ExhibitESoundnessofApproach

State of Alaska

ExhibitESoundnessofApproach.pdf

Exhibit E: Soundness of Approach

The State of Alaska is proposing several projects within four rural Alaskan communities (three tribal regions). Many of the communities in these areas have very high social vulnerability indices from low student scholastic performance to high rates of domestic violence, substance abuse, suicide, skin infections, hepatitis, and upper respiratory issues. Interestingly, these communities have been historically resilient and adaptive through many shocks over the centuries, and now the environmental impacts from changing weather patterns requires new approaches to restore that resilience and preserve their cultures. The state's approach will provide models for improving resiliency statewide and in imperiled communities that have made the decision to relocate or stay in their traditional locations.

Proposed projects focus on infrastructure, housing, and food and economic security. One project is for the relocation of housing and utilities from a climate change imperiled location to a new more resilient, culturally appropriate location. The other projects are designed to make infrastructure more resilient to systemic events. This includes protection of community food stores which are gathered over the summer months, and port and dock facilities for economic development.

Community 1: Galena – "It's All about the Kids"

Projects for the City of Galena were deliberately chosen to strengthen an already resilient community. "It's All about the Kids" is the motto of Galena with the primary focus revolving around the schools within Galena. The economic engine in Galena is the local public school K-12 Grades, and the regional boarding school. The community has three main entities: the local federally recognized tribe (Louden Tribal Council), the local government (City of Galena), and the local school (Galena Public Schools). All three entities work together to form a strong community.

The projects are grouped together into five categories that the community identified as essential to increase their resilience. The project groupings are Human and Environmental; Family Resilient and Community Growth; Community Infrastructure and Green Energy; Tribal and Cultural; and School Infrastructure Projects. All 23 projects have been impacted by the qualifying 2013 flooding event. As shown in

the table in Dropbox X, the combined total of the 23 Galena projects is $79,057,914 with a leverage value of $34,806,969 and a Benefit Value of $210,815,616. This results in a ratio of One HUD dollar to every 2.67 Benefit dollar.

Human and Environmental Health Projects

Project G1: Dust Control

This project will allow the City of Galena to move away from an airborne dust problem and the use of Calcium Chloride. This project will be run as a self-help project within the City Roads Department. Materials include 6,300 cubic yards crushed gravel chips and 15 tons of liquid asphalt. Labor will be required for the City Force Account Labor and Project Management.

Unmet Need: During the dry summer months, the City of Galena grades, waters, and adds Calcium Chloride to the roads to prevent dust from becoming airborne. This is a costly, daily solution. During the May 2013 flooding event, river sediment from the Yukon River was washed onto the roads which made more dust and created a larger hazard.

Resilient Mitigation: This project will allow the City to move away from an airborne dust problem and the use of Calcium Chloride. This project will be run as a self-help (Force Labor) project within the City Roads Department and would minimize the daily O&M of the roads.

Leverage: A City-owned 10 CY dump truck, road grader, loader, and compactor will be provided to the project; all equipment is already owned. To complete this project, the City of Galena Roads department has agreed to purchase a 1,000-gallon Trailer-Mounted Asphalt Distributor and Dump Truck-Mounted Chip Spreader which will be used after the completion of the project for annual maintenance of the chip and seal roads. The City of Galena has already committed to purchasing the $18,500 piece of equipment and funding O&M of the chip seal roads.

Future Risks: The risks of doing nothing are impacts to the health of the youth and elders within the community. During the summer months, many children are outside playing and riding their bikes. Elders walk to the store and walk to visit others and are exposed to airborne dust.

Vulnerable Population Benefit: Will be known when BCAs are complete.

Model for other Communities: Most villages in Alaska lack paved or hard surface roads. This is a simple solution if funding was provided to other communities.

Feasibility: Chipping and sealing the roads will not require engineering to complete as this is a very straight forward project. A survey will be required for line and grade. Locally available gravel can be crushed or barged in from upriver. Liquid asphalt is available within Alaska.

Project G2: Public Shower House/Laundry Facility

Unmet Need: Many residents within Galena do not have the convenience of in-home laundry facilities. Furthermore, many homes within Galena do not have City water. Prior to the 2013 flood, residents and visitors depended on a community shower house and laundry facility. This facility was damaged during the May 2013 Flood and has not reopened.

Resilient Mitigation: A coin-operated type facility would accommodate those without access to regular showers and/or laundry services. Both local residents and visitors traveling to Galena for vocational, recreational, or medical reasons would benefit. The existing facility would be elevated above the base flood plain elevation of 136.5 feet and updated to include more energy efficient systems.

Leverage: The building used in the past is still useable; damage from the flood needs to be repaired, and some renovations/ additions are required to incorporate a laundry facility. It is centrally located between the school/pool and clinic/City offices, and is piped into the recovered heat loop from the power plant for heating. The building heat is supplied 100% from recovered heat from the power plant. The existing building is 750 SQ FT.

Future Risks: The risks of doing nothing are health-related. Having access to clean laundry and a place to bathe eliminates and reduces the chance for common cold and disease to spread.

Vulnerable Population Benefit: will be known when BCAs are complete.

Model for other Communities: Most communities in Alaska have a local washeteria.

Feasibility: The existing 750 SQ FT building is already plumbed for showers. With a retrofit of the interior to repair the flood damages and elevating the building in the previous manner as the 41 homes elevated in 2014/2015, this is a very feasible project.

Project G3: Fire Hall Replacement

Unmet Need: The Antoski Road Fire Hall, owned by the City of Galena, is inadequate and unreliable as a base of operations for Galena first responders. The fire hall serves as the main vehicle and equipment storage facility for the Galena Volunteer Fire Department (GVFD) and the Galena Emergency Medical Squad (EMS). The GVFD houses its three main response vehicles in the fire hall, including two pumpers and a rescue truck. The EMS ambulance is also stored in the fire hall, along with the City of Galena water delivery truck.

The fire hall has been experiencing severe foundation issues on the north side of the building for almost 10 years, resulting in significant slanting of the concrete floor and gaps along the floor where overheard doors no longer create an airtight seal. As a result of this air gap, the fire rescue truck used for firefighting froze to the floor. During the winter months, two of the five bays are unusable. Global warming has damaged the foundation with the melting of the permafrost, as shown in the pictures in Dropbox. The 2013 Spring Flood exacerbated that problem by further weakening the subsurface under the fire hall, and the north side of the fire hall now clearly appears to be sinking into the ground.

Resilient Mitigation: Replacement of the existing fire hall with a modern facility built to meet the BFE of 136.5', and facility will include: floor drains, exhaust ventilation system, indoor tanker truck filling capabilities, and be connected to the power plant waste heat loop. The foundation will be constructed of 8-inch helical piles drilled to a depth below the active layer. The building will be a pre-engineered metal building with an appropriately-insulated building envelope. The footprint of the facility will be 40' x 60'.

Future Risks: In interior Alaska, where average temperatures are below freezing for half of the year, keeping emergency response vehicles in a properly-heated space is critical for providing timely services. Due to the degradation of the existing fire hall, this is increasingly becoming a challenge. Failure of the ambulance to start

or having the water tanker frozen to the floor during an emergency could result in the loss of life if EMTs are not able to arrive in a timely fashion.

Vulnerable Population Benefit: Having first responders available in a community is vital to the survivability in this harsh climate during the winter months. As a regional hub with a doctor-staffed clinic, this community is more resilient than most when it comes to emergency services for the people in need during a health crisis. Will add more once BCAs are complete.

Model for other Communities: Other regional hubs in Alaska do not have the capabilities for emergency response such as Galena. What Galena has can be replicated in other communities. However, without a viable fire hall, their ability to provide necessary services as a hub community will be impacted.

Feasibility: A proven foundation system will be used in Galena to counter the effects of permafrost. This facility replacement project will be a cost-effective solution to permafrost issues, flooding events, and protection of emergency equipment.

Project G4: Abandoned Building Remediation

Unmet Need: During the 2013 flood event, a number of properties were damaged beyond repair and have since been abandoned. These properties pose a health and safety risk for the community and especially for fire and public safety personnel. Some of these properties are also a threat to the Yukon watershed while others could be redeveloped if they were cleaned up. Twenty property owners have already requested help with demolition if funding is available. The City of Galena and USDA have determined 20 additional homes need to be demolished that were abandoned during the flood.

Resilient Mitigation: Cleaning up the properties that do not threaten the watershed will provide the community with an opportunity to return that land to productive use and foster future development. Surrounded by wetlands, Galena has limited developable land available for expansion. Revitalizing damaged properties that are already connected to roads and utilities is both cost-effective and more sustainable than developing new lands.

Leverage: As part of a USDA/State Partnership to mitigate 1,350 feet of river bank erosion, three abandoned homes will be demolished. This grant allows for home demolitions affecting the watershed. Demolition will

prevent abandoned structures from becoming problems for the city in the future. The City Council has already adopted resolutions supporting the required work. Additional leverage includes the 2014 project work sheet that included removal of 10 structures with the contract work valued at $525,968.

Future Risks: Abandoned structures are a risk and liability in any community within the US. This results in squatters, drug houses, and dangerous places where kids will play.

Vulnerable Population Benefit: Safety of the children is very important within the City of Galena. With the boarding school and many young families, removal of the abandoned structures will remove the risk of potentially dangerous play areas that could appeal to children.

Model for other Communities: Removal of abandoned buildings, unusable materials and equipment, and broken items is a chronic problem in rural Alaska as everything needs to be shipped outside the community for disposal. This remediation project is a good place to start.

Feasibility: Removal of the abandoned structures will allow for growth in areas where limited land is available.

Project G5: Landfill Compliance and Expansion

Unmet Need: After the May 2013 flood, debris removal created a problem at the local landfill. The landfill is currently in violation of its permit condition and is at 90% capacity. A backhaul to Fairbanks, Alaska for recycling of flood-damaged vehicles is needed.

Resilient Mitigation: An expansion project is needed at the landfill to increase the size by approximately five acres with new fencing around both the old section and new. Currently, 155 flood-damaged vehicles, 30 snow machines, and 15 4-wheelers need to be backhauled from the community.

Future Risks: Without an expanded landfill, residents will have no other choice but to dump trash at the gate and on the road leading to the landfill.

Vulnerable Population Benefit: Solid waste needs to be placed and covered in a landfill and not scattered throughout the community because the current landfill site is now reaching capacity. Without a viable landfill, health concerns arise.

Model for other Communities: Many Alaskan communities face similar issues. This project is a good place to start.

Feasibility: The existing landfill has plenty of available land around the facility that is already owned by the City of Galena. There is no need to obtain Site Control.

Family Resilient and Community Growth Projects

Project G6: Land Development and Protection Planning

A land plat study is needed to develop a new community subdivision within City limits. Currently, the two subdivisions within the city are at capacity with no room for young families or new residents to move into the community. This project includes a community evaluation to determine the best land suitable for development; a land survey; plot development; and infrastructure design for water, sewer, and electrical utilities.

As a part of the land development planning phase, a feasibility study would be prepared to derive solutions to protect the Galena Interior Learning Academy (GILA) school property from flooding. During the May 2013 flooding event, the earthen berm surrounding the City Airport and the GILA School was within 6-inches of being over-topped. A feasibility study is needed to determine viable options to protect this critical infrastructure. One option includes closing the triangle with an earthen berm around the school lot. This berm to complete the triangle would be ½ mile long with an additional foot of protection above the current flood protection elevation. The GILA is a regional boarding school operated by the Galena City School District (GCSD) that provides quality education to approximately 230 high school students. GILA occupies most of the former Galena Air Force Station which was deeded to the City of Galena after the air base was closed. The GILA School, Airport, and Runway have a 4.5-mile earthen berm for flood protection. During and after the 2013 flood, the school campus served as the base for flood recovery, housing displaced residents and response workers. The School property is north of the Airport within a triangular shaped lot.

Future Risks: The planning activity is necessary. Future action will be required after the planning phase to protect this critical infrastructure (only planning costs are included in this project).

Vulnerable Population Benefit: This area needs to be protected to provide for flood recovery efforts.

Model for other Communities: Advanced planning before engaging in land development is something many rural communities could benefit from. As a regional hub, Galena is a natural place to demonstrate the local benefits of planning ahead for development. All Alaska communities need to be as proactive as the City of Galena in their planning processes.

Feasibility: With strong City and tribal institutions already in place, planning for future development and protection of existing assets requires only the addition of expert advice and professional services to be successful. The GRAC and will use this feasibility study for the betterment of their community.

Project G7: Community Development Planning

After the May 2013 flood in Galena, the community formed the GRAC (see Exhibit C for more information). The community of Galena is a regional hub for the surrounding communities. Galena provides transportation, employment, shopping, recreation, cultural activities, and medical care. In the past, there has been a larger variety of services available, but with the closure of the Air Force base during Base Realignment and Closure actions in 2005, many of those left the community.

A comprehensive plan for economic development and growth will provide an incentive for individuals, businesses, agencies, and other organizations to invest in Galena with a reasonable expectation of viability and growth. The City of Galena, Louden Tribal Council, and the School District have all invested heavily in this community and are individually and collectively a strong resource to support development and growth.

This plan will take into consideration the availability of structures and land around the airport which could be used to support the transient population with food and accommodation facilities. It will look at the needs near the clinic for food, accommodations, and laundry. It will look at available land and energy resources in the community to promote private services, businesses, and industry. It will look at collaboration between the Tribe, City, and School to increase the population of Galena by taking steps to improve jobs, housing, and the cost of living.

The community of Galena is a strong, vibrant community that is a resource throughout the region and the state. They have come back strong from the losses suffered during the 2013 flood and have proven their commitment through their involvement with the recovery process. The community is looking to strengthen themselves.

Future Risks: The community will not grow if this project is not implemented.

Vulnerable Population Benefit: A federally recognized tribe will be impacted.

Model for other Communities: All Alaska communities need to be as proactive as the City of Galena in their planning processes.

Feasibility: The GRAC will use this plan for the betterment of their community.

Project G8: Early Childhood Development

Unmet Need: The community currently has building space in one of the City Hall/Clinic wings to develop a daycare and Early Childhood Development Center. This space is approximately 2,000 SQ FT. This project is currently in the planning stages and has stalled because of the lack of seed money for a Program Administrator. Funds requested for this project would be used to establish a viable community daycare facility and Early Childhood Development Center.

GCSD chose to fund preschool as they saw this as key to providing local students with the skills needed to be successful later in their academic career. This left families of children ages 0-3 without any organized child care. Galena has a high employment rate, meaning that both parents in many families work, and few adults are available for less lucrative, informal work like in-home babysitting. Many young children have constantly changing supervision, as families piece together babysitting. Many families are bringing young children to work or declining steady work due to lack of childcare. Job recruitment to Galena for highly-specialized skills is hindered due to lack of organized childcare. Finally, lack of reliable childcare inhibits families interested in fostering a child in need.

Since the previous Early Learning Center closed, Dr. Huntington tracked the number of young children in the community and informally polled their parents as to childcare preferences, with the goal of planning a

day care center. Each year, this year included, there have been 12-17 children under 3, with 7-9 of them looking for full-time childcare and 14-21 children between the ages of 3 and 5, with 8-10 of them looking for half-time childcare, opposite their preschool schedule.

Minimum Mitigation: The start-up expense for a childcare center could be minimized if it were housed in the respite unit of the Edgar Nollner Health Center. This area has two exits; one is independent of patient use areas. It has enough space to accommodate the numbers discussed above and has been inspected by the Fire Marshall. Modifications required include: repair to the outer door, installation of an infant toilet (currently, there are two adult-sized toilets), repair to the wooden deck, and installation of a fenced play area. Once these modifications are in place, the cost of employing staff could generally be balanced by the income generated. Costs are otherwise minimized by a partnership between multiple organizations within Galena. See below.

Resilient Mitigation: Minimum mitigation above provides for the structure and facilities to open a childcare center, however, the best chance for success includes funding a director position at a pay scale to attract an employee with an early childhood development background. This employee could complete curriculum development, adapt it to the age mix each quarter, maintain files on each child, improve communication with parents, and supervise other employees.

Leverage: TCC presently covers the cost of heat, water, and sewer of the proposed space, and they have agreed to continue if the space housed a daycare. The City of Galena owns the space and leases it to TCC, and they have agreed to approve the change in use. The Edgar Nollner Health Center previously occupied the space, and they have agreed to consolidate to open this area to a daycare. Louden Tribal Council and the GCSD have indicated that they would endeavor to assist a public daycare with paying for and obtaining healthy food for lunch and snacks. Fairbanks Infant Learning Program has indicated interest in assisting with administration and curriculum development.

Additional Leverage: This daycare facility will be located in the City Hall/Clinic building. Under the HMGP DR-4122 Grant, this structure is scheduled to be elevated in the summer of 2016. The Grant Value is $1,371,000, and work will be completed in the summer of 2016.

Future Risks: This center would allow parents to work, knowing that their children are being well-cared for. Currently, young families (particularly teachers) within the City lack daycare options. This prevents young families from moving to Galena as both parents are unable to work. The request includes the cost of a Program Administrator and one teacher for three years.

Vulnerable Population Benefit: Children with two working parents will be much better served having a secure place to grow up and consistency in their day-to-day lives. With the lack of a professionally run daycare facility, the children are bounced from one babysitter to the next as their parents try to make a living and provide for the family.

Model for other Communities: Most communities with modern economies have childcare available. The cooperation of the city, tribal, and scholastic entities to meet the need would provide an excellent example for rural communities that are looking to modernize their economies. Having access to a professionally run daycare facility would allow other active communities the ability for both parents to work. A daycare facility would also allow both parents time to subsistence hunt and fish.

