

Navajo Nation ISP ARRA Proposal 14 August 2009

Executive Summary

8. Executive Summary of Project for BIP and BTOP: Please provide an Executive Summary of the proposed Project. The executive Summary should be a brief description of the Project, and address the following topics. [Three Page Limit]

- a) Opportunity the proposed system seeks to address.
- b) A general description of the proposed funded service areas (location, number of communities, etc.)
- c) Number of households and businesses passed.
- d) Number of community anchor institutions, public safety entities, and critical community organizations passed and/or involved with project (e.g., health care, education, libraries, etc.).
- e) Proposed services and applications for the proposed funded service areas and users.
- f) Approach to addressing the non-discrimination and interconnection obligations
- g) Type of broadband system that will be deployed (network type and technology standard).
- h) Qualifications of the applicant that demonstrate the ability to implement and operate a broadband infrastructure, and/or be a sustainable broadband services provider.
- i) Overall infrastructure cost of the broadband system.
- j) Overall expected subscriber projections for the project.
- k) Number of jobs estimated to be created or saved as result of this project.

a) Opportunity the proposed system seeks to address.

The Navajo Nation, the vast Native American homeland stretching across Northeast Arizona, Southeast Utah, and Northwest New Mexico, has an opportunity to partner with the United States Government's ARRA broadband stimulus program to provide its citizens with access unparalleled in the history of the Nation to the rest of the world via broadband Internet access. This proposal will bring high speed Internet to 95% of the Navajo Nation in 18 months via satellite-backhauled WiMAX.

The three major benefits of the Navajo Nation satellite-backhauled WiMAX towers are implementation speed, infrastructure reusability, and sustainability.

- a) Speed is critical to getting both the Navajo Nation, as well as all America, Internet access for stimulating innovation to build our collective economic strength to resist future global economic malaise. The Navajo Nation plan to erect WiMAX towers backhauled with satellite is beautiful in its simplicity. Erect the tower, connect to the satellite, install user modems, and it's done. Depending on the number of towers, the first service could be implemented within 90 days of receipt of funding, and the last 30 to 90 days later. If over 100 towers are erected
- b) Satellite-backhauled WiMAX uses universal technology such that if ever another connection is available to the tower, such as fiber or wire, the higher bandwidth technology could be connected to the same WiMAX structure with no change of equipment necessary. Therefore, the satellite connection initially set up to backhaul the WiMAX, becomes a backup solution to provide continuity should the land-based technology be severed. Similarly, the universality of the equipment is extended to suppliers. While one supplier may supply the satellite backhaul, once fiber or wire is strung to the tower, any other supplier may provide

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broadband service over the same tower electronics, again with no change of equipment necessary.

- c) Fiscal sustainability enhances the infrastructure reusability. Rather than relying on service from external suppliers, the Navajo Nation will service all customer accounts with its own service personnel. Personnel expenses are expected to be paid from day one with service fee revenues, derived from the gross revenue resulting from the four rate plans. The Navajo Nation can conservatively expect the four rate plans, which range from \$50 per month for a MIR down/up of 1.5M/384k and no CIR, to \$150 per month for a MIR down/up of 3M/640k and CIR of 64k/64k, to generate management fees from at least \$250,000 resulting from 1900 users in Year 1, to \$1.2 million from 9500 users in Year 5. And those numbers represent 50% adoption in Year 5, of only the 54 Chapter Houses recognized by the US Census Bureau as Census Defined Places, or CDPs. Revenues from additional users, including tourists and users in the other 56 Chapter House communities, will almost certainly occur.

Navajo Nation Satellite-Backhaul WiMAX Rate Plan						
Plan	Monthly Rate	Max Down	Max Up	CIR	GB/mo	Additional
Home	\$50	1.5M	384k	none	2	\$30/GB
Home Plus	\$75	1.5M	384k	32k/32k	2	\$30/GB
Business	\$100	2.0M	512k	48k/48k	3	\$30/GB
Executive	\$150	3M	640k	64k/64k	4	\$30/GB

The Navajo Nation has 110 recognized communities called Chapter Houses. Of the 110 Chapter Houses, 54 are CDPs. The Navajo Nation has progressively improved its access to the world with communications. Its larger cities provide residents with dial up access, cell phone access, and limited broadband access via fiber. Of course, broadband access by way of satellite has been available to individuals with line of sight for at least a decade. Many of the Chapter Houses have enjoyed satellite access for several years – but only with access available to the single building. Also, as much as several hundred miles of glass fiber connect several of the cities and Chapter Houses, but this fiber has been largely used to backhaul telephone, and provide broadband to very select segments of society such as education and government. The residents have had access to broadband only via dialup, DSL or satellite dish.

