

**Del Norte County Teletransportation/Telecommunications Study  
Phase III**



**Figure 1 -- Rugged and Beautiful Del Norte County Coast**

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**Del Norte County Teletransportation/Telecommunications Study  
Phase III**

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## **Del Norte County Teletransportation/Telecommunications Study Phase III**

### **Executive Summary**

Results to date from Del Norte teletransportation/ telecommunications planning efforts are conducive to solving county and regional broadband supply challenges and include:

- Teletransportation / Telecommunications Strategic Plan to guide planning efforts
- State-of-the-art broadband offerings in the northern portion of the county
- Identification of demand building approaches
- Viability for broadband south of Crescent City and for regional route redundancy
- Solid working relationships with providers and regional partners.

For Del Norte and the surrounding region we offer a vision of building a “Coastal Broadband Ladder to the Future” (see Figure 2 -- Broadband Ladder to the Future).

In this planning phase we addressed the route between Crescent City and Medford and Crescent City to Eureka. Wherever possible let’s use existing right of ways (ROW). Generally speaking these are well-established power or telephone distribution. This is often the least cost approach that uses existing poles and conduit. Fortuitously, these ROWs exist on or near 197/199 or 101.

Del Norte (and Curry) would both benefit from route redundancy (197/199) but path diversity may be a reasonable first step (a coastal route enables path diversity).

Estimates for the 197/199 route are at \$3 to 5 MM. This is a very rugged route of an estimated 75 miles. A detailed engineering of the route would determine actual investment amounts.

A coast route through southern Del Norte County broadband service would provide necessary backhaul. There is no fiber-based backhaul infrastructure on the coast from Crescent City to Eureka. The challenge for this coastal route in Del Norte is that of low population density. In order to provide sufficient business justification for investment in broadband services south of Crescent City in Del Norte County it will be necessary to build from Crescent City to Eureka.

An estimate of \$3.5 to 4 MM is on the table from a provider. This is a route of an estimated 75 miles. A detailed engineering of the route would determine actual investment amounts.

A wholesale business model is recommended for this route. Considerable best practices and results show that by first establishing anchor tenants through a wholesale offering brings the opportunity for local and regional investors to serve the retail markets. In this model a provider would build the infrastructure and sell services to ISPs larger institutions and businesses along that route. Most of these wholesale customers would be located in Humboldt County. Two communities that could benefit from this approach are seen in: 1) Klamath area and the Yurok reservation and 2) Orick.

The high-level study of Del Norte’s Public Safety Communications (PSC) capabilities and status provided the following information:

- Definite interest in exploring joint teletransportation /telecommunications planning
- PSC status and planning as viewed by members of the public safety community.
- Locations that may be suitable for location of broadband wireless radios and identification of licensed spectrum in use for PSC.

This information will be integrated into other teletransportation / telecommunications planning as we move into the future. In an era of tight funding we have an opportunity to conjoin efforts to leverage funds while at the same time continuing the expansion of infrastructure and services capabilities and capacities.

Funding opportunities include the California Advanced Services Fund, Headwaters Fund, United States Department of Agriculture/Rural Utilities Service (The Broadband Access Loan, The Distance Learning and Telemedicine program, The Community Connect Grant program, a variety of public safety communications grants, and other developing resources.

The consultant recommends continuing the progress and entering into a Phase IV planning effort. Phase IV would build on previous efforts and results to continue Del Norte teletransportation / telecommunications planning leadership in northern California, including:

- Continue efforts to increase high speed broadband access to all Del Norte residents who desire it (middle- and last-mile infrastructure), especially to non-urban residents and entities.
- Encourage collaboration among providers and other investors by seeking and fostering partnerships where available and appropriate.
- Assess and resolve any county-wide policies that may serve as barriers to broadband development (e.g., permits, building ordinances, etc.).
- Work with area educators and workforce development entities to evolve economic development opportunities through the use and adoption of broadband and computer technology (i.e., education and workforce preparation, distance education and life-long learning).
- Continue efforts to increase infrastructure in the region to facilitate creation of the Del Norte segment of a statewide e-health network.

It is also recommended that Del Norte continue participation in the Redwood Coast Connection (RCC) project, a project to aggregate broadband demand in 4 northern California counties. It is a detailed market profile of the region and will be useful for planning purposes. In more ways than one Del Norte is a leader in this collaboration.

In a word, progress! This is not hyperbole. Significant planning work is completed, more is required, and we already see results.

## **Del Norte County Teletransportation/Telecommunications Study Phase III - Work Element N**

### **Overview and Outcomes**

Results to date from Del Norte teletransportation/ telecommunications planning efforts are conducive to solving county and regional broadband supply challenges and include:

- Teletransportation / Telecommunications Strategic Plan to guide planning efforts
- State-of-the-art broadband offerings in the northern portion of the county
- Identification of demand building approaches
- Viability for broadband south of Crescent City and for regional route redundancy
- Solid working relationships with providers and regional partners.

### **Teletransportation/Telecommunications Strategic Plan**

Phase I set the stage and began the planning process. The Phase II work conducted under the auspices of the Tri-Agency Economic Development Authority (TAEDA, completed in June 2007) and funded through the Del Norte Local transportation Commission, resulted in a strategic plan with three broad goals adopted by the TAEDA, as follows:

#### Goal 1

Del Norte County's Teletransportation / Telecommunication Infrastructure and Services Match 21<sup>st</sup> Century Demands

#### Goal 2

Del Norte County's Workforce Is 21st Century Ready

#### Goal 3

Del Norte County Is A Full Participant in the 21<sup>st</sup> Century Economy *and the World Knows It!*

The strategic framework guides future efforts for broadband development and usage. It notably contains elements of supply and demand. On the supply side approaches are in place to guide development of additional infrastructure and services. Demand side approaches address usage through education and workforce skills development.

### **Infrastructure Improvements**

Throughout the Phase II every effort was made to “make things happen.” The Phase II planning helped accelerate activation by Charter of a 5 Gbps broadband connection that feeds in from the north from their Oregon coastal infrastructure. As a result Del Norte now has very high quality infrastructure that serves south to Crescent City and as far as Gasquet to the east on highway 199. This provides capacity for high-grade digital services for TV, broadband and, soon to be available, telephone service. Yes, there will be a competitive telephone service in Del Norte! The research and analysis derived from the planning process significantly contributed to this outcome.