Feasibility: The community has already developed a plan and identified the necessary physical assets for the early childhood development center. Additional funding would ensure that the project is a full success. The community has tremendous support for a daycare facility.

Project G9: Community Garden Improvement

Unmet Need: Sustainability and resiliency of a population is greatly affected by food security. Production of a home garden can improve health, wellness, and self-sufficiency in a small remote community like Galena. An estimated 20% of households in Galena garden in some capacity. There has been an established community garden in Galena for decades. However, poor soil, weeds, access to water, and pest management (lack of an adequate moose fence) has made gardening efforts a challenge for many people. Having an established site that is convenient, maintained, protected, and designed specifically for growing food would encourage many people in this community to pursue gardening. The interest is here; the community just needs a jump start.

A second component to the community garden improvement and expansion project would be the purchase of equipment to continue a small-scale farming project that was initiated by community members during the summers of 2012 and 2014. A ½-acre plot of potatoes was planted and harvested by students of the GCSD and community members. The 2012 year produced 1,200 lbs. of potatoes (a value of $1,524 when looking at purchase price and shipping). The 2014 summer produced over 1,500 lbs. of potatoes (a $2,076 value). There are tractors in the community along with a history of volunteer work at the community garden site. If the tractor attachments were available to simplify the planting and harvesting process, the school, working in conjunction with the Ag Fair Committee and other agricultural enthusiasts within the community, would continue to locally produce potatoes for the residential dining hall responsible for feeding 210 high school students three meals a day.

Future Risks: Rural Alaskan food prices are considerably higher than the national average and highly-dependent on the cost of fuel for shipping. Fresh vegetables are especially rare and expensive. Developing local agriculture makes the community much more resilient to changes in shipping costs and less dependent on outside food in general.

Vulnerable Population Benefit: As evidenced by the growing obesity rates nationwide, children are especially vulnerable to poor nutrition and not eating enough vegetables. In addition, nutritional habits established during childhood often last into adulthood. Children at GILA directly benefit through fresher meals and the opportunity to learn about growing food in interior Alaska.

Model for other Communities: Many hearty vegetables grow quite well in Alaska, and other communities could follow Galena's example by growing their own gardens, making them less dependent on food shipped in by air.

Feasibility: This program has a great start. With a little capital, this community garden will continue to grow.

Project G10: Crow Creek Subdivision Evacuation Route

Unmet Need: Campion Road, also called Tiger Freeway, is a State Highway maintained by ADOT&PF. Historically, it connected the Galena Air Force Base to the Campion Army Air Station, about six miles upriver

(Southeast) from Galena. During the 2013 flood, the road washed out in several places, with the result that the Crow Creek Subdivision was isolated with no access to higher ground. The road failure meant that residents of the 14 occupied houses in the subdivision were unable to evacuate by road or remove vehicles from the rising flood water. Campion Road was reopened about a week after the flood water receded, but the road continues to be threatened by erosion along the highly-active cut bank that parallels the road.

Immediately after the flood, ADOT&PF began construction of a new road about a half-mile farther from the river bank to maintain access to the City landfill and the high ground around the former Campion Air Station. As a result, most of Galena now has a more durable and flood resistant evacuation route. The new road does not address river bank erosion that is expected to destroy road access to the Crow Creek subdivision in the foreseeable future.

Resilient Mitigation: The new section of State Highway that was built during the winter of 2013-14 is located about ½-mile north of the Crow Creek Subdivision. A new connection from the end of Ptarmigan Road to the new section of State Highway would replace the old road, providing an emergency evacuation route to higher ground. The new connection is expected to require about ½-mile of new road.

Leverage: ADOT constructed a new state gravel highway with a design and construction cost of $9,879,853.50. The award was on November 30, 2013 with completion on October 1, 2014. The Campion Road Erosion Protection project consisted of a 3.7-mile long stretch with multiple small streams with culverts.

Future Risks: Within the Crow Creek Subdivision, there are 19 households impacted by only having one way out of the area. In the event of a flood, this area would have to evacuate in the direction of the river instead of north away from the river.

Vulnerable Population Benefit: Two senior citizens and five families with children live within this subdivision with limited evacuation routes.

Model for other Communities: Flooding is a concern in many rural villages.

Feasibility: Gravel for a road is locally available. The only material that would need to be shipped into the community would be geotextiles.

Community Infrastructure Protection and Green Energy Projects

Project G11: Smart Grid

Unmet Need: A control system to tie-in the existing power plant, the 2.6-megaWatt (mW) solar array, grid scale battery storage (1-mW), and the 250-kilowatts of wood gasification are required. Currently, the plant operators are manually switching the Gensets based on load. This is inefficient and wastes valuable resources. Modernization of the Galena power generation equipment and use of a smart grid will make the community more resilient to rapidly fluctuating fuel prices. This combination would make Galena's power generation 75% renewable and save the city $1.2 million annually based on FY15 fuel costs. As a regional hub, Galena is well-suited to demonstrate the advantages of combining smart grids with renewable power generation.

A smart grid is a system which includes a variety of operational and energy measures including smart meters, smart appliances, renewable energy resources, and energy-efficiency resources. Electronic power conditioning and control of the production and distribution of electricity are important aspects of the smart grid. Sophisticated smart grid systems are needed to strategically manage diverse and geographically-scattered renewable power sources such as wind farms, solar plants, and hydro stations. Smart grid will ensure that this energy can be stored safely and distributed where and when it's needed. Reliability, cost savings, and energy independence are just three of the many benefits of a smart grid.

Resilient Mitigation: The mitigation effort for this project is to install a Smart Grid Control and Data Acquisition System (SCADA). This system will be programmed to allow the community utility to gain operational efficiencies by automation of the power plant. Additional components will include residential electrical meters with reporting capabilities back to the utility and automated switch gear.

Future Risks: With the high cost of electrical production and the cost of living in interior Alaska, doing nothing results in wasted valuable resources.

Vulnerable Population Benefit: The community pays $0.67 per kWh as compared to Anchorage at $0.11 per kWh. With the reduction of the cost of electricity, the community would become more resilient by saving their valuable resources to feed their families.

Model for other Communities and Feasibility: Communities around the world are turning to smart grid technology to reduce load spikes, improve grid efficiency, and smooth renewable integration. Implementing the proposed smart grid and renewable generation would make Galena a world-class example for renewable generation. The city has begun investigating the possibilities for a smart grid and already has one estimate for the major parts of the system. This project would serve as a useful model.

Project G12: Electrical Generation Flood Protection

Unmet Need: Galena has six diesel-powered generators with a combined output capacity of 4.1-mW. All six generators were impacted by the May 2013 river flood event. The power plant is currently at an elevation of 133.4 feet and received 2.1 feet of water during the flood.

Resilient Mitigation: Replacement of the existing building with an appropriately-sized pre-engineered metal building on an elevated platform using helical piles drilled to a depth of 35-feet below ground surface is necessary. The six existing diesel-powered generators will be moved into the new facility. A new control system would be required to work within the Smart Grid System along with automatic switch gear.

Leverage: ADOT has an FAA funded Airport Lighting project planned for the 2016 construction season. The advertised project in the bid documents has the price for construction ranging from $2.5 to $5 M. The scope of this project is to reduce the energy needs of the runway lighting. Currently, the City of Galena is required to have 100-kW of spinning capacity at the power plant ready for use as pilots need lighting for airport operations and landing. The lighting will be replaced with a LED system which will reduce the on-demand spinning capacity to 20 kW at the power plant. This lighting project will save the community $196,224 per year in fuel costs for runway lighting.

Future Risks: With the unknowns as to when the next flooding event will happen, this facility is at risk every spring thaw. Without mitigation, this facility is at risk every year during spring thaw. It would also be difficult to invest money to improve the plant efficiency without first mitigating the risk of damage to that investment. Life as normal takes longer to be restored when the power plant goes down from flood waters.

Vulnerable Population Benefit: Having a reliable supply of power during and after a flooding event allows for faster and safer recovery. With their homes raised, many in the community will likely shelter in place during future flood events. The entire community will be more resilient during these events with a power plant that is also protected against flooding.

Model for other Communities and Feasibility: With the previously proven helical piling system designed for arctic conditions and a pre-engineered metal building, the power plant can be elevated. Other communities along the Yukon have already demonstrated that building power plants on pilings is a reliable mitigation against floods.

Project G13: Community Alternative Energy with 250-kilowatts of Wood Gasification

Unmet Need: Residents within the City of Galena pay $0.67 per kWh as compared to Anchorage rates of $0.11 per kWh. The high electrical rates make family budgets tight.

Resilient Mitigation: A Biomass 250-kW wood gasification component will be added to the power generation capacity of the community system. This system would replace 131,000 gallons of fuel while creating local jobs. Based on 2015 fuel prices, this addition would result in a savings of $344,225 per year. The calculated savings for this system is $0.08 per kWh. The fuel source for this plant would be from the sustainable wood chip project being used at the local high school. Currently, the local boarding school serving Alaskan village students has purchased four pieces of equipment for wood chip harvesting and has converted their steam boilers to glycol boilers to heat the school with a biomass system. With the investment made in harvesting this product for the school biomass system, the City would like to capitalize the local investment and increase the savings at the City Power Plant using the wood gasification system. Since this is a sustainable product, the City of Galena would like to supplement power generation with a 250-kW wood gasification system.

Future Risks: With the high cost of electrical production and the cost of living in interior Alaska, doing nothing results in wasted valuable resources.

Vulnerable Population Benefit: The community would become more resilient by saving their valuable resources to feed their families.

Model for other Communities: Innovative approaches to living in the last frontier is vital to survival. This wood gasification (biomass) project can be replicated in communities up and down the Yukon River system. Numerous communities around Alaska's interior have begun using wood biomass for heating. With a successful example to follow, these communities could also leverage their local biomass supply for wood gasification and reduce their own power generation costs.

Feasibility: With the abundance of renewable biomass fuel surrounding Galena, this system would be used to supplement winter power generation. This results in a yearly savings of 131,827 gallons of fuel per year.

Project G14: 2.6-Megawatt Solar Array with Grid Scale Battery Storage

Unmet Need: Residents within the City of Galena pay $0.67 per kWh as compared to Anchorage rates of $0.11 per kWh. The high electrical rates make family budgets tight.

Resilient Mitigation: A 2.6-megawatt solar array with grid scale battery storage would eliminate the need to burn fuel during the warmest months when recovered heat isn't useful to the community and would save 199,484 gallons of fuel annually. Based on 2015 fuel prices, this would result in a savings of $738,091 per year. The calculated savings for this system is $0.28 per kWh. The community currently recovers heat in the winter from the diesel power plants to heat the community pool, pool building, City Hall, and Clinic.

Leverage: Within the community, 40-kW of solar power has been installed within the last two years. The existing installation of solar systems is proving this technology is feasible within Galena.

Future Risks: With the high cost of electrical production and the cost of living, doing nothing results in wasted valuable resources.

Vulnerable Population Benefit: With the reduction of the cost of electricity, the community would become more resilient by saving their valuable resources to feed their families.

Model for other Communities: See above.

Feasibility: Solar systems are proven to work very well in the spring and summer months in Northern Alaska. As designed, this system would allow for diesel off (fuel burning power generation) scenario for five months a

year. This results in a yearly savings of 199,484 gallons of fuel. During the winter, the excess heat is recovered to heat eight community buildings.

Project G15: Water Treatment Plant Mitigation

Unmet Need: The water treatment plant for the City of Galena produces 24 gallons per minute with a total daily output of 34,560 gallons per day. This results in an available water supply to each resident of 63 gallons per day per person. Engineering design standards are 125 gallons per day per person. The limiting factor in the treatment plant is the filtration system. Additionally, 5-10 hP water pumps, one-75 kVa Transformer, two boilers, and the system control panel are below the 136.5 foot elevation recommended for protection in the FEMA flood zone.

Resilient Mitigation: As a minimum mitigation, the five each 10 hP water pumps, one-75 kVa Transformer, two boilers, and the system control panel should be elevated within the existing plant. This will mitigate damage in the event of another flood. This equipment should be elevated approximately three feet. In addition to the minimum mitigation, the filtration unit should be replaced to provide for an adequate supply of water to each resident. The filtration unit replacement or upsizing goal would be to produce 70 gallons per minute.

Leverage: Through an EPA SDWA funding source, $675,000 has been provided to supply a new treated water storage tank. The proposed water storage tank is 300,000 gallons. The funding was approved in July 2015.

Future Risks: Currently, the electrical equipment and pumps are two feet below the 136.5 foot recommended building elevation. During the last flood, this equipment was damaged and had to be replaced. The filtration units within the water treatment plant only produce clean drinking water at a rate of 24 gallons per minute. This results in 63 gallons of treated water per day per person. The national design value for treated water per person is 125 gallons per day. Upsizing the filtration system to a production of 70 gallons per minute would decrease the risk of running out of clean drinking water.

Vulnerable Population Benefit: A lack of clean drinking water with plenty of supply would result in third world country conditions.

Model for other Communities: will add

Feasibility: The existing piping and electrical systems are in good working order, just sited in a location prone to flooding. By relocating the water pumps, transformer, boilers, and control panel, this investment will provide protection from future flood damage. Upsizing the filtration units would require replacing the existing systems with larger units in the same location.

Project G16: Wastewater Treatment Plant Mitigation

Unmet Need: The City of Galena is on a waste haul system. No homes within the community are connected to the sewage lagoon. Instead, homes have waste holding tanks, and the tanks are pumped as needed. Five community buildings have above ground piping to transport sewage waste to the lagoon. Primary treatment occurs within the lagoon. Secondary treatment of the liquid waste is a community leach field. During a flooding event, water overtops the sewage lagoon and spreads raw sewage through the community.

Resilient Mitigation: A plug and play system is recommended to eliminate the need for a sewage lagoon. This proposed system has been discussed with the DEC for the feasibility aspects of the idea. This system would use two 8,000-gallon holding tanks as primary treatment and a way to store wastewater until it is treated. Seven Advantex type systems would be installed along with a sludge reduction system.

Future Risks: Not eliminating or mitigating the sewage lagoon before the next flooding event would result in raw sewage being spread throughout the community again.

Vulnerable Population Benefit: Every member of the community is vulnerable to pathogens found in raw sewage. As a result of the May 2013 flood, the flood waters overtopped the lagoon and spread sewage throughout the community and into homes.

Model for other Communities: Many rural communities in Alaska are on a waste haul system.

Feasibility: The only other alternative to protecting the population from the spread of raw sewage during an event is to build a $33M dike around the lagoon. Package sewage treatment systems that are pre-engineered and shipped assembled are becoming common in Alaska.

Project G17: Galena River Bank Stabilization/Erosion Prevention

Background: The Yukon River flows over a thousand miles from Canada to the Bering Sea, completely unhindered and free flowing. Erosion on cut banks near the main channel, and the reciprocal sand bar creation occur incessantly all along its length. Galena has been situated on the cut bank (higher) side of the river since it was first settled in the 1920's. The 'old town' section of Galena is on the river side of the levy that was built by the Air Force in the 1940s, and has slowly been eroding over time. Based on elder accounts, photos, and maps, the River Bank has lost hundreds of feet of land, including several roads.

During the Mid-1980's, riverbank stabilization projects placed large rock (Rip-rap) along the shore, above and below a set of metal sheet pilings that have been in place at the east end of the large runway for more than 50 years. The Rip-rap was extended upriver around 2001 for about another 1,000 feet. The total section of already protected river bank is 1.8 miles long. While expensive and probably somewhat intrusive to land owners at the time, it has successfully prevented any further erosion of river bank in those areas. The value of this erosion control was especially apparent during the 2013 flood. Houses located along the sections with rip-rap sustained only water damage, and many homes located along the sections with no rock were hit by ice and knocked from their pilings (effectively destroyed). There was no loss of river bank despite ice scouring along these rip-rapped sections. The sections without protection suffered ice scouring and the loss of anywhere from 2-20 feet of bank.

Since the flood, one 800 foot long section has been rip-rapped at the most downriver portion of Old Town (west end of the levy) and another 1,350 feet is scheduled to be hardened just upriver from this section during the 2016 summer construction season. (see map).

Unmet Need: Four zones of river bank have been identified as in need of 'hardening' against erosion. The old town section (Zone 1), from just above the concrete boat launch upriver to the uppermost boat launch (and the beginning of existing rip-rap) is 2,100 feet long. This section has actively eroding the river bank, and many of the homes that were damaged from the 2013 flood are in this section. The Alexander Lake section (Zone 2) is a short section of 700 feet, from just below Carol Lowe's house to the existing rock upriver from the sheet pilings.

The Crow Creek section (Zone 3) is from just above the Crow Creek road intersection down river to the existing rip-rap. This is the longest section and has the steepest and most actively eroding bank. It is 2,700 feet long, and could be extended upriver even further.

The Boat Launch section (Zone 4), from about 200 feet above the concrete boat launch downriver to the lowermost boat launch is in a zone of deposition (not actively eroding), and is where many people park and launch boats. This section might benefit from some form of mitigation to block ice, but is not actively losing bank and losing land.

Minimum Mitigation: Zone 3, a 2,700 foot section of the Crow Creek section, is the first priority for the City of Galena to protect from erosion. This is the most active area eroding.

Resilient Mitigation: Harden all four zones filling in the gaps not previously protected, making a contiguously protected section 2.9 miles long that would prevent the further loss of property, roads, and infrastructure. The priority order is: Zone 3, Zone 2, Zone 1, and then Zone 4.

Leverage: USDA is currently funding a 1,350 foot section bank stabilization project with a 10% State of Alaska match. This project is funded at $8.1 million with a project start date of December 2015. Approximately, 16,000 cubic yards of rip-rap will be mined 12 miles east of Galena during the winter and hauled via ice roads and staged. During the 2016 summer construction, rip-rap will be placed. Community support is very high and numerous comments were received during the solicitation period expressing the need for this work to physically protect the community, its roads, and homes.