The ARRA legislation gives the Navajo Nation the opportunity to consider both extensive implementation of fiber to the larger population centers backhauling both wired access and WiMAX wireless service, point-to-point (PTP) microwave to service population centers large enough to justify it, and widespread adoption of satellite with confirmed information rate (consumer satellite has up-to-speeds, but no minimum speeds, so users can actually experience access rates slower than dial-up rates) at remote households.

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Time and money are the major challenges to implementing fiber and PTP microwave. With estimates between \$10,000 to \$100,000 per mile for laying fiber, depending on terrain, and distances in the Navajo Nation averaging about 40 miles between towns, if you ran fiber between 60 towns at \$20,000 per mile, that's a minimum of \$50 million – not including the last mile equipment. And the project could take five to ten years to fully lay the fiber.

The fastest way to give residents, emergency services, healthcare and education broadband Internet access also happens to be the least expensive: WiMAX backhauled by satellite. At roughly \$0.3 million per installation, including tower, last mile electronics and satellite connection with confirmed information rates, the entire 60 towns could be Satellite backhauled for under \$20 million. With satellite backhauled WiMAX, the residents get access to distance learning, telemedicine and Internet communications 90 days after installation is fully approved.

Action INTELEX, a Navajo Nation owned communications infrastructure and services business, proposes, in conjunction with the Navajo Nation and partner vendors, to erect WiMAX towers that offer broadband Internet access to underserved or unserved Chapter Houses. Sustainability is built in by making the Navajo Nation its own Internet Service Provider by leasing satellite space, and training Navajo Nation citizens to provide customer care and communications management to all the citizens served by this service. The Navajo Nation's customer care department would realize 15% of the gross monthly fee revenues to fund the customer care staff and any maintenance.

b) A general description of the proposed funded service areas (location, number of communities, etc.)

Action INTELEX proposes to equip 15 CDPs with satellite backhauled WiMAX towers in three phases. The First Phase will coincide with the first round of ARRA funding, and would erect one tower in each of the 15 CDPs listed in the “Navajo Nation First Phase Households” table below. Implementation would likely commence within 90 days after receipt of funding, and be completed, depending on the number of towers, 90 days later. The services quote indicates that funding required is \$299,855.00 per tower for 200 users within four miles of the tower. Therefore, the First Phase 15 towers would require \$4,497,825.00.

The first phase CDPs consist of:

Navajo Nation First Phase Households						
Phase	Chapter House CDP	State	Agency	Served	2000 Census	Households
1	Shiprock CDP	NM	SR	Underserved	8156	2179
1	Tuba City CDP	AZ	WNA	Unserved	8225	2029
1	Chinle CDP	AZ	CH	Underserved	5366	1348
1	Kayenta CDP	AZ	WNA-FD	Underserved	4922	1236
1	Fort Defiance CDP	AZ	FD	Underserved	4061	1110
1	Window Rock CDP	AZ	FD	Underserved	3059	878
1	Crownpoint CDP	NM	ENA	Underserved	2630	750
1	Upper Fruitland CDP	NM	SR	Unserved	1664	431

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1	Thoreau CDP	NM	ENA	Unserved	1450	423
1	Lukachukai CDP	AZ	CH	Unserved	1565	418
1	Dilkon CDP	AZ	FD	Unserved	1265	296
1	Tsaile CDP	AZ	CH	Unserved	1078	242
1	Leupp CDP	AZ	WNA	Unserved	970	227
1	Nenahnezad CDP	NM	SR	Unserved	726	189
1	Dennehotso CDP	AZ	WNA	Unserved	734	168

Phase Two would coincide with the second round of ARRA funding, and could supply one tower for each of the next 39 CDPs. Implementation would likely commence within 90 days after receipt of funding, and be completed, depending on the number of towers, 90 days later. At \$299,855.00 per tower for 200 users within four miles of each tower, and 39 communities receiving one tower each, Phase Two would require \$11,694,345.00.