Sutter Hospital, Hambro, government, many small businesses, and residents see the benefit of this BIG PIPE on a daily basis. Yet the served region has yet to fully exploit the opportunity. This is slowly but surely occurring as members of the served area gain realization of the impact of this enhanced level of services and further learn how to use it.

### **Importance of Education and Skills Training**

Helping the residents of the area keeping pace with telecommunication offerings and knowledge of how to use them will be an ongoing process. There is a coordinated support network that must be put in place and kept activated to ensure continued growth. We need to mount strong efforts help residents, entrepreneurs, and a variety of institutions understand how telecommunication is applicable as a teletransportation service. This also applies to the many quality of life services that can now be adopted in healthcare, education, government and public safety.

Otherwise put, area residents require a variety of forms of education and workforce skills development to keep pace with the constantly changing technology landscape. Only by taking advantage of the teletransportation / telecommunications services provided in Del Norte will there be a realization of the potential to successfully compete locally, regionally, nationally and globally. It's been said, "Without a purpose technology is worthless." The majority of Del Norte residents now have the same level of broadband services as in the big cities. Let's make sure we are using them. At time of this writing Del Norte has barely touched the enhanced capability they clamored for in the past.

### **Infrastructure Inventory**

Phase II efforts yielded a treasure trove of very detailed infrastructure documentation and mapping for the county consisting of microwave backhaul, antennas (cellular and microwave), telephone switch locations and routes, detailed radio information and other components. It is a surprisingly complex and rich provision of infrastructure and services for a rural county (see Appendix 1 for examples -- Figure 16 -- Antennas in Del Norte, Figure 17 -- Verizon Microwave Network and Telephony Switches, and Figure 17 -- Verizon Microwave Network and Telephony Switches).

This inventorying of infrastructure and services yielded valuable information that identified gaps in services, service quality issues, and possible infrastructure alternatives going forward. To this we can now add the Public Safety Communications (PSC) information gained in this planning phase.

## **Phase III Planning**

### **Four Planning Aspects**

The Phase III efforts move Del Norte closer to achieving those goals. Four aspects were the focus of expanding infrastructure, services, and utilization, as follows:

- 1) Plan for Southern Del Norte County initial broadband service (i.e., broadband from Crescent City to Klamath)

- 2) Plan for countywide route redundancy of telecommunications services (voice and broadband)
- 3) High-level study of public safety related telecommunications status and opportunities.
- 4) Assist with implementation of other recommendations of the adopted strategic plan recommendations.

## Meetings and Interactions

Phase III efforts included multiple meetings and discussions with providers, local agencies and Tribal Governments. By working closely with providers throughout the planning process we now see additional strong interest in providing service south of Crescent City down to Eureka and potential for developing multiple fiber legs toward our goal of regional of route redundancy.

Teletransportation / telecommunications planning requires widespread regional collaboration and cooperation and planning efforts on behalf of Del Norte County. It must range beyond the county's borders. To that end a number of contacts in and out of the county were required. These individuals and organizations provided some level of information, advice, and listened to the consultant's ideas for moving forward. We may have missed some in the following list. Please accept apologies in advance for any omissions, errors in spelling or titles.

Meetings and direct interactions at some level included the following parties (in alphabetical sequence on last names):

Tim Athey, Operations Commander, County of Del Norte  
 Phil Barker, IT Director, Curry County  
 Ray Baum, Oregon PUC  
 Barbara Bowers, Budget Officer, Trinity County P.U.D.  
 Cathy Britain, Telemedicine Consultant, CS Britain consulting  
 Susan Brown, Economic Development Director, Curry County  
 Tamera Buchanan, Executive Director, Del Norte Local Transportation Commission  
 Terri Camarena, Tribal Administrator/COO, Elk Valley Rancheria  
 Rick Coleman, General Manager, Trinity County P.U.D.  
 Russ Crabtree, Tribal Administrator, Smith River Rancheria  
 Randy Crawford, Chief, Fort Dick Fire Protection District  
 Jacqueline Debits, Economic Development Coordinator, Humboldt County  
 Earle Desomber, Plant Manager, Charter Communications  
 David Finigan, Supervisor, County of Del Norte and Tri-Agency Economic Development Authority  
 Dero Forslund, County Administrator, Trinity County  
 Jay Freeman, V.P. Controller, Hambro  
 Jeannine Galatioto, County Administrative Officer, County of Del Norte  
 James Glazer, Conceptual Artist, Del Norte  
 Keith Grunberg, Charter Communications  
 Kevin Hartwick, Cholwell, Benz & Hartwick  
 Denice Helwig, Special Assistant to the President, Humboldt State University  
 Cheri Howard, Community development, Del Norte County  
 Chris Howard, President, Crescent City/Del Norte Chamber of Commerce

Onno Husing, Executive Director, Oregon Coastal Zone Management Association  
 Jeramey James, IT, Smith River Rancheria  
 Bradley Kuhnert, Charter Communications  
 Lucie LaBonte, Commissioner, Curry County  
 Amanda Mager, Assistant Planning Director, Yurok Tribe  
 Dale Miller, Tribal Chairman, Elk Valley Rancheria  
 Tina Nerat, Neratech, Humboldt County  
 Georgia Nowlin, Supervisor, Curry County  
 Brian O’Callaghan, Deputy Executive Director, Rural Human, Services, Inc.  
 Gary Nailon, Chief Executive Officer, Elk Valley Rancheria  
 Peter Pennekamp, Executive Director, Humboldt Area foundation  
 Rick McGee, Owner, Telecommunications Companies  
 Edwin Parker, PhD., Telecommunications Consultant, Parker Communications  
 Buzz Parlasca, Chief, Gasquet Fire Protection District  
 Dave Parris, Chief, Yurok Department of Public Safety  
 Doug Plack, Police Chief, Crescent city  
 Rollin Richmond, President, Humboldt State University  
 Paul Romero, IT, Yurok Tribe  
 Richard Ryan, Hunter Communications  
 Ron Sandler, President, Del Norte Ambulance  
 Marilyn Schafer, Supervisor, Curry County  
 Kelly Schellong, Crescent City Council  
 Grant Scholes , Director, Marketing and Public Relations, Sutter Coast Hospital  
 Dave Short, Battalion Chief, CalFire  
 Mike Souza, Director of Information Technology, Sutter Coast Hospital  
 Connie Stewart, Senior Field Representative, Patty Berg, Assemblywoman, 1<sup>st</sup> District CA  
 Michael Sullivan, County of Del Norte, Tri-Agency Economic Development Authority,  
 Local Transportation Commission  
 John Thompson, Trees of Mystery  
 Maria Tripp, Council Chair, Yurok Tribe  
 Steve Wakefield, Chief, Crescent Fire Protection District  
 Rewiti Wiki, Executive Director, Crescent City/Del Norte Chamber of Commerce  
 Allen Winogradov, Coordinator, Del Norte Office of Emergency  
 Richard D. Young, PhD, CEO/Harbormaster, Crescent City Harbor District

One might readily and accurately say, “It takes a community to build a broadband infrastructure and services!”