Future Risks: Without hardening, continued bank erosion will almost certainly destroy both roads and property in the near future.

Feasibility: This project is technically feasible, and previous efforts have had great success.

Tribal and Cultural Projects

Project G18: Tribal Office and Cultural Center

Unmet Need: The Louden Tribal Council building was severely damaged during the 2013 Flood. It was a miracle that none of the grant files, tribal enrollment, past minutes, and any other valuable documents were not destroyed.

Resilient Mitigation: Demolition of the old office which was condemned after the flood is necessary. Construction of a 3,000 square foot, two-story facility with the primary service office located on the first floor would follow. The services will include, but not be limited to: Housing, Indian Child Welfare, Social Service, General Service, Workforce Development/Job training, and Higher Education. The building will include handicapped access throughout and will be constructed with energy-efficient materials using green products and will be designed to adapt to the environment.

Leverage: Louden Tribe has been awarded a State of Alaska/FEMA project worksheet to replace the building and contents. The award amount has been determined at $203,386.00. The estimated cost of replacement is $890,580; leaving $687,194 in unmet needs.

Future Risks: The loss of the uniqueness of the federally recognized Louden Tribe and the tradition of this Council cannot be measured. A new home is needed for the Louden Tribal Council.

Vulnerable Population Benefit: Louden Tribal Council is seeking funding to construct a Tribal Community Service Center. This facility will be used for providing services to tribal members, hold Tribal and community meetings including trainings, workshops, community celebrations, counseling services/meetings, and cultural gatherings with the community and students. The Louden Tribal Council office is vital to their 773 tribal members; 259 tribal members live in Galena. Louden also provide services to non-tribal community members who live in Galena.

Model for other Communities: Many communities lack the cultural component of the Tribal office. Additionally, many tribal offices are non-existent or have inadequate space for Tribal business.

Feasibility: The Louden Tribal Council currently has a 35% design being developed for this new facility. With additional funding, the design can be completed, and construction would commence.

Project G19: Home Elevation above the Base Flood Elevation

During the 2014 summer construction season, nine elevated home foundations were constructed with the State of Alaska funding 100% of the project, and 32 existing homes were elevated through a partnership between FEMA and the State of Alaska with a 75%/25% cost split. During the 2015 summer construction season, 10 existing homes were elevated through a partnership between FEMA and the State of Alaska with a 75%/25% cost split. This has resulted in 51 of the 130 homes within the City of Galena protected from a similar May 2013 flood event. The scope of this project would be to elevate 35 additional homes using the same proven helical pile foundation system that works very well with the permafrost in interior Alaska.

Leverage: Between the State of Alaska Match and FEMA, the following funds were expended on the 2014/2015 foundation and elevation projects: for nine foundations $1,080,367; for DR 4094 $1,945,450 (13 homes); and DR4122 $5,323,547 (29 homes).

Future Risks: With the elevation of 35 more homes, 75% of the homes within Galena will be protected from a flooding event like the May 2013 event. 95% of the structures were impacted from the May 2013 event.

Vulnerable Population Benefit: Having 35 more homes protected from a similar event would allow quicker recovery after a flood.

Model for other Communities: The foundation design is adaptable to other communities within flood zones and in permafrost areas. The 8-inch pipe piles with 18-inch helices were designed for the worst soil conditions where winter frost jacking of homes creates problems.

Feasibility: This project would be a continuation of the momentum gained during the 2014/15 summer construction seasons to protect 51 homes from flooding.

Project G20: Yukon Elder Assisted Living Facility Expansion

Unmet Need: This project expands an existing program, YKEALF (Yukon Koyokuk Elders Assisted Living Facility), which has demonstrated the ability to meet the needs of at-risk elders who require assisted living care. They can no longer live safely at home and their needs exceed what their families can meet. YKEALF currently is at capacity with nine elders in residence. There is increasing inquiry regarding availability of space

for elders from all over the State of Alaska. YKEALF also provides a forum in which youth and elders interact. GILA students are separated from family and community. At least three times a week, groups come to spend time visiting or doing activities with the elders. They learn songs, share traditional foods, hear the stories, and have fun. This program provides a family and community environment for at risk youth who are separated from families.

Minimum Mitigation: Long-term sustainability is dependent upon increasing revenue. Increasing revenue happens with an increase in residents. This project at minimum should increase capacity to 15 residents, which would substantially increase sustainability. However, this would not meet the needs of a-risk elders and would not allow for program development.

Resilient Mitigation: The facility was initially designed to be 20 units but had to be cut back because of lack of funds at that time. Twenty units would further increase the possibility of not only of sustainability but would meet the increasing needs of at-risk elders and improve socio-economic conditions of at least 11 more individuals and their families. In addition to the 11 units, a 1,200 Square Foot area will be provided for a youth/elder interaction area, library, and staff training. With the planned daycare facility, a proposal has been laid out to have the daycare kids interact with the elders a couple of times per week.

Leverage: A wood boiler was installed in July 2015 on an elevated platform at a cost of $226,945.92 as a fuel saver/green project.

Future Risks: The level of care that elders need is getting progressively higher with health issues such as dementia (80% of residents have this diagnosis), diabetes, rheumatoid arthritis, and various cancers. Since the flood of 2013 as well as other disasters, an increase of issues such as post-traumatic stress disorder, depression, and respiratory diseases are being seen. Without additional space to house our elders, they are often left to fend for themselves.

Vulnerable Population Benefit: YKEALF not only provides assisted living care for at risk elders but it has proven to be a valuable employment opportunity for locals (as well as regionally) who often would not be able to find employment otherwise. Staff enjoys the benefit of being able to work at or near home. Many of the

staff have been able to get off public assistance. Since the facility opened four years ago, three of their caregivers have gone on to pursue careers in medicine. Oral and cultural traditions are preserved.

Model for other Communities: Elder assisted centers within the communities allow for family visits and to have access to traditional foods.

Feasibility: This facility welcomes all elders state-wide and nation-wide no matter their ethnicity.

School Infrastructure Projects

Project G21: Galena Interior Learning Academy Biomass Glycol upgrades

Unmet Need: GILA is a boarding school operated by GCSD that provides quality education to approximately 230 high school students. It occupies most of the former Galena Air Force Station, which was deeded to the City of Galena after the air base was closed. Heat for all of the school buildings is provided by a central steam plant and underground steam distribution system (the utilidor) which connects the low-pressure steam boilers to the buildings, including classrooms, dormitories, a dining hall, an on-site water plant, and maintenance facilities. The legacy system was installed by the Air Force decades ago, and it is both technically and physically obsolete. A recent engineering study indicated that the utilidor system wastes heat equivalent to about 60,000 gallons of diesel fuel per year, and that it is very likely to fail catastrophically within the next 10 years. Aggressive maintenance on the system is required year round, especially during the summer months. One result is that the school campus is not normally used during the summer because the buildings cannot be supplied with domestic hot water when the steam system is shut down. During and after the 2013 flood, the school campus served as the base for the flood recovery, and provided housing for displaced residents and response workers. The school facilities were invaluable to the response, but as a result, the steam system maintenance was deferred for a year with serious results for operations during the winter of 2013-14.

Minimum Mitigation: The State of Alaska has approved a grant to replace the boiler portion of the heating system. The proposed new wood chip-fired boiler will greatly reduce the cost of operating the GILA School buildings, but cannot be implemented without first replacing the heat distribution pipes in the utilidor. A new utilidor system has been designed to complement the wood chip boiler, and will provide greatly increased

thermal efficiency, lower maintenance costs, extended operating life, and improved reliability. The combination of the wood chip boiler and the new utilidor is expected to reduce diesel fuel consumption for the GILA School by about 200,000 gallons per year. To meet this schedule, the City is looking for a way to pay for the utilidor upgrade. No grant funds have been identified, but debt funding appears to be a possibility.

Resilient Mitigation: The long-term goal of the community is to develop the former base and the wood energy project into a comprehensive plan that will incorporate highly-efficient buildings, renewable energy systems, and local resource development into a sustainable local economy. The utilidor replacement is a key part to beginning the plan by supporting the GILA School and maintaining the key assets on the base including emergency and transient housing, the emergency power plant, and the existing on-site water plant.

Leverage: Replacing the utilidor piping is expected to cost $3,129,806. The City of Galena currently has a 2016 AEA grant fund to replace the steam boilers with the new wood chip-fired boiler, which will leverage $3,096,898. Although there is a clear economic payback for the utilidor replacement, the cost of the project ultimately comes from the GCSD school budget and will affect the educational opportunities for the school system.

Future Risks: Without additional funding, the City will only be able to complete the minimum work required to move away from steam, and the school would ultimately spend more on heating as the city repays the loan.

Vulnerable Population Benefit: GILA offers students from around the state educational opportunities they do not have at home. The central heating system is critical to the school's operation during the cold Alaskan winter. A major failure of the current steam heating system would jeopardize not only all the other school buildings but also the entire student body's school year.

Feasibility: The engineering design is currently at the 35% design stage. A 65% design is expected by no later than November 15, 2015, and construction supplies will be ordered in early 2016. An engineering design study has already been completed and found in favor of replacing the utilidor as soon as possible. With the design phase nearing completion, this project will be shovel ready by the time funding is awarded.

Project G22: Math and Science Building Upgrades to Modernize the Learning Environment

Unmet Need: The Composite Headquarters Facility is located on the former U.S. Air force base in Galena, Alaska. The original facility was constructed in 1984 to provide a command center and secure storage. The entire base was closed in 2010, and control of the existing buildings was turned over to the Galena city government and school district. The building is currently being used as classrooms by GILA. There are building code and life safety issues required to make this facility into the proper configuration for a school building. The issues include: lack of a sprinkler system; fire alarm system; minor structural deficiencies; exit stairs/ADA compliance; science classroom safety; electrical code issues; new roof required; and plan layout changes required.

Resilient Mitigation: The former US Air Force Headquarters Building lacks adequate math and science classrooms that would support a district-wide Science, Technology, Engineering, and Math (STEM) initiative. This project would provide four state of the art science classrooms (chemistry, biology, and two general science classrooms) on the second level and three state of the art math classrooms on the first level. This remodel would provide state-of-the-art science and math instructional space not typically seen in rural Alaskan schools and would afford the district the opportunity to increase the quality of science and math instruction for students attending the boarding school.

Future Risks: Graduates from the Galena School District have gone on to become lawyers, engineers, nurses and even medical doctors. The local clinic is staffed by a board certified medical doctor. This is very rare in small Alaska communities. This doctor is from Galena. Without keeping the schools up to date Galena will fall behind.

Vulnerable Population Benefit: The impact of these instructional improvements will touch students in every region of the state of Alaska.

Model for other Communities and Feasibility: The existing structure is well built and suited to be converted from the Air Force Galena Headquarters Building to a State of the Art Math and Science building for GCSD.

Project G23: Sustainable Energy for Galena Alaska, Inc. (SEGA)

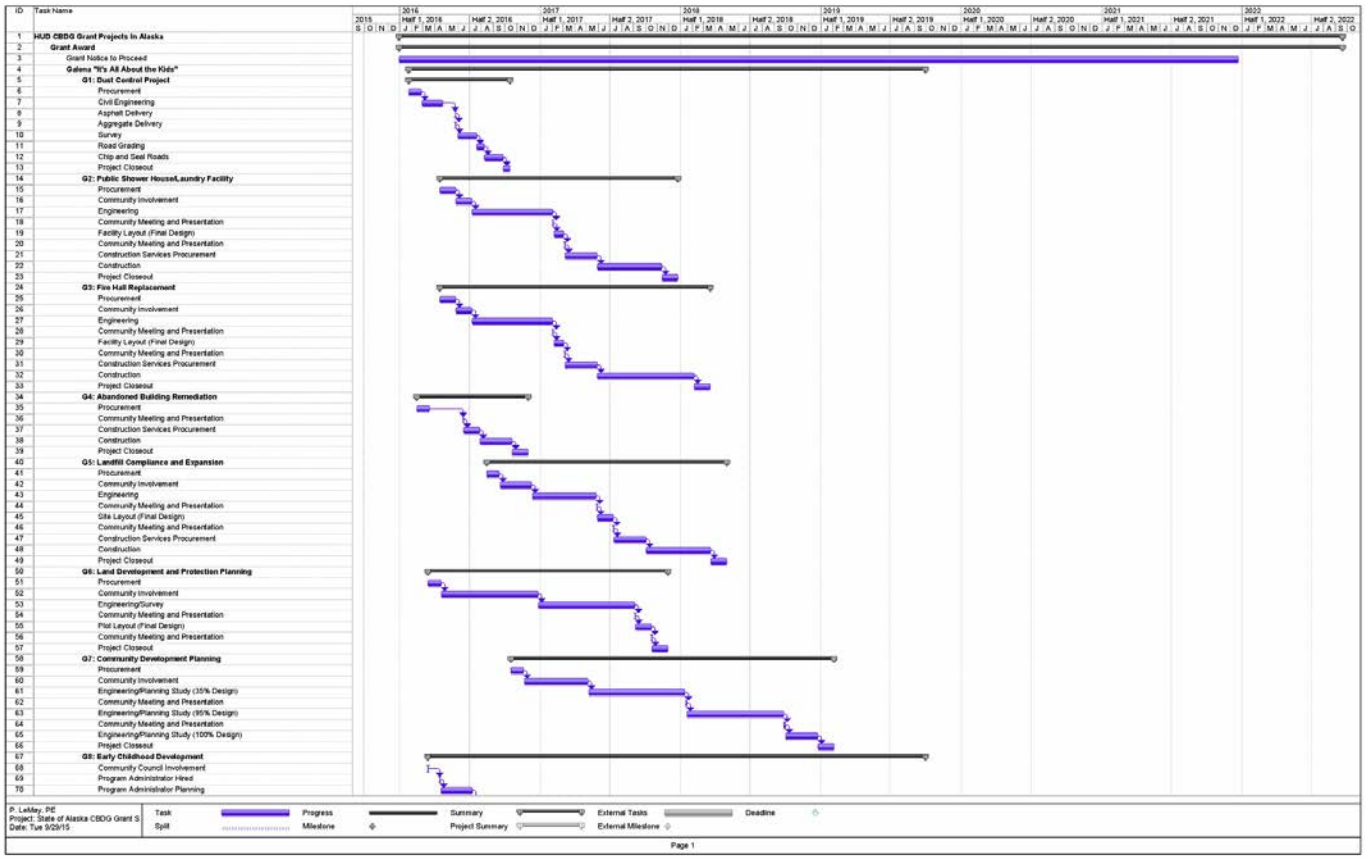
In order to provide a fuel supply for the wood boiler system, the City, the School, and the Louden Tribe have combined to form a non-profit timber harvest entity, called Sustainable Energy for Galena Alaska, Inc. (SEGA). The new corporation will provide local jobs and a responsible, sustainable fuel. The City has been awarded a state grant of $447,000 that was used to purchase four key items of harvest equipment for the project, including a harvester-processor, a log skidder, a wood chipper, and a self-loading log truck. In addition, the City and GCSD have funded SEGA with $200,000 of locally derived funds to implement the harvest plan in cooperation with Gana-A'Yoo Limited, which is the native village corporation that owns most of the nearby forest resources. All of the principal civic groups (e.g. the City of Galena, the GCSD, the Louden Tribal Council, and Gana-A'Yoo Limited) are cooperating closely on the harvest project. The harvest activities are scheduled to begin about November 1, 2015. SEGA is seeking loan funds to provide about $250,000 of operating capital to bridge the transition from the diesel fired boilers to using the wood fuel. The harvest plans require that the trees be harvested and dried for about a year before they are chipped and delivered for boiler fuel.

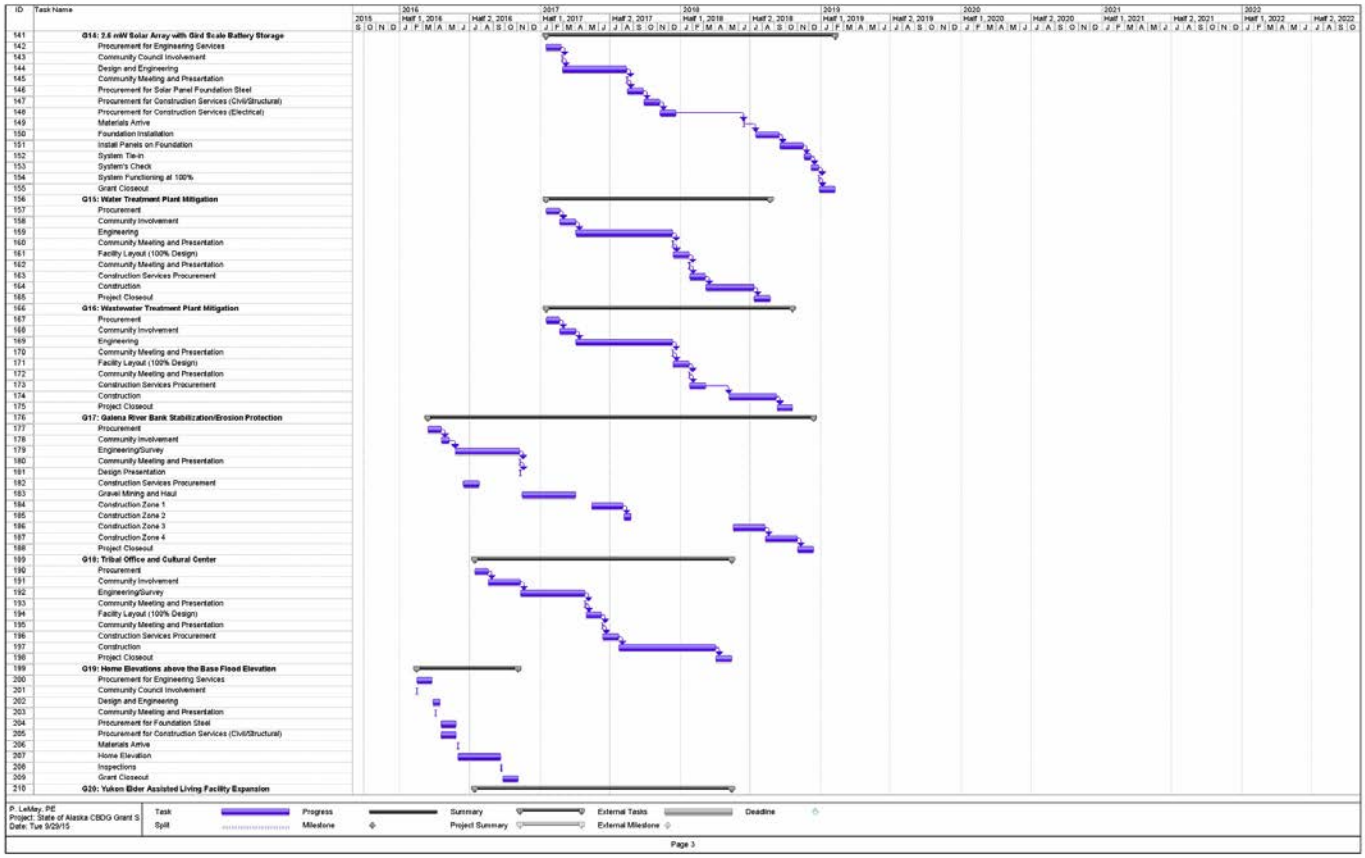
Table 1--Value Categories as it relates to the project outcomes with Budget, Direct Leverage, and BCA Calculated Values.

