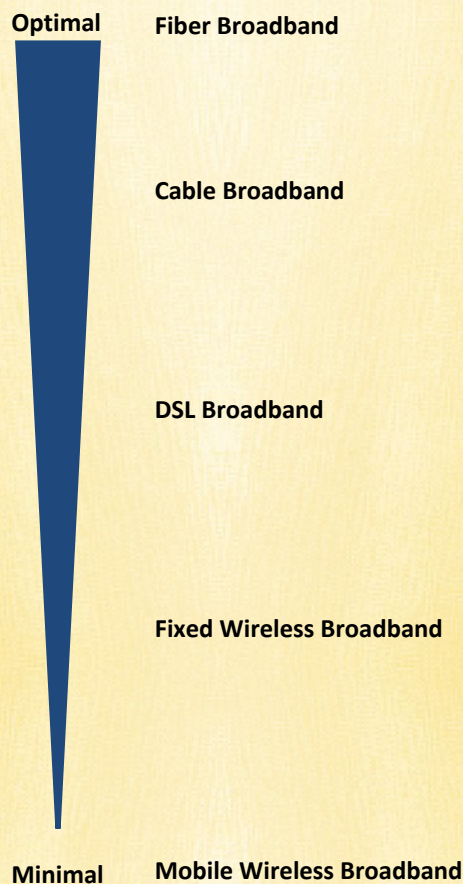
NOTE: We will continue to refine gap map because coverage projections vary dramatically depending on the source.

Region Five
DEVELOPMENT COMMISSION

# BROADBAND SPEEDS

| Goals: | Download Speed | Upload Speed | Comments |
|---|---|---|---|
| **FCC Goals** – "at least 100 million homes" | 100 Mbps | 50 Mbps | Most likely for urban areas |
| **FCC Goals** –anchor institutions in each community | 1,000 Mbps (1 Gbps) | (not specified) | The FCC assumes that if fiber is brought to an anchor institution it will be easier to build out from there, but if anchor's provider isn't required to, it frequently doesn't happen |
| **FCC goals** – everyone else | 4 Mbps | 1 Mbps | By 2020 - Rural groups feel this difference is very unfair |
| **Minnesota Goals:** Yardstick used: | "10 – 20" Mbps 10 Mbps | "5-10" Mbps 6 Mbps | By 2015 |
| **Technologies:** Note: We are unable to find a standard speed rating for the technologies listed below; they are therefore a compilation of several sources of information and give estimated real-world capacity *at this moment* using typical ISP electronics with several users on the system; rather than theoretical capacity with advanced electronics in a controlled setting. | | | |
| **Dial-up** | 40-56 Kbps | | Ties up phone line; old phone lines cannot support this. |
| **DSL** (using ADSL2+ which is currently most common form) | 15-20 Mbps | 1 Mbps | Still see many rural packages at 4/1 |
| **Cable** | Up to 20-30 Mbps, urban up to 100 Mbps | 2-8 Mbps | Most rural packages lower. Real speed may be quite different from advertised. Cable is primarily located in towns and not present in rural areas. |
| **FTTH** | 1 Gbps+ | 1 Gbps+ | Depends on electronics, some only 100 Mbps (but can be easily upgraded per customer.) Typical modestly priced rural packages about 10/1 meg. |
| **Mobile wireless – 3G** | 1-4 Mbps | 0-1 Mbps | Reliability issues, Expensive data caps. The coverage in rural areas is spotty and focused along highways. |
| **Fixed Wireless** | 1-10 Mbps (generally more toward 1) | 1 Mbps | Line of sight and interference issues. |
| **Mobile wireless – 4G** | 1-15 Mbps | 1-5 Mbps | Reliability issues, Expensive data caps. The coverage in rural areas is spotty and focused along highways. Higher speeds requires fiber infrastructure. |

# OUR VISION

**We believe:**
**1. Rural America *is* relevant. People living in cities *need* Rural America's goods and services for subsistence and quality of life.**
**2. Those goods and services cannot be delivered without a rural population to support them.**
**3. People providing those goods/services living in Rural America, should be equal participants in and consumers of modern technology.**
**4. Additional infrastructure is needed to make modern technology accessible to our rural communities.**