### **Notes on Project-related Mapping**

Mapping is used to determine route feasibility. Many hours were invested driving and walking potential routes. A GPS device helped capture accurate waypoints along routes. These were then imported into a topographic mapping product (DeLorme version 7.0) that allowed for creation of layering of routes onto maps. Please note that these are not detailed engineering maps but serve to demonstrate viability of routes.

Telecommunications companies can gain access to maps from power companies that are very detailed right down to the location of poles. Why do this mapping then? Experience teaches us

that often until we can demonstrate feasibility in a project, nothing happens. In addition to maps we also have to bring an idea of potential demand (customers). This is all normal business practice when advocating for an investment in rural broadband.

In this report we have limited the reproduction of the detailed maps. Two simple reasons drive this decision: 1) the detailed maps are large and lose quality rapidly when condensed for 8.5” x 11” paper -- breaking them into smaller readable maps would make this report very thick) and 2) this is a planning report and not a detailed engineering effort – sufficient detail for planning purposes is provided through the narrative and a few selected maps.

### A Coastal Broadband Ladder to the Future

For Del Norte and the surrounding region we offer a vision of building a “Coastal Broadband Ladder to the Future.” In the following graphic (see Figure 2) you can get a sense of that “ladder”. The rails of the ladder are 101 and I-5. The rungs are the connecting routes between 101 and I-5. In the graphic you will note rungs and rails in red (CC to Medford, CC to Eureka, Eureka to Redding, and Fort Bragg to Ukiah). These are the missing legs for the region. In the graphic you will also note that some of the rungs are in place (there are a number of additional connecting paths in Oregon not shown).

In this planning phase we address the route between Crescent City and Medford and Crescent City to Eureka. We briefly touch on the Eureka to Redding connection. We remain mindful that this is a regional matter and that we must be supportive of all the missing paths. For this reason we need to continue active involvement in collaborations with others in the region.



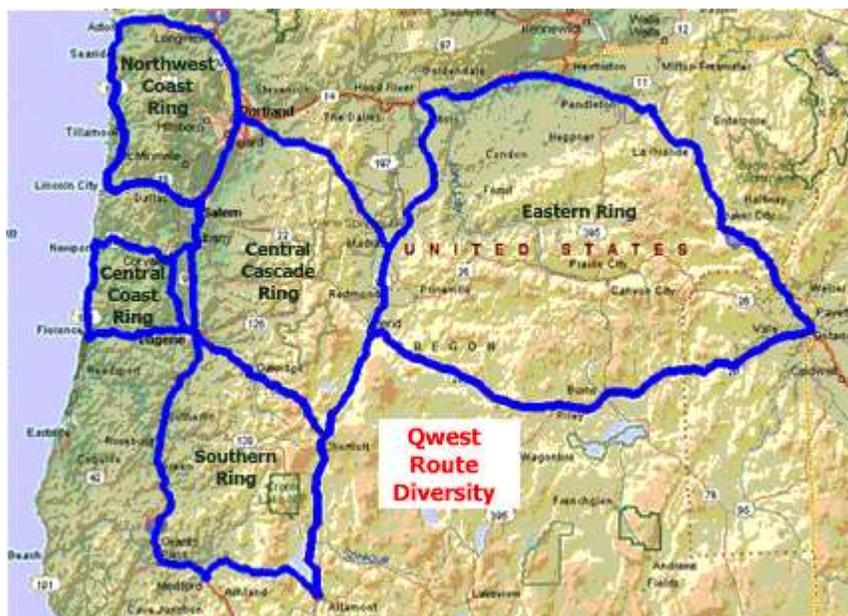
**Figure 2 -- Broadband Ladder to the Future**

## Telecommunications Route Redundancy

Del Norte and Curry counties would both benefit from route redundancy. Route redundancy is a phrase that implies that telecommunications will be always available in the event of some form of interruption in a network serving an area. A first step toward route redundancy may be that of route or path diversity<sup>1</sup>. Path diversity is discussed later in the context of the proposed coast route.

Route redundancy is critical to those businesses and institutions (e.g., healthcare) that require non-stop communications capabilities.

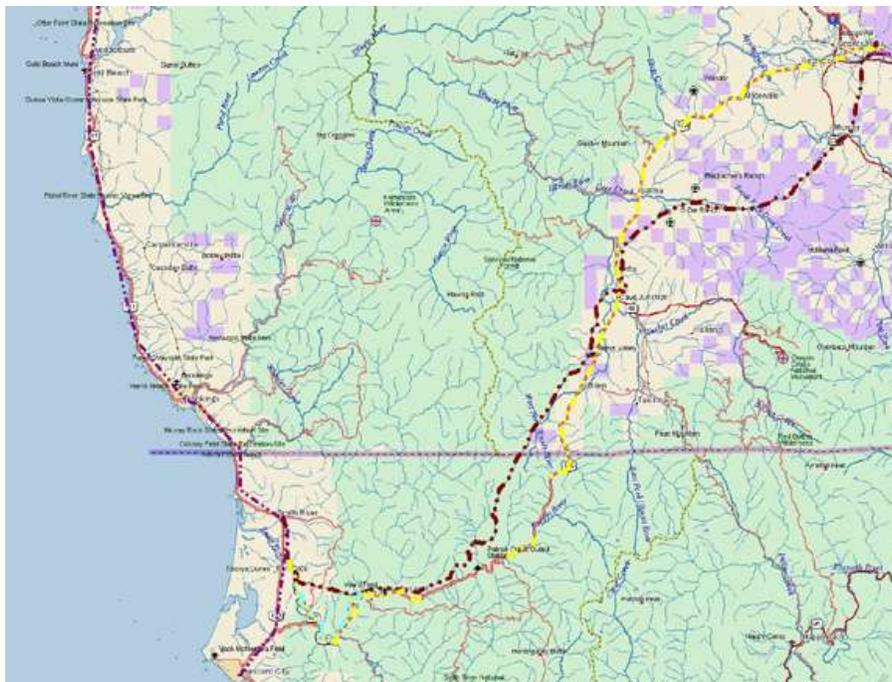
*Route redundancy* generally means that you can buy service from single provider such that behind the scenes and without any intervention by the customer, telecommunications services remain uninterrupted in the event of a network failure anywhere in that provider's network serving a customer base (region) due to automatic switching by the provider. That is the ideal situation and there are many examples of that approach in use today. One example is the 5 large Qwest rings in Oregon. There are a number of other redundant rings in Oregon in addition to the Qwest infrastructure shown in the following map (see Figure 3). Colorado is another state with many route redundant rings. When you look at a map of Colorado's rings it looks "like a bowl of Cheerios."