Project	Value Categories: Resiliency	Environmental	Social	Economic	Vulnerable Population	Project Funds Request	Leverage	Benefit
Human and Environmental Health								
Dust Control	X	X			X	$1,121,545	$18,500	$4,041,304
Public Shower House/Laundry			X		X	$466,379		$2,606,426
Fire Hall Replacement	X				X	$583,311		$5,853,741
Abandoned Building Remediation	X	X	X	X	X	$636,310	$525,968	$644,889
Landfill Compliance and Expansion		X				$815,500		$2,083,368

Family Resilient and Community Growth								
Land Development and Protection Plan	X			X		$415,600		$1,438,479
Community Development Planning	X			X		$196,000		$1,438,479
Early Childhood Development	X		X	X	X	$365,225	$1,371,000	$3,990,000
Community Garden Improvement			X		X	$62,992		$76,312
Crow Creek Subdivision Evacuation Route	X				X	$2,448,517	$9,879,853	$5,944,993
Community Infrastructure Protection and Green Energy								
Smart Grid	X			X		$464,140		$597,346
Electrical Generation Flood Protection	X			X	X	$1,689,520	$5,000,000	$1,800,000
Alternative Energy/250-kW Wood Gasification System	X			X		$878,200		$13,106,267
2.6-mW Solar Array with Grid Scale Battery Storage	X			X		$9,423,316		$19,832,782
Water Treatment Plant Mitigation	X	X	X	X	X	$547,668	$675,000	$1,428,479
Wastewater Treatment Plant Mitigation	X	X	X	X	X	$1,600,100		$3,083,368
Galena River Bank Stabilization/Erosion Prevention	X	X		X	X	$34,188,725	$8,100,000	$38,743,750
Tribal and Cultural								
Tribal Office and Cultural Center	X		X		X	$890,580	$203,386	$989,193
Home Elevation above the Base Flood Elevation	X		X		X	$6,823,248	$8,349,364	$10,106,250
Yukon Elder Assisted Living Facility Expansion	X		X		X	$4,238,223	$140,000	$9,982,882
School Infrastructure								
GILA Biomass Glycol Upgrades			X	X	X	$3,129,806	$3,096,898	$33,119,349

Math and Science Building Upgrades			X	X	X	$7,823,009		$49,907,959
Sustainable Energy for Galena Alaska, Inc. (SEGA)	X		X	X	X	$250,000	$447,000	
					Totals:	$79,057,914	$34,806,969	$210,815,616

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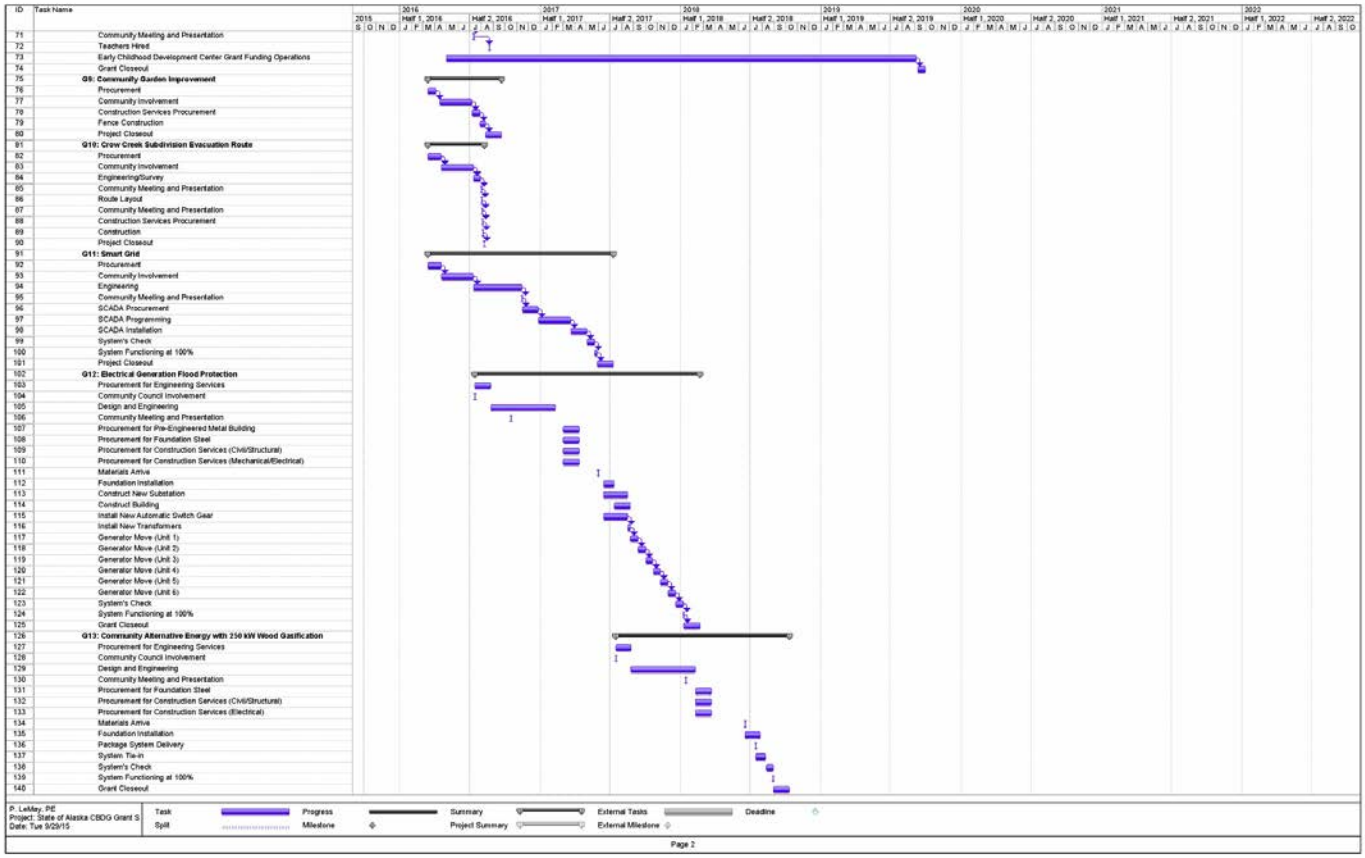
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134 Materials Arrive
135 Foundation Installation
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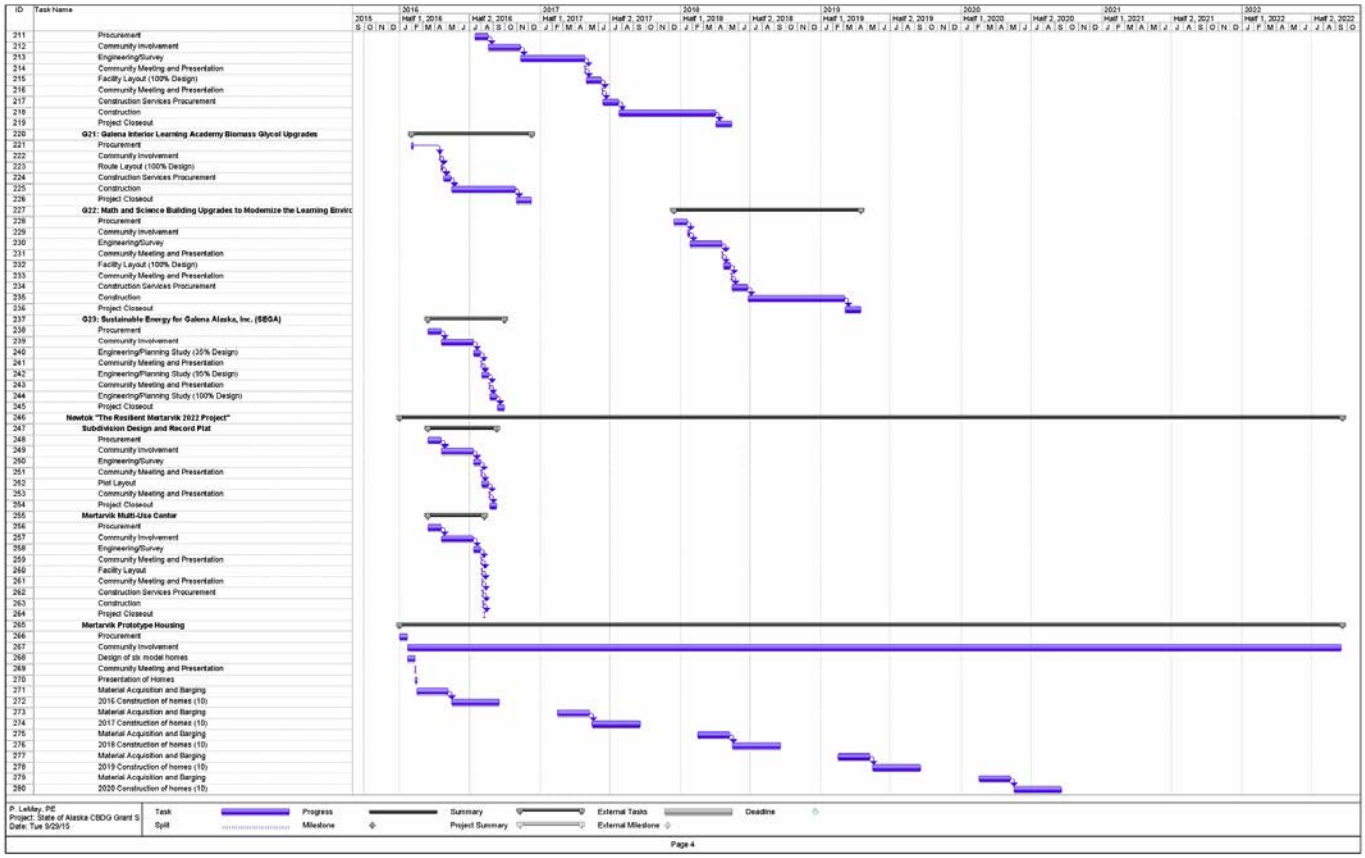
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231 Community Meeting and Presentation
232 Facility Layout (100% Design)
233 Community Meeting and Presentation
234 Construction Services Procurement
235 Construction
236 Project Closeout
237 G23: Sustainable Energy for Galena Alaska, Inc. (SEGA)
238 Procurement
239 Community Involvement
240 Engineering/Planning Study (35% Design)
241 Community Meeting and Presentation
242 Engineering/Planning Study (95% Design)
243 Community Meeting and Presentation
244 Engineering/Planning Study (100% Design)
245 Project Closeout
246 Newtok "The Resilient Mertarvik 2022 Project"
247 Subdivision Design and Record Plat
248 Procurement
249 Community Involvement
250 Engineering/Survey
251 Community Meeting and Presentation
252 Plat Layout
253 Community Meeting and Presentation
254 Project Closeout
255 Mertarvik Multi-Use Center
256 Procurement
257 Community Involvement
258 Engineering/Survey
259 Community Meeting and Presentation
260 Facility Layout
261 Community Meeting and Presentation
262 Construction Services Procurement
263 Construction
264 Project Closeout
265 Mertarvik Prototype Housing
266 Procurement
267 Community Involvement
268 Design of six model homes
269 Community Meeting and Presentation
270 Presentation of Homes
271 Material Acquisition and Barging
272 2016 Construction of homes (10)
273 Material Acquisition and Barging
274 2017 Construction of homes (10)
275 Material Acquisition and Barging
276 2018 Construction of homes (10)
277 Material Acquisition and Barging
278 2019 Construction of homes (10)
279 Material Acquisition and Barging
280 2020 Construction of homes (10)
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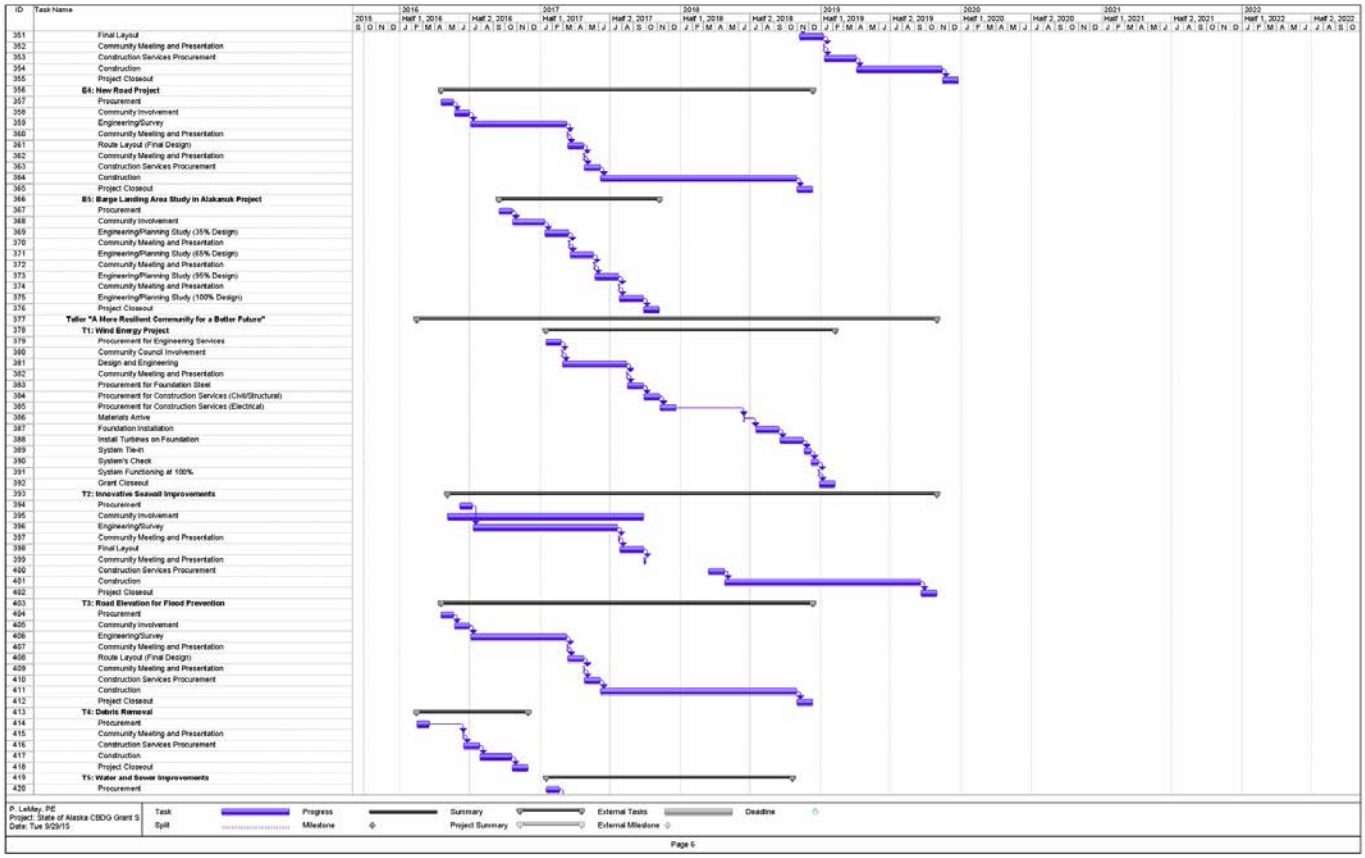
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Half 2, 2018
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Half 2, 2019
Half 1, 2020
Half 2, 2020
Half 1, 2021
Half 2, 2021
Half 1, 2022
Half 2, 2022
351 Final Layout
352 Community Meeting and Presentation
353 Construction Services Procurement
354 Construction
355 Project Closeout
356 E4: New Road Project
357 Procurement
358 Community Involvement
359 Engineering/Survey
360 Community Meeting and Presentation
361 Route Layout (Final Design)
362 Community Meeting and Presentation
363 Construction Services Procurement
364 Construction
365 Project Closeout
366 E5: Barge Landing Area Study in Alakanuk Project
367 Procurement
368 Community Involvement
369 Engineering/Planning Study (35% Design)
370 Community Meeting and Presentation
371 Engineering/Planning Study (65% Design)
372 Community Meeting and Presentation
373 Engineering/Planning Study (95% Design)
374 Community Meeting and Presentation
375 Engineering/Planning Study (100% Design)
376 Project Closeout
377 Teller "A More Resilient Community for a Better Future"
378 T1: Wind Energy Project
379 Procurement for Engineering Services
380 Community Council Involvement
381 Design and Engineering
382 Community Meeting and Presentation
383 Procurement for Foundation Steel
384 Procurement for Construction Services (Civil/Structural)
385 Procurement for Construction Services (Electrical)
386 Materials Arrive
387 Foundation Installation
388 Install Turbines on Foundation
389 System Tie-in
390 System's Check
391 System Functioning at 100%
392 Grant Closeout
393 T2: Innovative Seawall Improvements
394 Procurement
395 Community Involvement
396 Engineering/Survey
397 Community Meeting and Presentation
398 Final Layout
399 Community Meeting and Presentation
400 Construction Services Procurement
401 Construction
402 Project Closeout
403 T3: Road Elevation for Flood Prevention
404 Procurement
405 Community Involvement
406 Engineering/Survey
407 Community Meeting and Presentation
408 Route Layout (Final Design)
409 Community Meeting and Presentation
410 Construction Services Procurement
411 Construction
412 Project Closeout
413 T4: Debris Removal
414 Procurement
415 Community Meeting and Presentation
416 Construction Services Procurement
417 Construction
418 Project Closeout
419 T5: Water and Sewer Improvements
420 Procurement
P. LeMay, PE
Project: State of Alaska CBDG Grant S
Date: Tue 9/29/15
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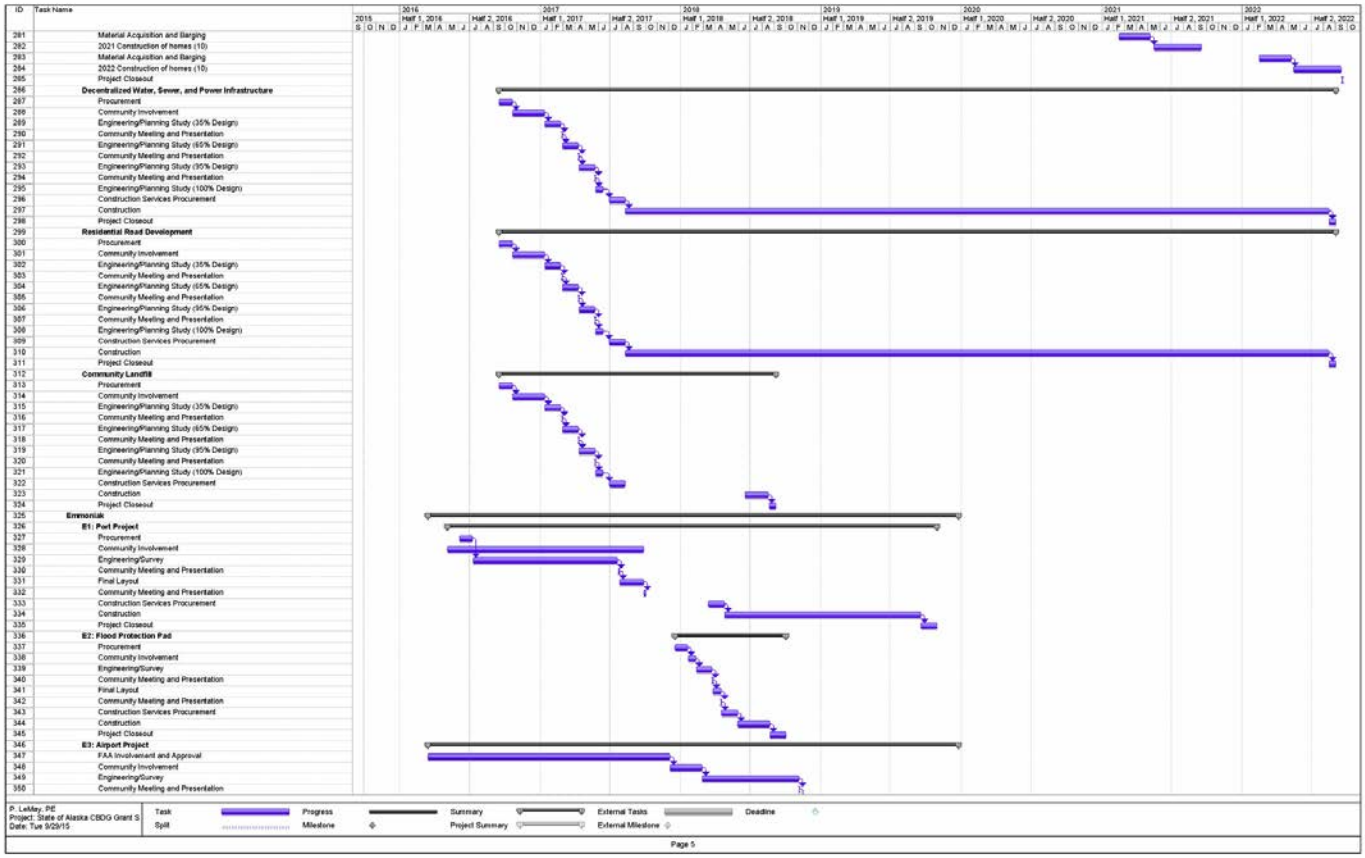