We envision our innovative entrepreneurs, often small businesses, having the infrastructure they need to operate an efficient, successful business because they have reliable, cost-effective, access to broadband.
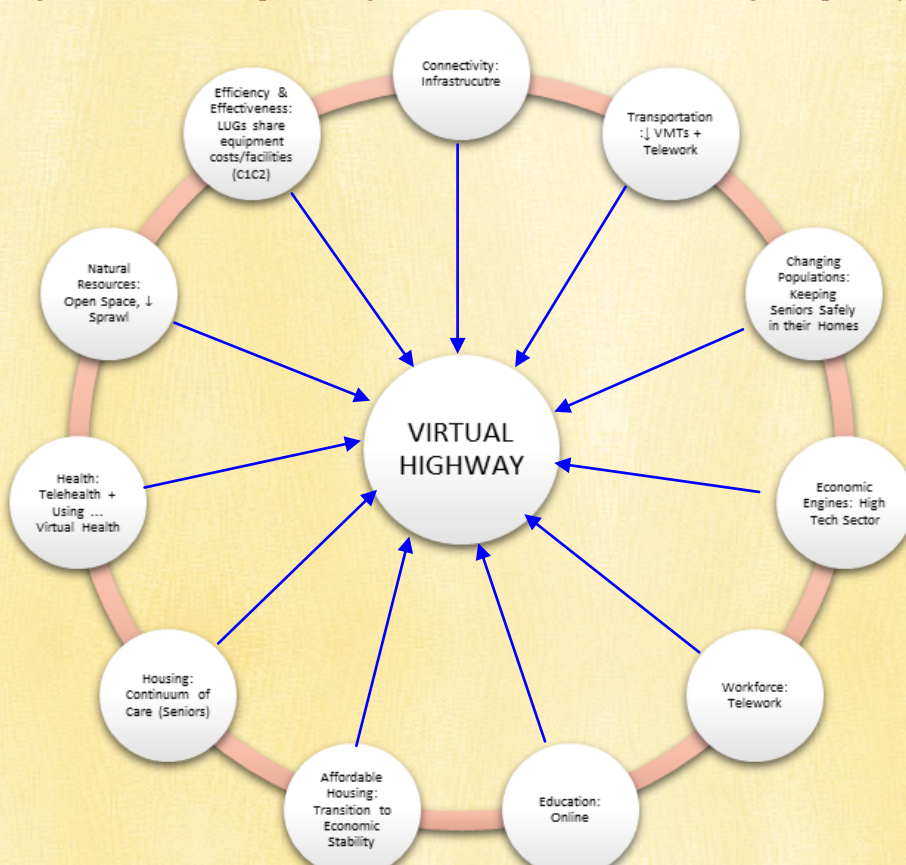
We picture that our high-tech sector, an emerging economic engine, can find the skilled workforce they need to be able to remain in our region.

We see laid-off workers accessing the wealth of online workforce resources such as iSeek, and feeling empowered to use additional online and local training resources to find promising new careers, rather than sinking into poverty and depression.

We imagine a healthy, sustainable rural lifestyle where seniors can stay on the farm or retire to their 'up north' homes, continuing to enjoy the health benefits of their favorite outdoor activities, without their children worrying about their health status.

The benefits aren't to our region alone, though; visitors to our scenic lakes and parks can be assured that they will be able to stay in touch with their office or family back home throughout their stay, and road travelers will have access to communications services wherever they are.