**Figure 3 – Oregon Qwest Route Redundancy Example**

Wherever possible let's use existing right of ways (ROW). Generally speaking these are well-established power or telephone distribution. This is often the least cost approach that uses existing poles and conduit. Fortuitously, these ROWs exist on or near 197/199 or 101 (see Figure 4 -- note that Charter feeds down the coast into Crescent City).

<sup>1</sup> The phrase "circuit diversity" is also used. I have avoided that phrase here as it is a carry-over from the circuit-switched world of the rapidly fading public switched network. However, the image conjured up is the same.



**Figure 4 -- Potential Highway 199 Route**

### **Potential for Use of PacifiCorp High-Power Transmission Infrastructure**

The consultant verified high power transmission infrastructure of 73 miles to which fiber might be installed (see Figure 4-- dark dash-dot-dot line). A variety of roads provide close access to the high power transmission infrastructure. These consist of forest service roads and roads like the Old Gasquet Road. It is extremely rugged terrain.

### **Potential for Use of Local Power distribution and Telephony Infrastructure**

Considerable local power (PacifiCorp) and telephone (Verizon, Citizens-Frontier, Qwest) distribution infrastructure exists along the highway (see Figure 4 -- yellow dash-dot-dot line) that could be used for fiber attachment. Charter is already on that route from 101 on 197 up to Gasquet on 199. The Charter infrastructure may be sufficient to handle broadband back haul needs in addition to serving their customers up to Gasquet. That's an engineering detail beyond the scope of this planning effort.

From Gasquet to the tunnel on 199 there are a few patches of local distribution seen. We were not able to verify how they are hooked into the high-power transmission infrastructure along that span (it's very rugged terrain). There are scant residences of note on 199 between the Lado Del Rio / Pioneer Road clusters and the north end of the tunnel. That distance is estimated at 16 miles.

From the north end of the tunnel there appears to be continuous local power distribution infrastructure all the way to I-5 (47 – 50 miles – see Figure 5 for a detail view of the border crossing and start of the local power distribution and telephony – yellow line).

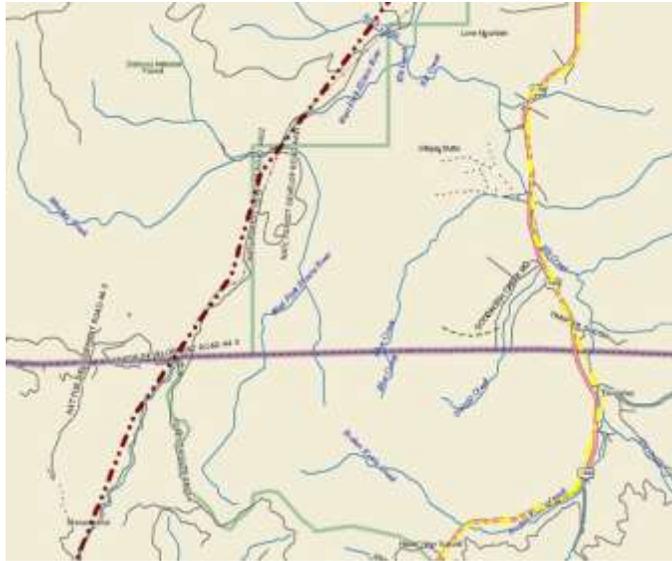


Figure 5 -- California/Oregon Border Detail

Interest in providing local broadband from Gasquet to O’Brien likely is very low. So from Gasquet to O’Brien (Citizens-Frontier territory) one could utilize the high power transmission route until it gets back to closer proximity with the local power distribution infrastructure, possibly in the Gilligan Creek/Rock Creek area. Or just stay on the High power line infrastructure to the O’Brien area (see Figure 6).

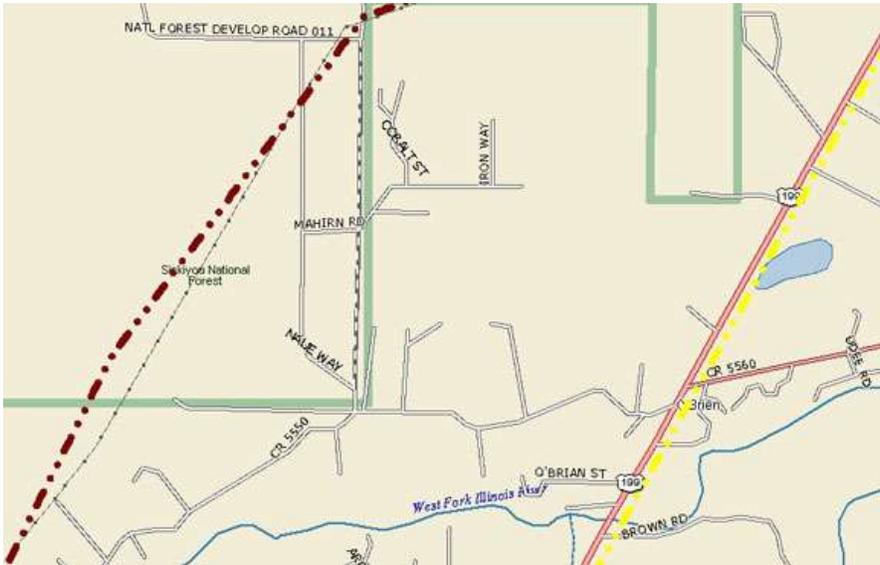


Figure 6 -- 199 Detail at O’Brien

**Provider Interest**

A first consideration for route redundancy would be to encourage Charter to build and operate the connection between Crescent City and the I-5 corridor. Charter seems to be an obvious candidate for this approach given their recent investment to reach down the Oregon coast to the Crescent City area (see Figure 7). Verizon has fiber from the Bandon area to the Oregon border but they demonstrate no interest in any investment in the area. Side-of-the road discussion with



Verizon maintenance staff indicate they often feel they are “begging corporate” for money just to keep the existing infrastructure viable.