Community 2: Newtok Move to Resilient Mertarvik

Newtok is a traditional Yup'ik Eskimo village located on the Yukon-Kuskokwim Delta along the western coast of Alaska, near the Bering Sea. Newtok is located within the AVCP Target Area, which was qualified in Phase 1 under the MID-URN for damages to residential structures and community infrastructure. The village sustained damages to key community transportation infrastructure (boardwalks and docks) during Presidentially-Declared Disaster DR-4162 for November 2013.

Project Context: Originally a nomadic people of the Bering Sea coast, the Newtok Tribe settled at the current village site in 1949 when the Bureau of Indian Affairs (BIA) built a school there. The location was the farthest point upriver that the BIA barge could navigate to offload school building materials. The current village developed around the school. The community became aware of severe and progressive erosion of the Ninglick River toward the village as early as the 1980s, when the community hired an engineering firm to

conduct an erosion assessment. The recommendation of this assessment was, *"Relocating Newtok would likely be less expensive than trying to hold back the Ninglick River."* [Dropbox Reference "Ninglick River Erosion Assessment"]

In 1993, when the community made a cohesive decision to relocate, the Tribe initiated a relocation site selection process. A site known as Mertarvik, Yup'ik for "getting water from the spring", located approximately nine miles from Newtok on Nelson Island satisfied all relocation site criteria and was selected by the Tribal Council and the community in 1994 as the prime site for village relocation. [Dropbox Reference "Background for Relocation Report"]. Nelson Island, formed by basalt flows from volcanic activity, is located between the mouth of the Yukon River and the mouth of the Kuskokwim River. Mertarvik is located on the northern coast of Nelson Island and is bounded on the north by the Ninglick River which drains Baird Inlet. Mertarvik was approved by Newtok residents in several survey polls. Blessed with a good supply of potable water, underlain by basaltic bedrock, located above the floodplain and with sufficient developable land area for construction of a new community, Mertarvik was determined to be a safe and suitable location for a new village site by the USACE and others [Dropbox Reference USACE geotechnical studies]. Because Mertarvik is located within the Yukon Delta National Wildlife Refuge, Newtok, led by Newtok Native Corporation, which was organized under the Alaska Native Claims Settlement Act, began negotiations with the U.S. Fish and Wildlife Service for the land. In 2003, a land exchange was completed between the Newtok Native Corporation and the Department of the Interior for the land at Mertarvik. In 2006, the Newtok Tribe approached the State of Alaska requesting assistance with the relocation effort. In response, the State organized an inter-agency working group, the Newtok Planning Group (NPG), to assist Newtok with the relocation. Since 2006, a range of pioneer infrastructure has been developed at Mertarvik, including a barge landing and staging area, an access road to the area identified for community development, a road alignment to a developing materials site, the foundation of a future multi-use building, a number of storage building and three homes. [Dropbox Reference Aerial photo of Mertarvik]. Two water wells have been drilled which produce high-quality ground water and an Airport Layout Plan has been approved by the Federal Aviation Administration. In 2012, the NPG completed the Mertarvik

Strategic Management Plan which lays out Newtok's phased relocation strategy. The plan focuses on strategic focus areas and lays out priority actions which jump-start progress in each strategic focus area, which in turn trigger additional opportunities and investment for the relocation effort. While the community has been implementing this strategy with the assistance of the NPG, ***the single greatest hurdle to the relocation effort has been identifying resources for housing***, which will allow the people of Newtok to move out of harm's way and establish the necessary population at Mertarvik to trigger development of community facilities such as a school and airport. AVCP RHA plans to contract CCHRC to develop the housing plan in Winter 2015 at the community's request.

The area where community development will take place at Mertarvik was the subject of the *U.S. Army Corps of Engineers 2008 NEPA document, Revised Environmental Assessment and Finding of No Significant Impact, Newtok Evacuation Center, Mertarvik, Nelson Island, Alaska* which includes a wetlands delineation of the project site. In order to meet the requirements of the federal government's No Net Loss Policy for the development of any wetlands at the project site, the State of Alaska is currently conducting the Newtok Environmental Site Inventory and Assessment which will develop a clean-up strategy for the Newtok site to restore the village site to natural wetlands after the community has relocated to Mertarvik. [Dropbox]

Health and Safety Needs and Risk: The health and safety of the Native Village of Newtok is threatened by severe riverine erosion and flooding. The Ninglick River is eroding toward Newtok at an average rate of 72 feet per year and a maximum yearly observed rate of erosion is 300 feet per year. Since 1954, approximately one mile of land fronting the village has been lost to the Ninglick River. This land was an important buffer that in the past protected the village from Bering Sea storms. As a result, the community has become increasingly vulnerable to coastal storms and its survival at the current village is extremely limited. Historical and projected erosion rates of the Ninglick River toward Newtok indicate that the Ninglick River will reach the community school by 2017, followed by the loss of the rest of community infrastructure. [Dropbox Reference Newtok Erosion Map]

These changes, likely exacerbated by climate change and associated thawing permafrost, have increased

the frequency and severity of flooding in Newtok during the last decade. According to local residents, the coastal storm season has become longer in recent years. A powerful storm surge can raise tide levels 10 to 15 feet above normal, and severe flood events, such as the 20-year flood of 2005 and the lesser flood of 2006, permeate the village water supply, spread contaminated waters through the community, displace residents from homes, destroy subsistence food storage, and shut down essential utilities. USACE predicts the 50-year flood would inundate almost the entire community.

Newtok's unsustainability due to erosion and flooding, its increased vulnerability to coastal storms, and the community's decision to relocate because of these impacts have led to broad disinvestment by funding agencies at the current village site. In 2006, a comprehensive environmental public health assessment conducted jointly by the Yukon-Kuskokwim Health Corporation and ANTHC made a direct link between this disinvestment in community infrastructure and the significant public health issues in the village. The assessment found that during the study period, 29% of Newtok infants were hospitalized with lower respiratory tract infections, including 20% for pneumonia, 18% for respiratory syncytial virus, and 11% for pneumonia respiratory syncytial virus, nearly twice the national average for these diseases. These conditions appear to result from an initial lack of infrastructure development and failure to properly maintain existing infrastructure.

The assessment concluded that, *"sanitation conditions in Newtok are grossly inadequate for public health protection. The situation appears to be one of compounding deficiencies, high levels of community contamination, little potable water for drinking and hygiene/sanitation practices, and household crowding. While it is true that sanitation conditions in the [Yukon-Kuskokwim] Delta region as a whole lag well behind those of other regions of the U.S., most all communities in Alaska have access to a year-round potable water supply, a contained location to dump raw sewage, and reasonable access to a solid waste disposal site. We know of no U.S. community other than Newtok that lacks all three."* [Dropbox Reference YKHC Health Assessment]

The community's relocation to Mertarvik is the only way to effectively mitigate the impacts of future disasters and climate change on the community.

The Resilient Mertarvik 2022 Project involves the development of a community subdivision plat, housing, water/sewer and power utilities, a community multi-use building, residential roads, and a landfill at the Native Village of Newtok's relocation site, Mertarvik. This project will be carried out in coordination with the NPG and will implement the community resilience strategy presented in the *Mertarvik Strategic Management Plan (need to add to dropbox)*. The project proposes the development of the following components:

Subdivision Design and Record Plat: To site roads, homes, energy and water/sewer facilities, the project builds upon the Mertarvik Final Community Layout Plan (May 12, 2015) and the Mertarvik Final Paper Plat (May 12, 2015) to produce a final subdivision design and record plat which will guide development at Mertarvik. (add both to dropbox)

Mertarvik Multi-Use Center: Final design and construction of the Mertarvik Multi-Use Center (MUC) will provide a place for a variety of community needs. While new homes are being constructed, the MUC will provide shelter for the community construction labor force. As families move over to Mertarvik, the MUC will serve as an interim school, watering point, and clinic until these facilities are developed. In the fully developed community, the MUC will serve as a tribal meeting hall and community meeting place.

Mertarvik Prototype Housing: Acquisition (buy-out) of approximately 62 homes in Newtok will allow for the design and construction of an equal number of new housing units at Mertarvik. The new homes will be based on a Mertarvik Prototype designed by CCHRC and constructed by a trained local labor force over the next four to six years to help the community of Newtok relocate, including five housing models: a three-bedroom, four-bedroom, young family starter home, extended family unit, and elder housing unit. The homes will be moveable and are designed to use 75% less energy than the average home in the region and be built for an average price of $360,000, including materials, labor, and shipping, significantly below average for residential construction in rural Alaska. The homes will demonstrate extreme energy efficiency (designed to use 75% less heating oil than the average home in the region) and incorporate local knowledge and traditional design principles. The foundation is adjustable and allows the building to be moved. This way, it can be built at the barge landing pad in Mertarvik, and then towed up to the designated plat, speeding construction.

CCHRC will develop workforce education and training with the regional trade school, Yuut Elitnarviat, so homes can be constructed by local labor. CCHRC is working with a regional corporation, AVCP Inc., in the hub community of Bethel to develop local timber harvesting and truss manufacturing (a saw mill) to contribute significantly to housing materials. A Project Manager position will be created to coordinate all aspects of construction with the community, including procurement of materials, transportation, quality control, and coordination between partner agencies and stakeholders. CCHRC will create a final manual and film to document design, construction, and workforce training components, and instruct other communities faced with relocating.

CCHRC will retrofit three 'multi-use' structures already in place at Mertarvik. CCHRC has many years of experience in the retrofit and energy efficiency improvements of both public and private buildings in all climate zones. That experience will apply to upgrading the performance and durability of all structures currently at the Mertarvik site.

CCHRC staff will work closely with the Yuut Elitnarviat trade school in Bethel to develop a workforce training program specific to the new homes, including building science, mechanical, electrical, and plumbing components.

Decentralized Water, Sewer, and Power Infrastructure: Water, wastewater, and electric systems will be able to stand-alone, as the community transitions to Mertarvik. Homes are designed to incorporate renewable energy such as solar and wind. CCHRC has developed a variety of power, water, and wastewater solutions for rural housing projects, including an innovative system for the Newtok demonstration house now under construction. The utilities have the ability to either stand-alone off-grid or tie into centralized systems as the community relocates and expands: including a gravity-fed water system that cleans water from a local source, and an on-site wastewater treatment system. This innovative wastewater system eliminates the use of the honeybucket—a significant improvement for residents. Lighting and mechanical systems will be designed to run on DC or AC power, allowing the building to run off grid with a generator and battery bank, or to plug into a conventional electrical grid when that is constructed. This system also makes the home ready to plug and play to renewable

energy sources. These systems ensure occupants will have safe, uninterrupted service even if there is a lack of infrastructure as the community relocates.

Residential Road Development: The residential roads at Mertarvik will be a similar design to the Mertarvik Access Road leading from the barge landing to the footprint of the new community. The Mertarvik Access Road was built with gravel topped by polyethylene road mats, a technology used by oil companies on Alaska's North Slope for road development on tundra. The 1,000-pound, 8x14-foot polyethylene mats interlock to form a strong, stable and uniform surface over tundra which can support pioneer infrastructure development by trucks, tractors, and loaders. The mats are seen as a promising tool for rural Alaskan roads because they are well-suited for use over tundra and wetland areas, they are easy to install and keep clean, and they cut down on dust that can be generated from gravel-only roads. The mats are ideal for remote locations because they can be loaded on barges, delivered anywhere, and assembled easily. The mats can also be used over and over; picked up and placed somewhere else, so they are considered an ideal and innovative technology for a newly developing village. Based on the planned layout of Mertarvik, the community will require xx mats to provide access to the new and relocated homes. The mats will be placed on 12—inches of gravel overlaying a non-woven geotextile. The gravel will be installed to provide a slight crown along the centerline of the mats and culverts will be used where necessary for drainage. The roads will be graded to follow natural terrain. Construction of these roads will require minimal disturbances to the ground to limit impacts to the permafrost underneath.

Community Landfill: The Newtok Community landfill will serve the population of 380. There is no commercial source of waste in the community. The Newtok School is also included in the population served. The landfill will operate as an above ground area fill landfill, meaning that a two foot gravel pad will need to be constructed as a base to insulate the waste from coming in contact with the tundra or with high surface water in the region. The site should be bermed and fully fenced. The recommended 1.75 to 2 acre site should be sufficient to serve the resident population. DEC design approval and a Class III Solid Waste Permit will be obtained for this landfill.