**But perhaps most importantly in these days of ever-tightening budgets, we see the costs of providing several state and federal programs being dramatically reduced.**



Efficiency & Effectiveness: LUGs share equipment costs/facilities (C1C2)

Connectivity: Infrastrucutre

Transportation :↓ VMTs + Telework

Natural Resources: Open Space, ↓ Sprawl

Changing Populations: Keeping Seniors Safely in their Homes

VIRTUAL HIGHWAY

Health: Telehealth + Using … Virtual Health

Economic Engines: High Tech Sector

Housing: Continuum of Care (Seniors)

Workforce: Telework

Affordable Housing: Transition to Economic Stability

Education: Online

# OUR APPROACH

## A Rural Broadband Impact Assessment …

Expanding broadband access to all portions of the region will impact every single theme in the Resilient Region Plan, as each of the plan's 11 themes assumes some degree of broadband infrastructure to address the needs of the poor, underemployed, and seniors (See pages 14 to 15).

**In keeping with the spirit of holistic, sustainable regional planning, prior to implementation, we want to first explore all of the potential impacts—to health, local economies, natural resources, and more**. We also need to **prepare a viable/sustainable business plan** and **solicit the investment needed** to expand broadband infrastructure to areas where currently none exits, we must understand user needs and potential impacts.

**Therefore, we, The Resilient Region Champions have requested that the Region Five Development Commission (R5DC) conduct an impact assessment to assess the outcomes and policy barriers to building a virtual highway as a healthier and more sustainable alternative to expanded physical transportation system. The rural broadband impact assessment will help us prepare a viable, sustainable business plan.**

Our Virtual Highway Project Priorities are:

(1) Assess the outcomes of telework (uses of broadband for business retention and expansion), online learning, and telehealth.

(2) Determine the broadband required to support implementation of the 11 theme recommendations,

(3) Refine the regional infrastructure gap maps,

(4) Investigate ways to minimize existing policy barriers, and

(5) Identify financial opportunities to build the needed infrastructure.

**More specifically the policy decisions the Rural Impact Assessment would inform are:**

- Who are the intended users/customers of broadband within the region?
- What are the needs in the region that assume broadband connectivity?
- What are the outcomes assumed by increased rural access to broadband? (Improved health outcomes at reduced cost? Businesses retention and expansion? Preparing rural children to compete in the global market place?)
- What are existing and emerging technology applications to meet these needs?
- What does the research show us about the positive and negative impacts of these applications?
- Given the applications and best practices, then what are the true gaps in infrastructure?
- What are the best practices to increase connectivity in rural places?
- What, then, is a viable, sustainable business plan for fulfilling these gaps? Who within the region could help address these gaps? What sources of funding are there to help address the infrastructure gaps – to reach the last mile?

# To identify barriers to reaching the last mile …

We already know that there are a number of private as well as state and federal policies that will affect our ability to "reach the last mile". Through wavers and new public/private partnerships we will overcome these barriers and demonstrate the improved health, learning, and business retention/expansion outcomes at reduced costs. This then will help establish that with these new business delivery models and new public/private partnerships that the need of rural places, across the state of Minnesota and the nation, reaching beyond the minimal up/down broadband speeds is viable, business wise, with significant impacts and cost savings.

- **Limited access to State ARMER Towers, a valuable rural asset.** ARMER Towers were built to support the statewide public safety wireless radio and wireless data network. Lack of access to these valuable rural assets limit our ability to "reach the last mile." Although hospitals have access, others, in some cases, such as clinics and rural telecommunications companies do not. We want to forage a new public/private partnership to demonstrate the benefit and to help satisfy HF 997/SF 1061 bill requiring statewide radio board to study long-term funding strategies for the ARMER system. Our business model shows the profound cost savings and benefits, and ROI from our innovative public/private virtual highway partnership.

- **Insurance reimbursement policies that discourage telehealth.** Private insurance companies tend not to reimburse health care providers for telehealth. There is evidence that there are tremendous cost/benefit savings. Public MA reimbursement policies are inconsistent. In some cases, telehealth is a reimbursable expense by MA, but in other similar cases, reimbursement is denied. For example, county staff are allowed to use virtual-well child checks for child protection, whereas virtual medication compliance checks are not allowed. These policies affect the efficient and cost-effective use of limited MA resources.