What Charter has created is a dangling route subject to interruptions by nature or humans. The 101 coast is noted for its heavy weather (wind) and mudslides that often take the infrastructure out of service. Many examples can be cited.

**Figure 7 -- Charter Network into Crescent City**

At this time two providers have expressed interest in the 197/199 route redundancy solution: Charter Communications and Hunter Communications. Charter appears to have the most resources to bring to this project and it seems a natural fit with the projected growth for their infrastructure. Planning efforts going forward need to encourage interest by ALL interested parties.

Helping Charter to understand the opportunities they gain by investing in completing their 199 route to the I-5 corridor would be consistent with planning efforts to date. It would create a win-win for the company and the region.

Hunter Communications is growing rapidly with many miles of redundant fiber in Klamath, Jackson and Josephine counties in southern Oregon. Hunter has expressed serious interest in expanding their footprint into northern California.

Both of these companies will be provided copies of this report and will be offered maps and additional accrued regional knowledge on request. The consultant has excellent ongoing relationships with both companies.

Estimates for this route are at \$3 – 5 MM. This is a very rugged route. A detailed engineering study of the route would determine actual investment amounts.

## **Planning for Southern Del Norte County Broadband Service**

### **Building a Coastal Route Using Existing Power Transmission Infrastructure**

Today the only coastal telecommunications route is provided by Verizon microwave infrastructure (see Figure 17 -- Verizon Microwave Network and Telephony Switches). This backhaul capability is provided via microwave radio transmission that is at full capacity. There is no fiber-based backhaul infrastructure on the coast from Crescent City to Eureka.

The consultant verified above ground power transmission infrastructure of 63 miles to which fiber might be installed (see Figure 8). An additional 29 miles of the route appears to have buried power, most likely in conduit. Cost of building this route is estimated at between \$3.5 to 4 MM.

The above ground distribution is readily accessible throughout the route with a couple of more difficult spans to address. The buried distribution requires additional engineering study to assess viability for pulling fiber through conduit.

In order to provide sufficient business justification for investment in broadband services south of Crescent City in Del Norte County it will be necessary to build from Crescent City to Eureka.



**Figure 8 -- Potential Coast Route**

### **The Continuing Challenge -- Low Population Density**

Investment in telecommunications infrastructure typically gauges homes and/or businesses passed to assess viability of a business model. The area south of Crescent City to Klamath in the 101 corridor is very sparsely populated (see Figure 9).



**Figure 9 -- Del Norte Census Tract Map<sup>2</sup>**

In particular we look at census tract 2.03 with 1,203 residents and 592 households. The population density is 8.9 per square mile and 4.4 houses per square mile (see Figure 10).

Geographic area	Population	Housing units	Density per square mile of land area	
			Population	Housing units
Del Norte County	27,507	10,434	27.3	10.4
<b>CENSUS TRACT</b>				
Tract 1.01	3,784	1,715	3,739.4	1,694.8
Tract 1.02	3,488	1,434	396.0	162.8
Tract 1.03	8,667	3,547	607.9	248.8
Tract 2.01	6,592	1,314	183.7	36.6
Tract 2.02	3,773	1,832	4.6	2.3
Tract 2.03	1,203	592	8.9	4.4

**Figure 10 -- Del Norte Population by Census Tract<sup>3</sup>**

This is not an attractive business scenario from a large retail broadband provider/investor point of view.

<sup>2</sup> U. S. Census, American FactFinder, Thematic Maps, <http://factfinder.census.gov/>

<sup>3</sup> GCT-PH1: Population, Housing Units, Area, and Density: 2000, Data Set: Census 2000 Summary File 1 (SF 1) 100-Percent Data, Geographic Area: Del Norte County, California -- Census Tract, <http://factfinder.census.gov/>

If we add in the segment in Humboldt County down to the Arcata area (census tracts 11, 102, 103, and 104), the business model improves considerably (see Figure 11 and Figure 12). Here the business model we refer to is one of a wholesale vs. retail opportunity.



Figure 11 -- North Humboldt County Census Tracts<sup>4</sup>

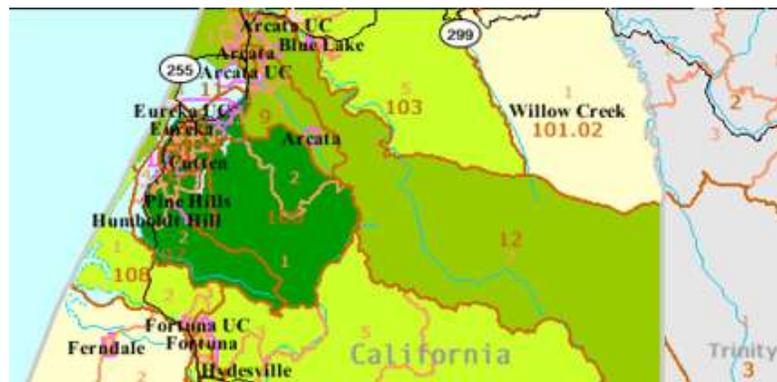


Figure 12 -- Mid Humboldt County Census Tracts

<sup>4</sup> U. S. Census, American FactFinder, Thematic Maps, <http://factfinder.census.gov/>

Geographic area	Population	Housing units	Density per square mile of land area	
			Population	Housing units
Humboldt County	126,518	55,912	35.4	15.7
CENSUS TRACT				
Tract 11	7,617	3,266	385.4	165.2
Tract 101.01	2,633	1,001	18.7	7.1
Tract 101.02	2,804	1,672	3.6	2.1
Tract 102	2,825	1,678	11.7	7.0
Tract 103	3,608	1,606	14.4	6.4
Tract 104	3,488	1,383	248.0	98.3

**Figure 13 -- Population by Census Tract<sup>5</sup>**

### Wholesale vs. Retail Business Models

While we advocate for residential (retail) services, considerable best practices and results show that by first establishing anchor tenants through a wholesale offering brings the opportunity for local and regional investors to serve the retail markets. Otherwise put, getting routes in place for middle-mile and backhaul provides the opportunity for smaller markets to gain access to the outside world. Often larger companies do not see these smaller markets as opportunities due to the increased cost of serving retail customers. Also many companies serving smaller markets do not have the resources to build out long haul access to the Internet but they are very savvy in addressing their immediate community's needs.