The landfill should operate with a modified collection system. Residents should drop off waste at a central transfer site near the landfill, consisting of several pull-behind trash cages. At least six-wheeled, fully-enclosed trash cages, and a four-wheeler to pull them are recommended for a community this size.

A Tok burn unit is also recommended for volume reduction of household waste at the new landfill. The unit requires no electricity or fuel to make it work. Burning waste will reduce the footprint of the landfill, lengthen the landfill lifespan, and reduce water impacts to the surrounding area. Because of this, the amount of landfill cover required at the site will also be reduced. Cover material to serve the landfill should be included in the landfill construction.

A Class III landfill is not designed to accept all waste streams. It is recommended that a material handling shed be placed at the site for managing hazardous and recyclable waste. E-waste, used oil, lead acid batteries, fluorescent tubes, and other hazardous wastes found in household waste streams can be stored in the shed prior to being shipped out of the community. Likewise, recyclable material such as aluminum, #2 plastics, and some metals can be consolidated and stored in or near the shed. A used oil burner with energy recovery should be placed in the shed for local management of used oil and for heating the shed. The shed can also be used to house the landfill equipment to keep equipment out of the elements and prevent vandalism.

It is recommended that, at minimum, a tracked skidsteer is allocated for the site. This will assist with landfill cover and empting ash from the burn unit. The skid steer will also be needed for material handling from the waste diversion program. If funds allow, a medium-sized, or D-4 sized dozer will be beneficial for waste not burned or diverted from the landfill. A medium-sized dozer can also be valuable for applying cover and maintaining access to the site. Both the dozer and skidsteer may have addition uses in the community.

Tank Farm: The proposed facility would consist of eight 25,000-gallon (nominal) double wall, skid-mounted aboveground storage tanks (6 diesel and 2 gasoline) and associated fuel handling and retail dispensing equipment. It is assumed that the foundation would consist of an insulated gravel pad with provisions for tank leveling if needed. This facility would provide 12 months of fuel supply at the current estimated demand and could be easily expanded to meet future demands as needed.

The following three projects will be added during the public comment period.

- Mertarvik SCERP development as a project
- Alternate proposal for helicopter landing pad
- We should include education strategy development (plan) and any equipment they might need and can't fund for distance learning.

Newtok/Mertarvik

Value Categories as it relates to the project outcomes with Budget, Leverage, and Benefits

Project	Resiliency	Environmental	Social	Economic	Vulnerable Population	Project Funds Requested	Leverage	Benefit	
	Value Categories								
Subdivision Design & Record Plat	X	X	X	X	X	$600,000.00		estimated greater than 1	Based on previous
Construction Mancamp	X					$500,000.00	ITR Buildings?	estimated greater than 1	Based on previous (~$10k per house)
Multi-Use Center Completion	X	X	X	X	X	$5,487,400.00	Cost of Foundation?	estimated greater than 1	Based on Acooke's
CCHRC Housing (50)	X	X				$19,640,900.00		estimated greater than 1	Acooke estimate plus 130 cy gravel pad @ $50/cy and lifewater STP wastewater system - assumes quarry gravel
Retrofit 12 Relocated Homes	X	X	X	X	X	$742,800.00	relocation grant?	estimated greater than 1	Costs based on 5 days of retrofit work using Acooke' W&S numbers plus electrical
Existing Homes Demo (50)	X	X	X	X	X	$4,650,000.00		estimated greater than 1	From Acquisition Grant Application ($93k per demo)
Subdivision Roads (Phases 1 & 2)	X	X	X	X	X	$24,532,000.00	BIA ?	estimated greater than 1	Durabase Roads using quote and shipping estimate $0.30/lb – assumes barged gravel subbase
Bulk Fuel Tanks	X		X	X	X	$4,500,000.00		estimated greater than 1	CRW estimate based on fuel demands for 65 homes and 4 commercial structures (generator loads, Heating and ATV) and similar tank

									facilities in rural AK
Landfill	X	X	X	X	X	$1,990,880.00		estimated greater than 1	DEC estimate with CRW-updated gravel and fence numbers – assumes barged gravel
					Total	**$62,643,980.00**		**estimated greater than 1**	

The Resilient Mertarvik 2022 Project Objective: By 2022, build social, physical, cultural, economic, and ecological resilience into the everyday lives of the Native Village of Newtok at Mertarvik, maintaining cultural identity and connection to place through a community-driven process, thereby providing a model for imperiled villages in Alaska.

Metrics to be Tracked for Proposed Project. The metrics that will be tracked for this project include the following components:

Resiliency Value Factors: reduction of expected property damages due to future/repeat disasters; reduction of expected casualties from future/repeat disasters; value of reduced displacement caused by future/repeat disasters; and reduced vulnerability of energy and water infrastructure to large-scale outages.

Social Value Factors: reductions in human suffering (lives lost, illness from exposure to environmental contamination, asthma and cancer rates in low income and minority populations living in areas with greater environmental risk; benefit to low- and moderate-income persons and/or households; improved living environment (such as elimination of slum and blight conditions, improved community identity and social cohesion, improve recreational value, greater access to cultural, historic, archaeological sites and landscapes, and equal access to resilient community assets); and greater housing affordability.

Economic Revitalization Value Factors: direct effects on local or regional economy (e.g. tourism revenue) net of opportunity costs; and value of property other than through enhanced flood protection, independent of

increases in property value captured by other benefits in the BCA or that might otherwise have occurred without the proposed project.

Increased Resilience to Current And Future Disasters: The Newtok community's move to Mertarvik is the only way to ensure protection from current and future threats and hazards, including future risks associated with climate change. This project is consistent with Newtok's desire to create a new model for a sustainable Alaska Native Village based on leading edge technology and lessons learned from unsustainable community development activity in the past.

Without this proposed project occurring, the property of the residents of Newtok will be lost and lives will be threatened. Newtok's situation is not a question of *if* the community will be lost to the Ninglick River, but *when*. In the near-term, homes closest to the Ninglick River will be lost; and many residents of Newtok will need to leave their homes to find shelter on higher ground during a 50-year flood. Residents might be able to crowd into unflooded buildings, but there is no assurance that there would be enough room for everyone for even a short period. The community will be without drinking water, power, or sanitary facilities and will be surrounded by contaminated water during and for a period after the flood. A severe flood would leave homes uninhabitable after waters receded and the people could require other shelter or evacuation until homes were repaired or rebuilt. Weather or damage to the airstrip could also stop aid from reaching the community by fixed-wing aircraft. The potential for disease and injury during a severe flood would increase. In the long-term, the survival of the entire community hangs in the balance. For a remote indigenous community, this would mean the loss of culture and a Federally-Recognized Tribe.

Benefit to Vulnerable Populations: By enabling the Newtok community to relocate to Mertarvik, this CDBG-NDR-assisted project will benefit the elderly, people with disabilities, individuals and families at risk of becoming homeless, the working poor, minorities, and Native Americans. Most residents of Newtok fit into at least one of these vulnerable populations. The creation of energy-efficient, affordable, culturally appropriate housing for the Newtok community at Mertarvik will help the community move from harm's way. Community capacity will be increased, and the local economy enhanced by training a local workforce to help build homes

and install decentralized water, sewer and power utilities.

Model/Replicable/Holistic: This proposal represents an important model for other communities considering relocation. This project will be significant, not only on a state-wide basis, but on a national and international basis as well. There is documentation globally of a number of indigenous communities forced to relocate due to the impacts of climate change. The Newtok model provides an example of how this process can be replicated. In Alaska, Newtok is one of several communities imminently threatened by the impacts of flooding and erosion. In 2009, the U.S. Government Accountability Office reported that 31 Alaska Native villages were imminently threatened by erosion and flooding. The GAO report noted that at least 12 of the 31 threatened villages have decided to relocate --in part or entirely--or to explore relocation options. The report identified that Newtok has made the most progress in its relocation effort. This proposed CDBG-NDR project will provide a huge boost to Newtok's relocation effort by enabling the entire community to move to Mertarvik. An established population at Mertarvik will trigger the remaining relocation tasks to begin: the local school district will initiate plans to build a new school at Mertarvik, the Federal Aviation Administration will initiate plans for a new airport based on the approved Airport Layout Plan which is the predecessor to funds being committed to a new airport, and a post office will be established. These actions provide a clear, feasible model for the relocation of other communities.

In addition to providing a model for relocating communities, this project could prompt a new paradigm in community sustainability in rural Alaska. Over the last several decades, many rural Alaska villages developed with little thought about economic development and the long-term costs for energy, transportation, water and sewer, freight delivery, air access, and other community infrastructure. In many ways, Newtok's relocation to Mertarvik presents a unique opportunity to create a new model for a sustainable Alaska Native Village based on innovative technology and the lessons learned from past decades of community development activity.

Project Feasibility: The State of Alaska has engaged the most qualified partners to carry out the Resilient Mertarvik 2022 Project. CCHRC is an industry-based nonprofit corporation created to facilitate the development, use, and testing of energy-efficient, durable, healthy, and cost-effective building technologies for

people living in cold climates. CCHRC began the Sustainable Northern Communities program in 2008 to address the needs for sustainable housing in rural Alaska. These prototype homes incorporate leading edge building and energy technologies—such as super-insulated walls or adjustable foundations—aimed at improving the energy efficiency and affordability of housing. The goal is that these prototypes can be reproduced to provide much-needed housing. Each home will contain stand-alone utilities for water, sewer, and power. This off-the-grid approach is a logical and feasible model for a relocating community. This approach is informed by the Alaska Water and Sewer Challenge initiated by DEC to develop innovative and cost-effective water and sewer systems for homes in remote Alaska villages. The project focuses on decentralized water and wastewater treatment, recycling, and water minimization. These approaches have a high potential for use in individual homes and housing clusters with the goal of significantly reducing the capital and operating costs of in-home running water and sewer in rural Alaska homes. CCHRC's design and construction of the MUC will follow a similar design philosophy. The intent is to design a building that is easy to maintain, is low-cost, and is culturally and environmentally appropriate and sustainable.

Consultation with other Jurisdictions in Region: Newtok and Mertarvik are located within the AVCP Target Area. The SIWG has held several partner briefings during both phases of this project application to consult and ally with communities within the region.

Plan Consistency: The Resilient Mertarvik 2022 Project is consistent with and implements several projects from the following the following planning documents: Mertarvik Strategic Management Plan [Dropbox Reference], Mertarvik Relocation Report [Dropbox Reference], Mertarvik Community Layout Plan, 2015 update [Dropbox Reference], Mertarvik Paper Plat, 2015 [Dropbox Reference], Revised Environmental Assessment and Finding of No Significant Impact, Newtok Evacuation Center, Mertarvik, Nelson Island, Alaska [Dropbox Reference], and the Newtok Local Hazard Mitigation Plan 2015 [Dropbox Reference].

Community 3: Emmonak

The City of Emmonak is located near the mouth of the Yukon River on the coast of Western Alaska, approximately 10 miles from the Bering Sea. Bordered on the south by Kwiguk Pass and to the east by

Emmonak Slough (Dropbox ? – Map--Emmonak), this small Yupik Eskimo community of 800 residents is recognized as the most suitable site for a port and dock facility in the lower Yukon region. Emmonak is strategically situated to provide basic shipping and transportation redistribution services to 13 other small communities in the lower Yukon region, serving over 5,500 residents in total.

During the Qualified Disaster (DR-AK-4122) from May 17- June 13, 2013, severe ice jams diverted water from the Yukon River into Emmonak and nearby communities. Flood waters and large ice chunks removed the top three inches of surface gravel from the roads and pushed the base layer of six inches plus size rock deep into the mud. Other roads were completely inundated with flood waters. The flood waters overtopped the roads and choked the existing culverts, rendering travel hazardous. Approximately 50-feet of the taxiway washed out, along with the runway lights and transmission lines serving the FAA navigational equipment. The Airport Road was washed out in five places preventing access to the runway. The infrastructure damage was so extensive that goods could not reach Emmonak. Not only did this affect the residents of Emmonak, but during the September 2, 2015, community engagement meeting, residents of surrounding villages said that this affected them also. Additionally, since Emmonak does not currently have a port, the movement of materials and equipment to Emmonak via air to complete other flood repairs and the normal building needs of the community was extremely limited by the damage to the airport. Pictures of the flood damage are included in Dropbox?- Emmonak Background Info.

Emmonak Projects: Four projects are proposed for Emmonak. Additionally, one project is proposed for Alakanuk in support of the proposed port project at Emmonak. The mission statement for these projects is to plan and deliver a transportation system that is disaster resilient and cost effective and that will enable easy movement of people and goods which will also improve the economy and quality of rural Alaska life.

Project E1: Port Project-- Located at the mouth of the Yukon River with access to deep river channel morphology for barge maneuvering and landing, Emmonak is recognized as the most suitable site for a regional hub. Despite the lack of any port infrastructure in Emmonak, maritime activity has significantly increased in recent years. Today, the lack of infrastructure hinders logistics, damages the riverbank, and delays cargo

transport. For example, Kwikpik Fisheries, the region's largest private employer, must build and maintain earthen barge landings along the riverbank to facilitate port operations. The landings continually wash away and occasionally fail catastrophically, choking the river with sediment and creating a hazardous work environment.

The 2011 *Planning for Alaska's Regional Ports and Harbors: Final Report* commissioned by USACE, identified Emmonak as the best investment opportunity in the lower Yukon region Dropbox?- Add. The proposed Lower Yukon River Regional Port (LYRR) project would construct a modern barge landing facility and upland staging area in Emmonak, facilitating the safe and efficient offloading of cargo from barge vessels that are the primary resupply method of the community. The Community of Emmonak has proposed a 650 foot port that would be a transportation hub in Western Alaska. Currently, everything that is brought into the town is now offloaded from barges directly onshore, which can be challenging in times of high and low water, especially as the volume of cargo continues to increase. According to city data, the number of shipping containers moved through Emmonak has grown steadily from 450 in 2002 to 1,700 in 2011. Over the same time the gross tonnage of total cargo moved in and out of the community has increased from 15,100 tons to 41,800 tons.

This project is an investment in fundamental maritime infrastructure that would directly support continued economic growth in the lower Yukon River communities to help stabilize and diversify economies largely dependent on government employment and unpredictable commercial fisheries. The design for this project was completed in 2012. Final drawings, technical specifications, and cost estimate are included in Dropbox?-Emmonak Dock Final Drawings, Emmonak Dock Tech Specs, and Emmonak Dock Cost Estimate.

The LYRR Port project design meets both current demands and anticipated future demand, with the additional benefit of river bank stabilization and erosion control. There are two primary components of the design: 1) a dock portion constructed of sheet-pile cellular bulkheads, anchored by pilings reinforced with armor rock, with an adjacent raised pad for cargo loading and staging; and 2) a barge landing ramp of poured concrete, stabilized by four sheet-pile cellular bulkheads and including anchor rock protections. The dock

structure would allow for barge side tie-up and crane offloading of smaller cargo, while the ramp will allow for the efficient offload of heavy equipment and large volume rock products. The raised pad will provide stabilized surface area for container and cargo storage and staging during loading operations. This design configuration has been identified by USACE as ideal for sub-regional redistribution hubs because it allows multiple barges to offload at a time and gives operators several options to maximize efficiency.

Project E2: Flood Protection Pad-- The pad will be used by the future Port of Emmonak as a staging and material handling area when construction on the regional port is finished. The Flood Protection Pad will also provide a safe staging area for people, animals, critical life-sustaining supplies, and high-value equipment above the historic flood level elevation. The pad will be constructed near the city docks on 8.9 acres of scrub-shrub wetlands. A survey of the proposed pad location and concept drawing as well as a budget are included in Dropbox?- Emergency Pad and Flood Protection Pad Budget Info. The City of Emmonak has already applied for the USACE Individual Permit Application and has been approved. They have also received approval from the State of Alaska, DEC Division of Water Wastewater Discharge Authorization Program.

Project E3: Airport Project— Emmonak is one of the region's largest communities and serves as the regional hub for aviation and marine transport. It has one of the area's largest fish processing plants providing an economy to about 20 area villages. The current runway is too short to allow for cargo jet service. In order for jets to fly into Emmonak, they need a minimum of 6,000 feet to land and take off safely. Lack of transportation capacity limits fishing in the lower Yukon and the economy of the region. This project would extend the runway to 6,000 feet, improve drainage, and install lighting (approximately 1,600 feet additional). The project will also extend the runway safety area to meet C-III standards, place embankment stabilization materials for the runway, improve drainage, improve lighting, and provide a safety area expansion.