The Second Phase Chapter Houses are:

Navajo Nation Second Phase Households						
Phase	Chapter House CDP	State	Agency	Served	2000 Census	Households
2	Navajo CDP	NM	FD	Underserved	2097	470
2	Many Farms CDP	AZ	CH	Underserved	1548	430
2	Ganado CDP	AZ	FD	Underserved	1505	421
2	Lechee CDP	AZ	WNA	Unserved	1606	332
2	Kaibito CDP	AZ	WNA	Unserved	1607	330
2	Houck CDP	AZ	FD	Unserved	1087	311
2	St. Michaels CDP	AZ	FD	Underserved	1295	306
2	Pinon CDP	AZ	CH	Underserved	1190	294
2	Tohatchi CDP	NM	FD	Underserved	1037	290
2	Twin Lakes CDP	NM	FD	Underserved	1069	276
2	Church Rock CDP	NM	ENA	Underserved	1077	257
2	Alamo CDP	NM	ENA	Unserved	1183	256
2	Cameron CDP	AZ	WNA	us	978	235
2	Teec Nos Pos CDP	AZ	SR	Underserved	799	225
2	Rock Point CDP	AZ	SR-CH	Unserved	724	167
2	Shonto CDP	AZ	WNA	Unserved	568	147
2	Round Rock CDP	AZ	CH	Unserved	601	143
2	Aneth CDP	UT	SR	Unserved	598	142
2	Rock Springs CDP	NM	ENA-FD	Underserved	558	132
2	Greasewood Spgs CDP	AZ	FD	Underserved	581	126
2	Newcomb CDP	NM	SR	Underserved	387	123
2	Tonalea CDP	AZ	WNA	Unserved	562	122
2	Ramah CDP	NM	ENA	Unserved	407	121
2	Rough Rock CDP	AZ	CH	Underserved	469	112
2	Chilchinbeto CDP	AZ	WNA	Underserved	462	110
2	Sanostee CDP	NM	SR	Unserved	429	106
2	Nazlini CDP	AZ	CH	Unserved	397	101
2	Crystal CDP	NM	FD	Unserved	347	99
2	Jeddito CDP	AZ	FD	Unserved	390	98
2	Beclabito CDP	NM	SR	Unserved	339	95
2	Naschitti CDP	NM	FD	Underserved	360	91
2	Nageezi CDP	NM	ENA	Underserved	296	82
2	Red Mesa CDP	AZ	SR	Unserved	237	78
2	Torreon CDP	NM	ENA	Unserved	297	73
2	Sheepsprings CDP	NM	SR	Underserved	237	57
2	Steamboat CDP	AZ	FD	Unserved	233	56
2	Oljato-Monument V CDP	AZ	WNA	Unserved	155	37
2	Pueblo Pintado CDP	NM	ENA	Unserved	247	34
2	Huerfano CDP	NM	ENA	Underserved	104	27

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Phase Three would coincide with the third round of ARRA funding, and would supply the remaining 56 Chapter Houses with WiMAX towers. While these communities are recognized communities within the Navajo Nation, they are not recognized as CDPs by the US Census Bureau. At \$299,855.00 per tower for 200 users within four miles of each tower, and 56 communities receiving one tower each, Phase Three would require \$16,791,880.00.

The Third Phase Chapter Houses are:

Baca/Prewitt	Cornfields	Lake Valley	Ojo Encino	Tohajiilee
Becenti	Counselor	Little Water	Pinedale	Tolani Lake
Birdsprings	Cove	Low Mountain	Red Rock	Inscription House
Black Mesa	Coyote Canyon	Lupton	Red Valley	Tsayatoh
Blue Gap/Tachee	Forest Lake	Manuelito	San Juan	Tselani/Cottonwood
Bodaway-Gap	Gadii ahi/To' Koi (Cudeii)	Mariano Lake	Sawmill	Whippoorwill
Breadsprings/Baahaali	Hardrock	Mexican Springs	Smith Lake	Whitecone
Canoncito	Hogback/Tse'Daa'Kaan	Mexican Water	Standing Rock	Whitehorse Lake
Casamero Lake	Indian Wells ZCTA	Nahata Dziil	Sweetwater/Tolikan	Whiterock
Chi Chil Tah	Iyanbito	Nahodishgish	Teesto	Wide Ruins
Coalmine Mesa	Kinlichee	Navajo Mountain	T'iistoh Sikaad/Burnham	
Coppermine	Klagetoh	Oak Springs	Toadlena/Two Grey Hills	

c) Number of households and businesses passed.

It is expected that, while service will be available to a much larger number of residents, in the first year of operation 10 percent of the households in the service area will adopt the service, an additional 10 percent the second year, and each year thereafter until the fifth year, when adoption will slow. While it is hoped adoption will be widespread, much greater than 50% adoption among residents will be unlikely, unless service is linked to critical services such as telemedicine and distance learning.

It is expected that in the first year of operation, any underserved educational, healthcare, and other government or protection services will swiftly adopt use of the service.

It is also expected that businesses that depend upon Internet access will adopt the service within the first year. It is expected as many as 50% of businesses will implement use the first year.