In the telecom world of investing it is often difficult to predict just what a provider might actually do. The scenario outlined in the previous paragraph is a proven model for proceeding and fits this route.

Aggregated population for the 101 corridor makes for a more attractive investment for a wholesale business model. In this model a large provider or investor with "deep pockets" would build the infrastructure and sell services to ISPs larger institutions and businesses along that route. Most of these wholesale customers would be located in Humboldt County.

Del Norte County wholesale customers would be located along the 101 corridor and might include motels, healthcare, public safety, financial institutions, Trees of Mystery, Yurok Tribal headquarters and some professionals operating out of their homes. This detailed cataloging of potential customers is a next planning step for addressing first-mile (AKA: last mile) completion and would include mapping their locations and willingness to contract broadband services if offered.

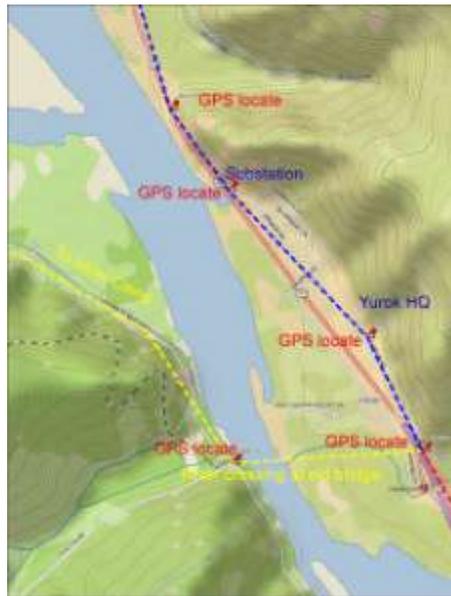
<sup>5</sup> Population by Census Tract, GCT-PH1: Population, Housing Units, Area, and Density: 2000, Data Set: Census 2000 Summary File 1 (SF 1) 100-Percent Data, Geographic Area: Humboldt County, California -- Census Tract, <http://factfinder.census.gov/>

## Bringing Services to Two Communities on 101

Having access to the Internet requires backhaul routes that provide connection to the outside world (i.e., to the Internet infrastructure). Two examples of how having a coastal route in place to bring broadband are seen in: 1) Klamath area and the Yurok reservation and 2) Orick.

### Klamath area and Yurok reservation

The Klamath area and Yurok reservation largely are without any broadband service today. Satellite provides that access for scant few but it is quite expensive for many living in the region.



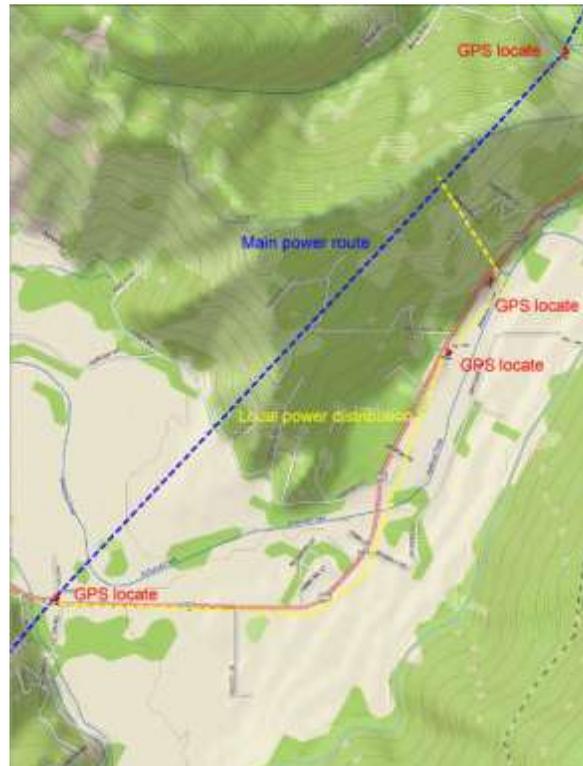
**Figure 14 -- Klamath Power Transmission Detail**

One possibility is for a local entity to establish itself as a wireless broadband provider. This might be an opportunity for the Yurok Tribe. With the coastal route in place they would have high quality access to backhaul to the Internet. Architecting a series of wireless hops up the river is well within technical and financial capabilities, although not without the usual challenges and due diligence. Not only could the Klamath area be served but broadband services could also be provided up river into the area between Johnsons and Weitchpec, possibly beyond. These services could include broadband and VoIP.

Yurok IT staff have already explored some this option and submitted a grant to the USDA rural Utilities Services (not approved in the first application). A serious barrier is access to the Internet via a quality backhaul service. The coastal route provides that access and they become a major anchor tenant on the route.

## Orick

The Orick potential previously has undergone thorough analysis.<sup>6</sup> The residents of the Orick area are further burdened even in the use of dial-up as all calls to a dial-up ISP are long distance calls. Once again a residential and business opportunity emerged. The challenge again comes from lack of a backhaul service provider. More than one wireless broadband provider has expressed interest in serving the Orick area.



**Figure 15 -- Orick Power Transmission Detail**

### Coast Route Enables Path Diversity

*Path diversity* may be a reasonable first step on the way to route redundancy. The ability to purchase network services from two separate companies each with its own unique path to your facility can provide relief. If one goes down, the customer intervenes and switches to the other provider. Equipment can be purchased by the customer and installed on site to achieve this. It is not the desired or ideal solution but it accomplishes the same end result for the customer, continuous communications. For this to occur, multiple providers must service the same area but using different paths. While this may not be the ideal or desired solution, it works.

For the foreseen future, and given the build-out of the coast route, path diversity could be accomplished. The coast route would meet the ATT big pipes in Eureka. This means that an entity might buy access on the coast route and a back up path on the ATT network, and vice-

<sup>6</sup> Orick Wireless Broadband Business Plan, Tina Nerat, Neratech, January, 2007, <http://www.neratech.net/docs/Orick.pdf>

versa. This path diversity solution probably has the greatest implications for Humboldt County entities but may have merit for Del Norte customers.

While not the ideal solution, it is a very viable solution that provides a solid interim step to fault tolerant processing for the region.