Project E4: Improved Airport Road with Bypass Project—A 1994 Corps *Trip Report* estimated that historic erosion rates along the city's waterfront ranged from 2 to 25 feet per year. Erosion is closest to the road at the old landfill, with a vertical cut bank of about 10 to 15 feet high. Frontage Road is in this area. At the estimated rate of erosion, the next flood will take parts of this road out. Frontage Road is vital to the

community because it is the only road that the tractor trailers can haul fish to the airport to be flown out. The other existing road to the airport, Airport Road, has a tight corner that tractor trailers cannot make. Also, a utility powerline is too low for a tractor trailer to go under. To armor Frontage Road the estimate is roughly $100M. This is not a long term resilient solution. An alternate solution is to construct a new road that is away from the eroding banks of the Yukon River, which would connect with the current Airport Road after it passes through the community (show diagram and city map). It would continue to allow tractor trailer to deliver the fish to the airport to be flown out. In addition to constructing this new section of road, Airport Road will require improvements. During the 2013 flood events, the Airport Road was washed out in multiple places, leaving residents without access to the airport. Improvements to Airport Road will include elevating the road and installing culverts at existing drainages. The road will still be subject to impacts from seasonal flooding; however, the elevated surface and the addition of culverts will minimize overtopping and associated erosion. The Airport Road is owned and maintained by ADOT. The new bypass road will be constructed on City-owned land and will be maintained by City staff

Project E5: Barge Landing Area Study in Alakanuk Project— When Emmonak, Nunam Iqua (formerly known as Sheldon Point), and Kotlik flood, Alakanuk does not flood and becomes a hub for recovery. Alakanuk is seven nautical miles from Emmonak and provides a good location for a secondary barge landing site. Currently, the barge dock is located near where most of the erosion in Alakanuk is occurring. When barges are at the existing landing site, an extensive amount of forward thrust is needed to keep the barge in place during offloading. This creates a massive amount of water movement near the bank which in turn creates or accelerates continuing erosion of the shoreline of the Yukon River. Ten homes, the tribal building, and the high voltage inter-tie power line from Emmonak are threatened by the erosion problem relating to the current barge landing operations. Additionally, barges delivering goods to the community previously landed on the Yukon River side of Alakanuk. However, due to changing river patterns, this site required dredging. This project would allocate funds to for an erosion control study to evaluate approximately two miles of the Kulupuk Slough running

through the middle of the City of Alakanuk and conduct a feasibility study for a deep draft barge landing site where it will not impact the community's infrastructure nor be impacted by continuing erosion.

Local, state, and federal government incurred higher costs of the necessary materials needs for 2013 flooding repairs. Had this port been in place prior to the disaster, materials would have already been in place and stored for future use, thus reducing the high cost of flying in emergency materials. DOT flew one load of culvert and materials into Emmonak, and that single flight cost $12,000. Costs to fly materials into Alakanuk would be even higher.

Implementation of these projects would address three current operational challenges in Emmonak: overcrowding (the current unimproved condition of the barge landing facility and inefficient offloading operations create periods of significant overcrowding and barge backup);
port regulations (local oversight and regulations of cargo deliveries into Emmonak is extremely limited. Inconsistent local management and disorganized operations significantly impact the reliability of current cargo and fuel delivery and redistribution through Emmonak); and erosion and flooding hazards (persistent riverbank erosion and flooding pose a significant threat to the existing physical infrastructure of local maritime industry businesses. It also makes it difficult to bring in heavy equipment after a disaster to help rebuild the community).

The Resilient Emmonak Transportation Improvement Program Objective: This program would create disaster/climate change transportation infrastructure for innovative rural roads, a port at the mouth of the Yukon River and an extended taxiway/runway for the AVCP regional hub, Emmonak, and a protection pad for heavy equipment and essential assets in the community. Through these projects, the national objective will be met by benefiting low and moderate income persons. The cost of transportation and goods will be less expensive; therefore, benefitting the community.

Emmonak

Value Categories as it relates to the project outcomes with Budget, Leverage, and Benefits

Project	Resiliency	Environmental	Social	Economic	Vulnerable Population	Project Funds Requested	Leverage	Benefit

	Value Categories							
Port Project	X	X	X	X	X	$14,000,000.00	$3,000,000.00	estimated greater than 1
Flood Protection Pad	X		X	X	X	$4,683,000.00		estimated greater than 1
Airport Runway Extenstion	X		X	X	X	$31,900,000.00	$2,900,000.00	estimated greater than 1
New Bypass Road	X	X	X	X		Estimated $1,000,000.00		estimated greater than 1
					Total	**$51,583,000.00**	**$5,900,000.00**	**estimated greater than 1**

Increased Resilience to Current And Future Disasters: There are currently no established port or harbor facilities on more than 700 miles of Western Alaska coastline between Bethel and Nome. Currently, the majority of cargo barges must dock upriver or downriver from Emmonak as the community area itself is not well-suited for barge access, even with riverbank maintenance.

Aviation provides a vital link to everyday goods and services in rural Alaska. Alaska's vast size, harsh terrain, extreme climate and large percentage of federally protected land make airports often the only mode of transportation serving the rural population. Creating an extended taxiway/runway that can withstand disasters and climate change is critical to this hub community, as well as allowing larger planes to land. The isolated villages dotting Alaska's landscape are all connected to each other and to the rest of the world by their airports. Aviation provides that fundamental link for access to necessities such as food, mail, healthcare, education, and travel but at such a high financial cost. In terms of investment for rural access, there is simply no near term possibility of achieving a fully connective road system.

The LYRR Port project may also be linked to future statewide liquefied natural gas (LNG) distribution. The state proposed LNG pipeline project includes an "Energy to the Interior" component that prioritizes supplying gas to Alaskans first before it is exported abroad. Yukon River communities are strategically positioned to receive LNG shipments by intermodal transport from Fairbanks or Nenana or by ocean barge. The development of other untapped natural gas resources could also lead to greater demand for maritime services in Emmonak. Emmonak has permission to drill for natural gas within a 50 mile radius of the city. The

development of oil and gas resources more locally in coastal Western Alaska could also benefit from port infrastructure in Emmonak. Recent legislation also provides tax incentives for oil and gas exploration within a 50 mile radius of Emmonak; the proposed LYRR Port could provide maritime support services to this future development.

A barge dock in Emmonak would benefit many communities in the Yukon Delta, providing them access to a nearby efficient and robust port: Alakanuk, Nunam Iqua, Emmonak, Kotlik, Mountain Village, Pitkas Point, St. Mary's, Pilot Station, Marshall, Russian Mission, Holy Cross, Anvik, Shageluk, and Grayling. The nearby coastal communities of Scammon Bay and Hooper Bay may also receive barge service through the LYRR Port.

Benefit to Vulnerable Populations: The communities of the lower Yukon region face some of the most challenging living conditions in Alaska. The high costs of goods and fuel, high unemployment rates, and limited economic opportunity threaten the long-term sustainability of these communities. This program is a modest but durable investment in basic port and barge landing infrastructure, aviation structures, and road structure that may directly improve the quality of life, health, and safety of local residents. The strategic location of this infrastructure investment will allow Emmonak to act a regional redistribution hub for cargo and fuel, potentially lowering costs of living and supporting local industry. This project may also promote the continued growth and diversification of economic opportunities available to local residents in this struggling region of rural Alaska.

With well-organized management, the proposed LYRR Port project would alleviate congestion and allow for ordered regulation and efficient barge delivery operations into Emmonak. It is anticipated that this directed maritime infrastructure improvement could reduce the costs of delivering cargo to the lower Yukon region. Shipping companies may then be able to improve service and reduce cost of goods delivered to local residents and businesses. The high cost of fuel in the lower Yukon region is the product of high fuel costs statewide and the difficulty associated with delivering fuel to the region. The primary way to reduce fuel costs to Western Alaska is to maximize the efficiency of fuel delivery operations.

Port construction in Emmonak will support efficient fuel shipment and delivery that facilitate less costly offloading operations. With proper management and coordination, these capacity improvements may allow Emmonak to receive and redistribute fuel at economies of scale that could reduce gasoline, propane, and heating fuel costs across the region. Increased maritime industry capacity in Emmonak could also allow the region to become involved in several large-scale industry development opportunities.

Project Feasibility: The airport and associated access roads are essential to the health and safety of the entire community. The designs and construction practices will be consistent with projects that have been completed in rural Alaska, will not require the acquisition of new lands and can be maintained by existing equipment in the community. The port project is a much needed improvement to the community that will have long-lasting beneficial impacts including economic development, reduced prices of goods and services, increased opportunities for business and residents and overall improvements to the region.

Consultation with other Jurisdictions in Region: Emmonak is located within the AVCP Target Area. The SIWG has held several partner briefings during both phases of this project application to consult and ally with communities within the region.

Plan Consistency: The Emmonak program is consistent with and implements several projects from the following the following planning documents: AVCP Community Economic Development Strategy Plan, 2012-2017 [Dropbox Reference] and the Emmonak Local Hazard Mitigation Plan 2014 [Dropbox Reference

Community 4: Teller: A More Resilient Community for a Better Future

The community of Teller is located on a spit between Port Clarence and Grantley Harbor, 72 miles northwest of Nome, on the Seward Peninsula. Teller is connected to Nome by a 72 mile highway that is maintained by the ADOT. Teller is located across the harbor from Brevig Mission[1], and because of their road access to Nome, Teller provides decreased cost of services and increases the resiliency of both communities in the event of future disasters.

[1] Picture of Brevig Mission and Teller

Teller, population 256, and Brevig Mission, population 411[2], are both predominantly Inupiat Eskimo communities, and they both depend primarily on a subsistence lifestyle supplemented with a limited cash economy. There are two Federally Recognized tribes in Teller, the Native Village of Teller and the Native Village of Mary's Igloo and one Federally Recognized tribe in Brevig Mission, the Native Village of Brevig Mission. These two sister communities did not sustain equal damage during the 2013 presidentially declared disaster. Fortunately, Brevig Mission sustained minimal damage during this disaster, while Teller sustained significant damage during the disaster and is still recovering. This disparity is due to the direct relationship in the lack of resilient infrastructure in Teller to decrease the amount of damage that is sustained during a natural disaster. Correcting this disparity is one of the primary desired outcomes of this application and provides the basis for the projects that the State of Alaska is proposing in this application. All of the projects that are being proposed for HUD-NDRC funding were developed by the community of Teller and are published community priorities[3].

The median income per capita and household income in Teller [4] coupled with the high rate of unemployment (55%) and the large percentage of children (48%) and elders[5] (6%) in the community poses additional challenges for this community to recover after a natural disaster. This vulnerable population demographic limits Teller's financial and economic resources for funding resilient planning, which is why the State of Alaska and the community of Teller work together collaboratively on recovery and resiliency efforts, before and after natural disasters. However, Alaska Natives are a very resilient people because resilience has always been a part of their culture[6]. Teller epitomizes this inherent resilience through their local actions to adapt to a changing climate. Teller may not define their actions as resilient solutions, but their efforts to advance their community past where they were before the 2013 presidentially declared disaster, to improve the quality of life for their people, and to increase the economic stability of their entire region defines resilience. These efforts will continue regardless of funding through the NDRC-HUD grant competition, but with additional funds

[2] DCRA Population Data
[3] Teller Local Economic Development Plan
[4] DCRA Poverty and Income Data
[5] Elders in Native Alaskan culture are over the age of 60.
[6] National Climate Assessment

provided by HUD through this competition, the State of Alaska proposes to augment and assist the community of Teller with their dream of creating a resilient community. Teller's goals are replicable and will provide a model for other imperiled communities in Alaska.

The State of Alaska in conjunction with the Community of Teller proposes to develop the following nine projects that address the unmet needs after the 2013 storm:

Mitigation and Economic Recovery and Revitalization Projects:

T1: Wind Energy Project

In 2013 during a severe fall storm, the electrical intertie that bridged the two communities sustained significant damage[7]. This storm caused $6,788,357 worth of damage in Teller[8], resulting in presidentially declared disasters (DR-4150-AK and DR-4160-AK) but also heavily impacted the Kawerak region as a whole resulting in $8,996,639.10[9] worth of damage.

This damage to the intertie has not been repaired and leaves Teller with a dilapidated power plant to supply its power. Frequent power outages have led community members who are able to purchase personal generators, but as the majority of this community is living in poverty, many people are living without power for extended periods of time.

The Alaska Village Electric Cooperative (AVEC) proposed an alternate project instead of replacing the intertie, because they felt that the area was no longer suitable for the intertie due to the expectation that the effects of climate change in that area will only increase. AVEC is committed to providing a solution for Teller's power supply problems that are still an unmet need as a result of the declared disaster and the design of a new power plant for Teller is underway. This new power plant is planned to be further from the coastline, but due to funding limitations, does not include a renewable energy component that would decrease the costs of electricity for the community. While building a new power plant in Teller is a step in the right direction, the State of Alaska would like to enhance this project by including a HUD-NDRC funded wind-energy component that would not only decrease the utility costs for the residents of Teller, but also provide an avenue for additional

[7] Picture of severed intertie
[8] AVEC FEMA Project Worksheet
[9] FEMA Project Worksheets for the Kawerak Tribal Region

budgetary savings through wind-heat production. The cost of fuel ($6.15 a gallon for gasoline and add cost for diesel) and electricity (.65 cents/KWH) are substantial costs for a local tribal and municipal budget[10] and inhibit economic revitalization and development.

This project entails the construction of two wind turbines and a tieline that will connect to the new power plant. The tieline will follow the Nome-Teller highway to Teller.

Cost: $4,072,000

Leverage: DR 4050 FEMA PW (AVEC): $6.8M

Project T2: Innovative Seawall Improvements

USACE identified an erosion area that is about 600 ft long with a 10 ft high bank in Teller[11]. The erosion is reported to be slow, but persistent. USACE identifies the existing seawall as protecting the town and its critical infrastructure from storm surges. USACE also identified that without this seawall, slow and persistent erosion would be expected to continue, and infrastructure immediately adjacent to the seawall, such as the school and sewage lagoon, would be jeopardized if left unchecked[12].

The seawall in Teller has protected the community since before 1980, and while it is old, it did protect the community during the last three major storm events in 2011, 2013, and 2014. The seawall was evaluated by FEMA, and a project worksheet was completed[13] in 2011, but before repairs could be conducted, the seawall sustained additional damage during the subsequent storm events. FEMA ruled that the seawall repairs were ineligible because they were unable to distinguish between the damages of the two natural disasters. The seawall in Teller is the community's first priority listed on their Local Economic Development Plan[14], and this desire was reaffirmed at the stakeholder community meeting held on August 25th, 2015 in Teller, AK[15]. This seawall project is critical to the longevity of this community and is still an unmet need.

[10] City of Teller Annual Budget
[11] Army Corps of Engineers Baseline Erosion Assessment: Teller
[12] September 21st, 2015 Correspondence with Bruce Sexauer, P.E. Chief, Civil Works Branch, CEPOA-PM-C, Alaska District, US Army Corps of Engineers
[13] FEMA Project Worksheet- Seawall
[14] Local Economic Development Plan
[15] Community Surveys

The 1984 (DOT/PF) *Task Force on Erosion Control Final Report* recommended that portions of the seawall should be replaced with more resilient construction. This seawall has been maintained and monitored by the Community of Teller since it was constructed and has been an effective means of mitigating storm surges until recent history. Teller is part of the Kawerak Tribal Region. This area of Alaska has been subjected to extreme storm events over the past few years, with the most severe events occurring in 2011 and 2013. These storms are causing more damage than they did historically due to climate change[16]. Historically, Teller would have been protected by a buffer of sea ice that would protect them from fall storm events. With the advent of climate change the sea ice forms later in the year and melts earlier in the year, leaving the community more vulnerable to storm events than in the past. The time has come to implement the recommendation of the USACE and install innovative technology and revamp the seawall in Teller so that it can continue to protect the community. This project will have additional benefits beyond protecting the new community power plant; it will also protect other critical infrastructure in Teller.

The community of Teller has done a commendable job in adapting to the changing climate and maintaining the seawall, but this community is a subsistence community and their per capita median income is only $10,498, leaving the City of Teller with a non-existent tax base to raise revenue to undertake a large scale capital improvement project.

Local community members have also voiced concerns that the local sewage lagoon is impacted during severe storm events, allowing human waste to escape the boundaries of the lagoon and enter public roads adjacent to the local school. This is a public area that is frequently inhabited by children so this is a significant environmental health concern. Community leaders have encouraged the State of Alaska to evaluate innovative seawall technology to divert water away from the lagoon, removing this threat to public health and to the environment.

[16] National Climate Assessment

Utilizing HUD-NDRC grant funds, the State of Alaska proposes to implement the recommendations made by the USACE and ADOT&PF[17] and construct a resilient seawall to protect Teller's critical infrastructure and eliminate the threat to the public health and to the environment.

The existing seawall in Teller is situated along the spit on the west side of the city, which separates Port Clarence to the west and Grantley Harbor to the east. The seawall was intended to protect the city from high waves which occur during storm surge events association with fall storms. The existing seawall consists of a variety of materials including a wood retaining wall, sheet piling, riprap and gabion baskets and has failed in several locations. Storm surges now flood into the village unimpeded and threaten the school, sewage lagoon, homes, and businesses. The proposed seawall improvements include removal of the existing seawall components and replacing with a new sheet pile wall, rip rap, and a gravel berm set back from the active beach zone. The new sheet pile wall would extend approximately 1,000 feet from the bluff near the cemetery to the north along the beach. The top of the sheet pile wall would be constructed to elevation 14, the historic flood level for Teller. Large riprap would be placed on the ocean side of the wall to de-energize wave action before it reaches the sheet pile wall. Additionally, a gravel berm would be constructed above the sheet pile wall for additional storm surge protection.

Metrics: The success of this project will be measured quantitatively by the number of feet of shoreline saved from erosion in the years following construction of the seawall and the number of homes that will be protected from flood damage. We will also measure qualitatively the relief of psychological stress of community members who now feel protected by the seawall.

Project T3: Road Elevation for Flood Prevention

The Nome-Teller highway connects Teller to Nome, but it also connects the newest housing development in Teller to critical infrastructure, including the local school and medical center. A section of this highway floods annually during and after storms events, cutting off the new housing development from the rest of the community. Without access to critical infrastructure and medical care, Teller cannot be truly resilient

[17] Teller Sea Wall Presentation, 2/6/15

because not all of their community members will be able to recover equally. During our August 2015 community meeting, one local told of how his elderly father was injured and unable to travel to the clinic to seek treatment because the highway was flooded. The proposed wind-energy transmission line is also planned to follow the highway, and this section of road would need to be made more resilient to flooding events regardless in order to prevent creating a similar situation that rendered the intertie project between Teller and Brevig Mission unreliable.