- **Local county and city comprehensive plan language needs to be written to encourage broadband infrastructure investments without compromising the quality of our natural resources (lakes and streams) a prime reason we are a tourist destination.** We have already, as part of the Resilient Region Planning process written for review, policies in a number of areas (such as shoreland management, storm-water management, affordable housing) that can be used by our Local Units of Government (LUG) http://www.resilientregion.org/local-government/ These are written as "samples" that a LUG can then use and adapt as needed given their own public input and review processes. *"The model ordinances you propose look good. I am no longer in a 'ordinance making' position but appreciate your efforts to make Region Five ordinances more uniform and workable. After twenty years of elected service and many more afterwards serving on the Deerwood Planning and Zoning Commission I think much good can come from this work." Mike Kneeland (June 2013)*

- **Document for other rural public/private partnerships that invest in rural broadband infrastructure leads to increased health, learning, and business retention/expansion outcomes at reduced costs.** We need to show other potential rural anchor tenants that the ROI value of broadband infrastructure is worth the investment. Through our public/private partnership we already have had success in developing viable, sustainable business models. We want to further expand this region-wide to demonstrate and teach others how to best forage new public/private partnerships to enable other rural areas to reach the "last mile."

## To address equity issues …

**Equity Questions for Small low-income Rural Businesses.** Lack of broadband access means: 1) lack of access to information regarding local, state, and federal programs, 2) lack of information regarding IRS, since tax forms and information are no longer sent via mail, and 3) inability to "complete" online applications for jobs, grants, programs, or services. In some cases, filing of paper applications or forms are no longer allowed.

**Equity Questions for Rural Education.** Lack of broadband access means: 1) students in small rural schools cannot take "advanced placement" courses, as can their Twin City Counterparts, 2) poor students will not be able to complete the now, often required, online class assignments, and 3) that poor children and adults will not be able to take advanced, online college courses.

**Equity Questions for Health.** Lack of broadband access means the inability to provide equal treatment to all of the health care customers. The inability to deliver these in-home services to all of customers within the region impacts the health care provider's ability to provide quality and cost-effective services.

# To refine and validate broadband outcome projections …..

Our preliminary research has already begin to identify potential outcomes from broadband expansion. But these come from projects in other states. As identified as a need by the Governor's Broadband Task Force—our project will continue to review the literature to determine if these outcomes, as estimates from other state-wide studies, hold true for rural places and have the potential to hold true for Minnesota. Our preliminary estimates show the results for rural Minnesota, where agriculture, home-based businesses, and tourism play heavily into our economy.

Conservative, initial estimates, based on local data as well as national state studies—indicates that for the Cass, Crow Wing, Morrison, Todd and Wadena Counties—**5658 square miles (6244 with water) a $9 Million infrastructure investment**, will results in a **$1 Million annual private leverage,** will significantly increase job and economic activity (500 to 1400 new jobs), business retention (up to 31% increase), start-up business (up to 14% increase) increased ability for 24,877 K-12 students (49% eligible for free and reduced lunches) to participate in the global workforce of tomorrow. In addition, the infrastructure has the potential to provide better health, safety and economic opportunity for the 40,500 (seasonal and year-round) residents, more than 401,605 northbound cars loaded with visitors (continuous traffic monitors August 2009), and 500 businesses who resident in Cass, Crow Wing, Morrison, Todd and Wadena Counties.

- **The $9 million investment could potentially add between 500 to 1,400 new jobs annually.**
  Local deployment as well as Joelle Tessler, (2008, February 6) Retrieved August 27, 2013 from http://internetinnovation.org/library/special-reports/10-facts-about-broadband-and-jobs/ and Jerome, S. (2011, Nov. 21) Retrieved August 27, 2013 from http://www.nationaljournal.com/tech/fcc-says-broadband-expansion-will-add-jobs-20111121?mrefid=site_search

- **The local economic growth and secondary investment enabled by broadband is 10 times the initial broadband investment, and the contribution to Gross Domestic Product (GDP) is 15 times the initial investment."**

  Strategic Networks Group. "Measuring Broadband's Impact" Retrieved July 26, 2011 from http://www.sngroup.com/broadband-lifecycle/measuring-the-impact-of-broadband/