### **Provider Interest**

No evidence exists so far that Verizon has any intention of upgrading their backhaul infrastructure between Crescent City and Trinidad where they pick up backhaul service from ATT.

Hunter Communications has expressed some interest but likely lacks the resources today to make it happen. We will continue to work with Hunter to assist them in their growth plans. *[Note: Hunter Communications likely will make significant investment in the region in middle-mile and last mile enterprise services.]*

Charter shows serious interest in examining the business viability of this route. It fits with long-range plans to service wholesale customers in the region. In a very recent meeting in Humboldt County coordinated by the consultant Charter and Humboldt county community leaders met. We had a frank discussion of what it takes for Charter to make an investment decision. Area representatives also presented solid business opportunities for the wholesale model to be viable. Additionally, the opportunity for using the California Advanced Services Fund and Headwater funding available in Humboldt County and in concert with that county's economic development assistance opportunities.

The consultant will continue to be available to any provider or investor interested in completing this route. Map work for the route already has been provided to Charter and Hunter. A copy of this report will be made available to them as well.

### **High-level Public Safety Communications Study**

The high-level study of Del Norte's Public Safety Communications (PSC) capabilities and status provided the following information:

- Definite interest in exploring joint teletransportation /telecommunications planning
- PSC status and planning as viewed by members of the public safety community.
- Locations that may be suitable for location of broadband wireless radios and identification of licensed spectrum in use for PSC. *Note: Related maps and other details are included in a separate report.*

This information will be integrated into other teletransportation / telecommunications planning as we move into the future. In an era of tight funding we have an opportunity to conjoin efforts to leverage funds while at the same time continuing the expansion of infrastructure and services capabilities and capacities. Too often we do not consider the potential for integrating telecommunications planning efforts. As a result opportunities for maximizing investments can be missed.

## **Funding Opportunities**

Too often in this space we see long lists of grant programs that often bring marginal chance of being adopted. We resist the temptation to follow that trend and instead list a few that are more likely vehicles for project funding.

### **California Advanced Services Fund (CASF)**

An allocation of \$100 million is designated for support of broadband deployment projects in accordance with the principles and processes under the “California Advanced Services Fund” (CASF) program and will be set initially at \$50 million per year. A process is in place for the submission of proposals by qualified telephone corporations to seek funding available through the CASF. Deadline for the first round of proposals is July 3, 2008 (modified from the order).

A separate showing is required for each proposed broadband project. For this purpose, a single broadband project is defined as deployment encompassing a single contiguous group of CBGs (or portions of CBGs, as applicable). The following definition is reasonable to adopt as the benchmark for evaluating applications, and as a threshold for defining whether an area is unserved or underserved by broadband facilities.

If an area is not served by any form of broadband, such that internet connectivity is available only through dial-up service, that area is unserved. Where area is served by broadband, but where no facilities-based provider offers service at speeds of at least 3 MBPS download and 1 MBPS upload, that area is considered underserved.

Parties may seek funding for more than one project within a single submission, but must provide separate supporting documentation for each project. The scoring criteria shall include consideration of ranking for “uneconomic” areas that are less likely to be served without public funds.

These funds could be a resource to provision of broadband services to Klamath and Orick communities with implications for Yurok Tribe populations up to the Weitchpec area. To enable such connectivity middle-mile connectivity would need to be put in place. This would be the Crescent City to Eureka route.

<http://www.cpuc.ca.gov/PUC/Telco/announcingcasf.htm>

### **Headwaters Fund**

The Headwaters Fund is a public fund for the advancement of economic and community development in Humboldt County. The Headwaters Fund offers business loans, loans/grants for infrastructure projects, and economic development grants via the following three programs:

- The Revolving Loan Fund makes loans to businesses and non-profit organizations in Humboldt County. These loans fill gaps in the market for available financing, while maintaining sound banking practices. Loan applicants apply directly to contracted financial institutions, not the Headwaters Fund itself.

- The Community Investment Fund is a loan and grant program for infrastructure and related projects that will result in permanent and tangible economic benefits to the community.
- The Grant Fund provides grants for projects benefiting base industries in Humboldt County. Non-profit organizations and government jurisdictions in Humboldt County are eligible to apply.

These funds could be a resource to building the Crescent City to Eureka route as there is great economic and societal value to Humboldt County in the completion of this route.

<http://www.theheadwatersfund.org/>

### **United States Department of Agriculture/Rural Utilities Service (USDA/RUS)**

The Broadband Access Loan program provides loans for funding the costs of construction, improvement, and acquisition of facilities to provide broadband service to eligible rural communities.

<http://www.usda.gov/rus/telecom/broadband.htm>

The Distance Learning and Telemedicine program continues its charge of bringing electronic educational resources to rural schools and improving health care delivery in rural America.

<http://www.usda.gov/rus/telecom/dlt/dlt.htm>

The Community Connect Grant program provides financial assistance to eligible applicants that will provide currently unserved areas with broadband service that fosters economic growth and public safety services.

<http://www.usda.gov/rus/telecom/commconnect.htm>

Each of these programs has potential to assist with funding to bring broadband to Del Norte. The proposal request requirements are somewhat complicated, demanding, and are not quickly produced. Sign up for fund availability notices from [www.grants.gov](http://www.grants.gov).

### **Public Safety Communications**

These funds derive from several sources and range from Homeland Security to the Health and Human Resources Administration. Sign up for fund availability notices from [www.grants.gov](http://www.grants.gov).

### **Other sources**

There has been some early and preliminary discussion with county supervisors about the possibility of utilizing county bonding authority to assist with funding of projects. These discussions are in the context of completing the 199 route redundancy project.

### **Assistance with Implementation of Other Recommendations of the Adopted Strategic Plan**

Progress under this topic did occur somewhat but not to the extent anticipated. This would have been a pro bono contribution to Del Norte's future by the consultant. The offer to assist still

stands. The intent was first and foremost to help stand up the Information Technology Advisory Committee (ITAC -- recommended in the adopted Teletransportation / Telecommunications Strategic Plan) so as to have an advisory body working on this topic in the county in addition to the work of the consultant. It is very critical to have community ownership of the responsibility for advancing IT related matters of importance to the county's economic development future.

The consultant was also available to assist county-wide with entities seeking consultation on demand side matters (i.e., education programs, workforce skills development, etc. – please refer to the Strategic Planning document).