Year	CDP Households	Users	Remaining
1	19466	1900	90%
2	19466	3800	80%
3	19466	5700	70%
4	19466	7600	60%
5	19466	9500	50%

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d) Number of community anchor institutions, public safety entities, and critical community organizations passed and/or involved with project (e.g., health care, education, libraries, etc.).

All community anchor institutions, public safety entities, and critical community organizations affiliated with or owned by the Navajo Nation will have equal access to this solution. Those underserved or unserved are expected to immediately adopt available WiMAX Internet services.

Navajo Nation First Phase Services									
Phase	Chapter	State	Med	Fire	Police	Corrections	Other	Education	Water
1	Shiprock CDP	NM	Med		POL, CIS	DOC		Various	Water
1	Tuba City CDP	AZ	Med	Fire	POL, CIS	DOC	Various	Schools etc	Water
1	Chinle CDP	AZ	Med	Fire	POL, CIS	DOC	Various	Schools etc	Water
1	Kayenta CDP	AZ	Med		POL, CIS	DOC	District Court	Schools etc	
1	Fort Defiance CDP	AZ	Med	Fire			Various	Various	Water
1	Window Rock CDP	AZ		Fire	CIS	DOC	Various	Schools etc	
1	Crownpoint CDP	NM	Med		POL, CIS	DOC	Various	Various	Water
1	Upper Fruitland CDP	NM						Various	
1	Thoreau CDP	NM						Various	
1	Lukachukai CDP	AZ						Various	
1	Dilkon CDP	AZ			POL, CIS			Various	Water
1	Tsaille CDP	AZ	Med					Various	
1	Leupp CDP	AZ		Fire			FDP	Various	Water
1	Nenahnezad CDP	NM						Various	
1	Dennehotso CDP	AZ						Various	

Navajo Nation Second Phase Services									
Phase	Chapter	State	Med	Fire	Police	Corrections	Other	Education	Water
2	Navajo CDP	NM							
2	Many Farms CDP	AZ							Water
2	Ganado CDP	AZ						Schools	Water
2	Lechee CDP	AZ							
2	Kaibito CDP	AZ							
2	Houck CDP	AZ							
2	St. Michaels CDP	AZ							
2	Pinon CDP	AZ						Schools	
2	Tohatchi CDP	NM	Med			DOC	NDWD		
2	Twin Lakes CDP	NM							
2	Church Rock CDP	NM							
2	Alamo CDP	NM					NOVR		
2	Cameron CDP	AZ							
2	Teec Nos Pos CDP	AZ					FDP		Water
2	Rock Point CDP	AZ							
2	Shonto CDP	AZ							
2	Round Rock CDP	AZ							
2	Aneth CDP	UT					RBDO		
2	Rock Springs CDP	NM							
2	Greasewood Spgs CDP	AZ					NDWD		
2	Newcomb CDP	NM							
2	Tonalea CDP	AZ							
2	Ramah CDP	NM					NOVR		
2	Rough Rock CDP	AZ							
2	Chilchinbeto CDP	AZ							
2	Sanostee CDP	NM							
2	Nazlini CDP	AZ							
2	Crystal CDP	NM							
2	Jeddito CDP	AZ							
2	Beclabito CDP	NM							

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2	Naschitti CDP	NM							
2	Nageezi CDP	NM							
2	Red Mesa CDP	AZ							
2	Torreon CDP	NM							
2	Sheepsprings CDP	NM							
2	Steamboat CDP	AZ							
2	Oljato-Monument V CDP	AZ							
2	Pueblo Pintado CDP	NM					NDWD		Water
2	Huerfano CDP	NM							

e) Proposed services and applications for the proposed funded service areas and users.

Proposed services include

- Broadband Internet via WiMAX antenna, centrally located in the community and with a range averaging 75 square miles, and satellite-until-fiber backhaul.
- WiMAX modem
- Satellite broadband Internet service for user outside service area.

Optional services include:

- VoIP PBX server permitting local calls at no cost
- RoIP permitting radio communications for emergency services
- Video on demand server
- Web caching server to enhance access speed for frequently accessed information.

f) Approach to addressing the non-discrimination and interconnection obligations

Service available to all users who can receive WiMAX through the system modem or WiMAX enabled computing, for standard usage fees. Internet link is pure bandwidth with no monitoring, requiring users implement antivirus and other data protections.

g) Type of broadband system that will be deployed (network type and technology standard).

User's computer, home or office network is connected to a WiMAX modem with an Ethernet cable. WiMAX modem communicates with the WiMAX tower using 5.7 GHz wireless connection. The WiMAX tower is connected to the Internet via Ku Band two-way satellite service.

h) Qualifications of the applicant that demonstrate the ability to implement and operate a broadband infrastructure, and/or be a sustainable broadband services provider.