- **Broadband can contribute to 31% Businesses Retention and 14% Entrepreneurship Start-ups.**
  "Jane Patterson, former leader of broadband development in North Carolina said that 31% of rural North Carolinians made money off their network connection through home businesses and that another 14% are planning to start home businesses." (Coleman, B. (2013, April 18). *Blandin on Broadband*. Retrieved August 16 2013 from http://blandinonbroadband.org/2013/04/18/broadband-communities-summit-in-dallas-day-two/

# To meet the broadband infrastructure needs of the Resilient Region Plan.



Our unique public/private partnership is ready to demonstrate the impact (in terms of improved health, learning, and business retention expansion outcomes) at reduced costs! It will provide a pathway for future broadband infrastructure investments in rural Minnesota (and beyond our state boarders).

The Resilient Region Plan, http://www.resilientregion.org/plan/, is organized across 11 themes and includes a number of recommendations and action steps. The relationship between connectivity and the relevant themes are elucidated below.

**Connectivity Theme:**

Access across the region. Ensure all households in the region have high-speed internet access, which meets common state standards.

Efficiency. Local units of governments will work across political boundaries to share equipment costs/facilities for more efficient delivery of high-speed internet.

Access for entrepreneurs. Provide access to technology needs and support to retain businesses and encourage potential entrepreneurs.

Telecommuting: (moved from transportation theme) Create a business plan that facilitates legitimate telecommuting jobs and promotes high-speed internet connection in the region. Upgrade and expand high-speed internet infrastructure in housing so residents may work from home.

Access for children. All school-aged children will have access to a computer with high-speed internet capabilities. [Explore the use of buses as wifi hotspots to help poor children gain access & complete homework.]

Funding. Identify and pursue state, federal, and philanthropic grants to fund connectivity recommendations.

**Housing & Affordable Housing & Changing Populations Themes:** Housing Support Services**.** Provide housing support services to the elderly and mentally ill that would allow them [to remain] as independent as possible under their circumstances.

**Health Care Theme:** Use of emerging technologies. Identify the emerging systems like VirtuWell that allows online access to health care providers.

**Education & Workforce Development Theme:**

Senior Workforce: … Create distance at-home learning opportunities while allowing experienced workers to "test out" of training modules.

Distance learning. Promote community-based distance learning via global interconnectivity. For example, integrate home-based learners at the community level for social activity along with an advanced online learning experience.

Work-at-home: Provide more work-at-home employment opportunities. This can be accomplished through the expansion of telework and home-based services and businesses.

Affordable, accessible training: Provide affordable and accessible training in promising fields. For example, online courses are more accessible for people without transportation options.

**Transportation Theme:**

Technology: Explore roadway technology and digital communication to ensure the movement of traffic.

Transportation impacts of development choices: Reduce the number of vehicle trips while building a transportation system to serve future populations.

Alternative transportation: … implement 'alternative transportation technologies' such as increasing broadband access throughout the region … (Broadband recommendations are included under the "Connectivity" theme.)

**Energy Theme:** Economic development. Determine the compatibility and interface between communications, smart grid technologies and internet systems. Develop a recruiting initiative encouraging technology-oriented companies to explore opportunities offered in non-urban spaces.

**Efficiency & Effectiveness Theme:** Incentives: Create incentives, like tax credits or licensure requirements, for telecommunication provides to strategically expand broadband access in rural/remote geographical locations.

**Economic Engines Theme.** As a first tier of priority, the region will focus efforts on the following economic engines:

Entrepreneurs: Develop and expand entrepreneurship and small, home-based businesses.

Technology: Expand the technology sector including software design and development, use of innovative technologies in agriculture, financial services, and delivery of health care.

Education: Develop and expand new approaches to education including high-tech tools, virtual and online, to address the high-tech skill development needed for the region.

Health Care: Expand the use of telemedicine to deliver health care in patients' homes and to address the need for specialty health care.

Retail: Continue to support our local businesses with online tools to promote their products beyond the five-county borders.

**Natural Resource & Development Patterns Theme:** Technology in development. Communities within the region should create a completely on-line, standardized development application process.

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