Key to formation of the ITAC would be the identification of a local leader, for example an economic development director as in Curry County. With the TAEDA agreement to stand up such a position the consultant expects to see progress on the formation of this advisory committee over the next year.

The consultant did participate in the following:

- Economic Development Conference (summit), Del Norte Chamber of Commerce
- Tri-Agency Economic Development Authority strategic planning session
- Redwood Technology Council

The consultant eagerly anticipates providing certain pro bono consultation on matters relating to the use of teletransportation / telecommunications matters. At this writing Del Norte has barely touched the broadband capacity available to it.

### **Summary**

In a word, progress! This is not hyperbole. Significant planning work is completed, more is required, and we already see results.

The vision of a Coastal Broadband Ladder to the Future is now a shared vision in the region.

Providers are demonstrating serious interest in investing in the region to enable 197/199 route redundancy and a coastal broadband from Crescent City to Eureka. Reality and experience tells us that seeing the actual implementations are somewhere in the 3 to 5 year timeframe. But without the development of relationships and bringing forward solid qualified information, we would not be seeing this level of interest. We need to reinforce continually the merit of these investment opportunities.

On a less encouraging note we continue to be disappointed at the lack of documented interest by Verizon in expanding their investment in the county. But where one provider does not meet the rapidly growing needs of a population, a market-oriented approach encourages investment by others. This is very much the case in Del Norte with multiple providers now expressing strong interest in making investments in the county.

Taking advantage of the broadband capacity improvements in the north county needs further encouragement. It is simply not enough to just have the infrastructure. It must be used. We need

to look to increased emphasis on this factor. The usage rate is being watched carefully and will be used to gauge whether or not additional investment is to be made.

One unanticipated result has been the documenting of the power line feeds from Oregon into Del Norte and down the coast to Eureka.

Overall we have seen good progress and forward momentum. It will be critical to keep the effort underway. Teletransportation / telecommunications development is a complex undertaking, especially in rural regions, and requires patience, perseverance and a thoughtful understanding of how to make things happen.

## **Recommendations**

### **Conduct Phase IV Planning Activities**

Phase IV would build on previous efforts and results to continue Del Norte teletransportation / telecommunications planning leadership in northern California, including:

- Continue efforts to increase high speed broadband access to all of Del Norte (middle- and last-mile infrastructure), especially to non-urban residents and entities.
- Encourage collaboration among providers and other investors by seeking and fostering partnerships where available and appropriate.
- Assess and resolve any county-wide policies that may serve as barriers to broadband development (e.g., permits, building ordinances, etc.).
- Work with area educators and workforce development entities to evolve economic development opportunities through the use and adoption of broadband and computer technology (i.e., education and workforce preparation, distance education and life-long learning).
- Continue efforts to increase infrastructure in the region to facilitate creation of the Del Norte segment of a statewide e-health network.

### **Continue RCC Collaboration**

Currently underway through the Redwood Coast Connection (RCC) Broadband Demand Aggregation Pilot Project<sup>7</sup> is additional detailed data collection and mapping that will provide the basis for developing the next level of detailed infrastructure planning. In particular this data and mapping will provide the basis for development of business

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<sup>7</sup> The RCC pilot project is being conducted under the guidelines of the California Broadband Task Force (CBTF) and funded through the California Emerging Technology Fund (CETF), Humboldt Area Foundation (HAF) and others. The consultant authored the project concept statement and coordinated development of the project plan approved by the CETF. The survey used to acquire the RCC broadband demand data is based on the survey developed by the consultant that was used in Del Norte. The project is intended to develop detailed broadband market information across four northern California counties: Del Norte, Humboldt, Mendocino and Trinity. At time of this writing there is NO plan for follow-up use of the data but development of such may occur in the year following completion of the report (late summer 2008). This could result in a lag between release of the information and its usage.

model alternatives for middle and last mile broadband service delivery in non-urban areas of the county. In a number of ways the effort in Del Norte is ahead of the RCC effort.

### Appendix 1 – Examples of Infrastructure Mapped in Phase II

Please note that all maps and other teletransportation / telecommunications information are available for use by others. The reports are published online at [www.callineb.com/documents.htm](http://www.callineb.com/documents.htm). Detailed poster-sized maps can be obtained in digital formats at no cost by contacting the consultant at [jirwin@mind.net](mailto:jirwin@mind.net) or 541.664.2456.



Figure 16 -- Antennas in Del Norte



Figure 17 -- Verizon Microwave Network and Telephony Switches



Figure 18 -- US Cellular Microwave

## Appendix 2 – Letter Acknowledging Regional Collaboration Efforts



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5 May 2008

Mr. Michael Sullivan, Chair  
Del Norte Local Transportation Commission  
1225 Marshall Street, Suite 8  
Crescent City, CA 95531

Dear Chair Sullivan,

I met John Irwin four years ago when I went to Ashland representing the Redwood Technology Consortium (RTC). I was meeting with the Southern Oregon Telecommunications and Technology Council (SOTTC) to share best practices of our technology advocacy organizations. I was an RTC board member and John was an SOTTC board member. After the meeting we started a dialogue about our adventures with broadband projects. Friendship and collaboration have grown from that chance meeting as we both find ourselves involved in State of Jefferson broadband projects.

As John started working on the Teletransportation /Telecommunication project in Del Norte County, we started communicating even more frequently, since I have been working in Humboldt County on broadband projects. Both John and I realize that broadband is a regional issue in rural areas. We have opened our address books to each other and have made introductions to key people as needed. John and I both like working in teams, but often find ourselves working alone on projects. We often review ideas and scenarios openly with each other, knowing confidentiality will be respected.

John and I now find ourselves working together on Redwood Coast Connect, a four-county broadband project. For the past year or more we've been in at least weekly, if not daily contact, as we work through the landscape of broadband on the Redwood Coast. We each have different experiences and putting our heads together is making a difference assessing the infrastructure and working with providers and policy makers to improve the broadband landscape in our region. I could not be successful in this project without John and his knowledge of Del Norte County and expertise in telecommunications.

Del Norte County is fortunate to have John working on broadband to improve all aspects of our lives: economy, health care, education, and more. I hope John and I will be collaborating for years to come.

Regards,

Tina Nerat

cc: John Irwin  
Peter Pennekamp, Executive Director, Humboldt Area Foundation  
Dave Finigan, Chairperson, Del Norte County Board of Supervisors  
Tamera Buchanan, Director, Del Norte Local Transportation Commission