NNISP and its Navajo Nation partner organizations have years experience servicing resident telecommunications infrastructures.

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Skycasters, of Akron, Ohio, has nine years experience in providing business grade satellite broadband Internet. Skycasters uses company owned and managed satellite infrastructure, ensuring the highest speeds available in the industry.

GlenMartin USA, of Booneville, Missouri, has 91 years service experience, and has 27 years of communications infrastructure installation experience.

i) Overall infrastructure cost of the broadband system.

- WiMAX tower and services at 110 chapter houses = \$32,984, 050.00

The First Phase infrastructure cost is:

- The First Phase, erecting 15 WiMAX towers would require \$4,497,825.00.

The Second Phase infrastructure cost is:

- The Second Phase, erecting 39 WiMAX towers would require \$11,694,345.00.

The Third Phase infrastructure cost is:

- The Third Phase, erecting 56 WiMAX towers would require \$16,791,880.00.

j) Overall expected subscriber projections for the project.

Year	CDP Households	Users	% Total
1	19466	1900	10%
2	19466	3800	20%
3	19466	5700	30%
4	19466	7600	40%
5	19466	9500	50%

k) Number of jobs estimated to be created or saved as result of this project.

The Navajo Nation support structure for this project will require a service and support organization in excess of its current staffing

The community-wide access will enhance community access to telemedicine, online educational, and business creation opportunities.

Entire Nation new jobs directly resulting may exceed 200.

This jobs base will be supported by Navajo Nation net revenue as follows:

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Navajo Nation Five Year Revenue Projection											
Year	Monthly Rate	Max Down	Max Up	CIR	GB/ mo	Additional	Users	Adoption Rate	Gross Revenue	Navajo Nation Fee	Navajo Nation Revenue
1	\$50	1.5M	384k	none	2	\$30/GB	1900	50%	\$570,000	15%	\$85,500
1	\$75	1.5M	384k	32k/32k	2	\$30/GB	1900	25%	\$427,500	15%	\$64,125
1	\$100	2.0M	512k	48k/48k	3	\$30/GB	1900	15%	\$342,000	15%	\$51,300
1	\$150	3M	640k	64k/64k	4	\$30/GB	1900	10%	\$342,000	15%	\$51,300
Total									\$1,681,500		\$252,225
2	\$50	1.5M	384k	none	2	\$30/GB	3800	50%	\$1,140,000	15%	\$171,000
2	\$75	1.5M	384k	32k/32k	2	\$30/GB	3800	25%	\$855,000	15%	\$128,250
2	\$100	2.0M	512k	48k/48k	3	\$30/GB	3800	15%	\$684,000	15%	\$102,600
2	\$150	3M	640k	64k/64k	4	\$30/GB	3800	10%	\$684,000	15%	\$102,600
Total									\$3,363,000		\$504,450
3	\$50	1.5M	384k	none	2	\$30/GB	5700	50%	\$1,710,000	15%	\$256,500
3	\$75	1.5M	384k	32k/32k	2	\$30/GB	5700	25%	\$1,282,500	15%	\$192,375
3	\$100	2.0M	512k	48k/48k	3	\$30/GB	5700	15%	\$1,026,000	15%	\$153,900
3	\$150	3M	640k	64k/64k	4	\$30/GB	5700	10%	\$1,026,000	15%	\$153,900
Total									\$5,044,500		\$756,675
4	\$50	1.5M	384k	none	2	\$30/GB	7600	50%	\$2,280,000	15%	\$342,000
4	\$75	1.5M	384k	32k/32k	2	\$30/GB	7600	25%	\$1,710,000	15%	\$256,500
4	\$100	2.0M	512k	48k/48k	3	\$30/GB	7600	15%	\$1,368,000	15%	\$205,200
4	\$150	3M	640k	64k/64k	4	\$30/GB	7600	10%	\$1,368,000	15%	\$205,200
Total									\$6,726,000		\$1,008,900
5	\$50	1.5M	384k	none	2	\$30/GB	9500	50%	\$2,850,000	15%	\$427,500
5	\$75	1.5M	384k	32k/32k	2	\$30/GB	9500	25%	\$2,137,500	15%	\$320,625
5	\$100	2.0M	512k	48k/48k	3	\$30/GB	9500	15%	\$1,710,000	15%	\$256,500
5	\$150	3M	640k	64k/64k	4	\$30/GB	9500	10%	\$1,710,000	15%	\$256,500
Total									\$8,407,500		\$1,261,125