The primary road in Teller, Front Avenue, extends along Grantley Harbor on the east side of the city from the spit to where it connects with Bob Blodgett Highway. Approximately 1.5 miles of Front Avenue sit below the historic flood level (elevation 14). In order to provide a safe evacuation route for the residents of Teller, Front Avenue needs to be raised to elevation 14. The existing road is approximately 20-feet wide. The proposed road would match the existing roadway width with 2:1 embankment slopes. Several areas along the coast will likely require riprap protection to minimize erosion. Culverts extending from one side of the new road to the other will be needed to allow any storm water that may overtop the proposed seawall to exit the other side of the roadway.

Metrics- This project will be measured quantitatively by tracking the number of flood events and storm surges in the future and comparing them to the number of times the Nome-Teller highway is impacted by these events. This will be a successful project if all residents in Teller have equal access to medical care before, during, and after a natural disaster.

Project T4: Debris Removal

In order to recover more quickly in the event of another natural disaster, the Native Village of Teller and the Native Village of Mary's Igloo have secured funding for debris removal within Teller. They plan to remove and transport out of Teller for proper disposal and recycling, hazardous material and scrap metal that would pose an environmental and/or public safety hazard in the aftermath of another natural disaster. Because scrap metal and construction and demolition debris are planned to be removed utilizing this funding, the State of Alaska would like to utilize HUD-NDRC grant funding to augment this local project to increase the amount of debris that is

removed. Because the new power plant is scheduled to begin construction in the fall of 2016, the demolition of the current power plant would fall outside of the grants awarded to each of the Federally Recognized tribes, and only materials created during the construction process would be eligible for removal under the tribal projects. If the State of Alaska were to receive an award for additional debris removal funding, we could increase the amount of debris that the community could divert for proper recycling or disposal during their tribal project, plus we could include the demolition debris generated in 2017, and allow the community an additional opportunity to remove material so that they can recover more readily after another natural disaster.

Leverage: $45,000 for Native Village of Teller and $45,000 for Native Village of Mary's Igloo.

Metrics: This project will track the total number of pounds of waste removed from the community for proper disposal and/or recycling. This project will also track hazardous materials that are removed, regardless of the total weight.

Improving the Quality of Life Projects

Project T5: Water and Sewer Improvements

The community of Teller is one of three dozen Alaska Native Villages[18] that are still living without water and sewer services. Teller is also part of an even smaller demographic that also does not have a functioning Washeteria. A Washeteria is a community building that provides a place for people to shower and wash laundry. The Washeteria in Teller does have two toilets and a laundromat and is managed by the local School District. Both toilets have not been functional in many years, and the laundry services are limited to a single washer and dryer. The current method of providing toilet services, is with a honeybucket, a 5-gallon bucket with a plastic bag in it to catch human waste. Without running water, there is not a means to wash your hands after using the communal honeybucket. When the honeybucket fills with waste, the bag is tied and the waste is hand carried to an unpermitted site for disposal. It is not uncommon for some communities to forgo the use of bags and carefully carry a full honeybucket to a dump site. This often leads to spills and contamination.

[18] Juneau Empire News Article

Without access to clean drinking water and basic sanitation needs, levels of respiratory infection and rashes are extremely elevated, leading to increased medical care costs and more sick days. Reliable access to clean drinking water and sanitary means of managing human waste should be a basic human right because without these services it is impossible for a community to flourish. This is one of the primary unmet needs for the community of Teller and is a significant roadblock to their ability to prepare and recover in the event of a natural disaster. This project is scalable because it can be broken down into two phases: design work, and construction. If HUD could fund both phases, this would fulfill this unmet need for the community of Teller; however, the State of Alaska and USDA are working together on addressing the water and sewer challenges in Teller. Some projects are currently underway, but it will realistically be 5 to 10 years before Teller will have their basic sanitation needs met under the current fiscal climate and funding availability through the USDA Rural Development RAVG fund. CDBG-NDR funding would allow this community to leapfrog forward, improving health and safety and the likelihood that they could recover more quickly from the impacts associated with recurring flooding. Leverage: EPA $2,771,600 committed leverage towards new water and sewer system. NSEDC $850,000 for upgrades to current Washeteria.

Metrics: This project will be measured quantitatively by tracking the total number of respiratory illness visits to the local clinic. This project will also be measured qualitatively by surveying the community members and asking how having adequate sanitation has improved their lives. The survey will address psychological benefits, social cohesion, and community pride.

Project T6: Elder Food Pantry

With the advent of climate change, the community of Teller recognizes that many of their local subsistence foods may become harder to access and may change in availability from season to season. For the past few summers, the Kawerak Tribal Region and Teller has had tremendous variation in the bounty of local berries, ranging from almost no availability to a crop so prosperous that storage space became limited. Traditional foods make up the majority of the diet in Teller, but the community lacks the storage space available

and the canning, refrigeration, and freezers necessary to store excess traditional foods when they are available. This is an unmet need for the community of Teller[19].

The community of Teller has tried for many years to get grant funding to start a program to serve their elders. Access to proper nutrition is essential for this vulnerable population. Many elders have limited mobility, and their ability to hunt, fish and gather their own foods has significantly decreased. The community of Teller has tried to fulfill this unmet need for their elders by applying for funding for a food pantry and a program for providing meals that include traditional foods for their elders, but has been unsuccessful in securing grant funding for this worthy program. Teller does participate in the State of Alaska elder nutrition program, but the food that is supplied is generic for all communities and is made up of food that is not traditionally consumed by Alaska Natives. The digestive tracts of elders are sensitive, and they do not adapt well to consuming heavily-processed foods. This led to the planning effort behind the Teller Elder Food Pantry. This program would be managed by the local tribal government and would provide a central storage facility for traditional foods and food preparation for elders. It would also allow them to prepare traditional foods and deliver them to elders who have decreased mobility. This project also would provide socioeconomic benefits, because it would provide employment opportunities and the preservation of culture for the elderly in Teller. The State of Alaska is asking for start-up costs for this program only; this program would be managed and sustained by the two local Federally Recognized Tribes after the first year of funding.

Metrics: This project will be measured quantitatively by recording the number of meals served to the community during 2017 and 2018.

Project T7: Community Garden

With the advent of climate change, the community of Teller is cognizant that some of their traditional foods may be harder to access than before. They have access to programs that will supply free seeds for growing local crops, but they lack the soil that would be required to be successful with local gardening. The community would like to have a community garden to increase the availability of nutritious non-processed food.

[19] Elder Food Pantry Grant Information

Children and the elderly would have priority access to the food grown in the community garden, but in similar communities in Alaska that have a community garden, there is usually excess available to the community at large after the children and elders' needs have been met. This project can stand alone from the Elder Food Pantry, but if HUD were to fund both programs, it would lead to increased food security for the community and would increase their over health. Adequate food security is essential for recovering and being resilient after a natural disaster.

Long-Term Planning and Commitment Projects

Project T8: Community Development Building

Mary's Igloo's Community Center Project developed because the current facilities are unsafe, unhealthy, small, old and dilapidated, and/or non-existent. The previous Mary's Igloo Traditional Council Office Building was destroyed in a fire.

The community of Teller has worked with Stantec and CCHRC to design a new community building. The design of the building is included in this application and is at 95% completion. The City of Teller has provided land to build the new building. The total construction cost is $2,300,000. The new building is a priority on the Local Economic Development Plan. This project has a commitment of $260,000 from Norton Sound Economic Development Corporation (NSEDC) and is requesting $1,000,000 from the NSEDC Large Infrastructure Grant Program. The $1,000,000 in funding will help leverage funds from the Rasmuson Foundation and Murdoch Charitable Trust for the remaining balance so Mary's Igloo can complete the construction. It is very urgent that the building be constructed in a timely fashion before the architectural plans are outdated and construction costs increase.

The new facility will have an impact on member communities from all over the region primarily Nome, Teller, Brevig Mission, Wales, and Shishmaref. The project has received an Our Town grant award from the National Endowment for the Arts to integrate local and regional culture into the design of the building. The building will showcase regional culture and will include government office space, library, commercial kitchen,

large meeting room (Native dancing), workshop and small business operation space, cultural museum, and gift shop (for regional arts and crafts).

In the Bering Strait Region, the need for cash is critical. Many people on the Seward Peninsula depend on both cash and subsistence economies for their livelihood and survival. It is necessary for many residents to combine subsistence practices with a cash income in order to purchase hunting equipment such as tents, stoves, gloves, guns and ammunition, all terrain vehicles, boats and motors, and fuel. Due to transportations costs associated with shipping these items to village locations, these expenses often equal or exceed the price of a new car or truck. The new building will impact the region locally and beyond by promoting wellness, culture, and economic development. The new facility will also become a significant destination for regional community members for meetings and cultural gatherings as well as tourists who use Nome as a base for regional travel.

Mary's Igloo Community Development Center Project directly relates Bering Strait Comprehensive Economic Development Strategies (CEDS) by addressing community poverty through entrepreneurship and economic development. The new facility directly relates to these Bering Strait CEDS goals and objectives:

Goal: Strengthen the region's economy through tourism development.

Objective 1: Expand tourism activities throughout the region

Objective 2: Encourage the construction of a multi-function facility, which offers cultural information, performing arts, visitor information, museum space, and other types of education information

Goal: Increase regional employment and income per capita through small business start up and expansion.

Objective 1: Support of regional processing operations to harvest reindeer and produce value-added products for wholesaling and export.

Objective 2: Develop training for small business management and operation, including training for specific business opportunities identified as being feasible in the region

Objective 3: Explore feasibility of community kitchens as business within the region for berries, teas, and other traditional foods for sale and export.

Objective 4: Encourage the use of Internet and other new technologies to promote business development.

Objective 5: Provide local outreach or incubator for computer business development

Objective 6: Market local trade and tourism in metropolitan areas.

This project will address the economic distress that lack of a community facility has caused to the community. The inclusion of small business incubator space will provide a fresh, innovative approach to building the businesses and jobs for the future. This facility will welcome people and showcase the culture and economic development efforts.

Proposed Time Schedule

Grant Applications to Rasmussen Foundation and Murdoch Charitable Trust

November 2015

Stantec and Cold Climate Housing Research Center will present final design documents and organize a strategy for procurement of materials and construction contracts (December 2015).

Order materials and supplies and put out bid for contractor (March 2016).

Hire contractor (April 2016).

Construction (July 2016).

Move in (December 2016).

Costs: $2,283,615.61 for total building. $350,000 cash match from the Native Village of Mary's Igloo. HUD-NDRC funding 1933615.61. There is an outstanding grant application to NSEDC for 1 million dollars, but that award has not yet been announced.

Vocational Training

The community of Teller would benefit financially if their people were provided the training necessary to work on NDRC-HUD funded projects in addition to other capital improvement projects that may be available in the coming years. Providing this training will provide economic revitalization and stability, because it will allow trained individuals from Teller to compete regionally for skilled employment. This training will also provide the community with the skills they need to operate and maintain current and new infrastructure projects in Teller, including NDRC-HUD projects.

Zender Environmental, who provides significant vocation training for the State of Alaska has pledged their service towards this project. However, Zender Environmental has a limited amount of seats available annually for vocational training, so the State of Alaska would like to augment their services and provide additional vocation training opportunities for the community of Teller. The State of Alaska would also like to provide training in skilled trades that Zender Environmental does not provide, including carpentry and technology training, which will be required with alternative energy projects.

Costs: $200,000 in NDRC-HUD funding for Teller Specific Vocational Training.

Leverage: Zender Environmental provides job trainings in addition to their other services. Each year, they receive $100k from EPA, about $109k from DOL, $20k to $30k for tuition or travel from UAF, and about $25k from University Washington. They can provide multiple trainings for any of these projects. Related to environmental, but also their DOL grant will cover a number of other certifications. The only required course is HAZWOPER. They develop curriculum based on need.

Project T9: Recovery and Resiliency Study for Critical Infrastructure

This study would provide an adaptation plan for the community of Teller. The community has developed a new subdivision outside of the current community in an area less vulnerable to climate change. This location shows promise, as a small section of land near this new housing development was evaluated for the new Washeteria[20], and was found to be suitable for development. Further evaluation of this area is necessary to determine the location of permafrost or other geological factors that may inhibit the development of additional infrastructure. It is not currently known if this new area has the geological support necessary for additional infrastructure to be developed, and this is critical information that is needed for long-term planning in Teller.

Cost: $250,000

Teller

Value Categories as it relates to the project outcomes with Budget, Leverage, and Benefits

[20] New Washeteria Design and Construction Plans

Project	Resiliency	Environmental	Social	Economic	Vulnerable Population	Project Funds Requested	Leverage	Benefit	
	Value Categories								
Wind Energy Project	X	X	X	X	X	$4,072,500.00		estimated greater than 1	Estimate from AVEC
Seawall Improvements	X	X	X	X	X	$4,542,500.00		estimated greater than 1	Engineers Estimate
Road Improvements	X	X	X	X	X	$2,974,800.00		estimated greater than 1	Engineers Estimate
Debris Removal	X	X	X	X	X	$90,000.00	$90,000.00	estimated greater than 1	Info from Community/ Trish
Water & Sewer Improvements	X	X	X	X	X	$18,000,000.00	$3,621,600.00	estimated greater than 1	CE2 Master Plan Estimate
Elder Food Pantry	X	X	X	X	X	$60,000.00		estimated greater than 1	Info from Community/ Trish plus additional for back-up generator
Community Garden	X	X	X	X	X	$70,000.00		estimated greater than 1	Using Galena's numbers rounded up
Community Development Building	X	X	X	X	X	$1,673,615.00	$610,000.00	estimated greater than 1	Cost from Stantech Design/Community receiving $260k from NSEDC and cash match from Mary's Igloo
Vocational Training	X	X	X	X	X	$200,000.00	$100,000.00	estimated greater than 1	Numbers from Zender
Recovery & Resilience Study	X	X	X	X	X	$250,000.00		estimated greater than 1	WAG based on similar studies done previously
					Total	**$31,933,415.00**	**$4,421,600.00**	**estimated greater than 1**	

Summary:

Teller is an ideal location for a resilience project because the erosion there has been proven to be manageable through mitigation; the community has already taken the initiative to move their new housing out of the flood zone; they have already secured funding for hazard mitigation and debris removal during the proposed project period; and they have already successfully secured funding for improvements to their water, sewer, and landfill through USDA during the proposed project period, which will allow the community to leap frog forward and become a resilient community with the ability to recover from future disasters, not only for themselves, but also

for their sister village, Brevig Mission who relies on Teller for security and critical services during and immediately after a disaster.

Teller is also one of two areas being evaluated for a deep water port for the Arctic Passage. The area is already being utilized by local maritime traffic during storm events because Port Clarence is naturally protected because of its geologic shape. Also, ships that are able to pass between the two gravel spits can shelter from severe storms in Grantley Harbor. It is not uncommon for the harbor to be relatively calm when compared to the Port and the Bering Sea during a fall storm. If a deep water port is developed in Port Clarence at the existing military station, it has the potential to supplement the local economy in Teller. As the area around Teller is naturally suitable for a deep water port and would require little to no dredging, and infrastructure is already in place at the military Long Range Radar Station, and a large group of national and international leaders recently visited the site for evaluation, it is not unreasonable to expect that Teller may become instrumental in the near future in helping to manage the Arctic Passage for the United States.

Project Title: Moving From the Past into the Future

This project focuses on the development of an organizational structure and methodology to support Alaskan communities in their efforts to develop climate change adaptation strategies based on applied science, local observations, and community engagement. This methodology recognizes the state's early history and climate work with vulnerable riverine and coastal communities which influenced the recognition of the effects of climate change and motivated a vision for the future. The central theme of this project is molding a future where communities can foster their resilience and adaptation through a collaboratively developed methodology that improves access to resources, information on technological advances, adaptation best practices and assists with intergovernmental bureaucracies. This proposed project would develop a concerted organizational structure linking three existing climate change adaptation projects by Alaska Native Tribal Health Consortium (ANTHC), Alaska Institute for Justice (AIJ), and the State of Alaska's lead agency on community engagement and documentation of climate change impacts, the Division of Community and Regional Affairs (DCRA). This structure will develop synergy amongst local, regional, state, and federal stakeholders to support rural Alaska

Native communities in building adaptive capacity to prepare for, respond to and recover from the impacts of climate change. These three specific adaptation activities are stand-alone projects that combined develop a planning continuum that can be leveraged by the communities for planning and implementation purposes.

These three adaptation activities related to the climate change effects on social, economic and cultural activities in rural Alaska communities are; 1) DCRA's Alaska Community Coastal Protection Project, a resiliency planning effort, with Community Inter-Agency Working Groups on "Defend in Place" or Relocation options in Kivalina, Newtok, Shishmaref and Shaktoolik (Dropbox file reference 1); 2) ANTHC's Local Environmental Observer (LEO) program which engages communities as front line observers of climate change. (Dropbox file reference 2) LEO provides a platform to document impacts through (citizen science) and exchange information between local observers and experts related to the observation. This program builds capacity for planning, addressing environmental health concerns through opportunities for dialogue with field experts and the science community. This program has been implemented throughout rural Alaska and has observers in Alaska, Canada, Greenland, Washington, Oregon, and Arizona. ANTHC also offers 7 Generations, an interactive training workshop, which introduces a community-based curriculum for developing local environmental plans, raises awareness associated to emergency preparedness and climate change (Dropbox file reference 3) ; and 3) Alaska Institute for Justice has received a $287,000 NOAA grant to research and develop an adaption methodology template by working with 5 of the 31 imperiled communities identified in the 2009 Government Accounting Office (GAO) report *"ALASKA NATIVE VILLAGES - Limited Progress Has Been Made on Relocating Villages Threatened by Flooding and Erosion*. (Dropbox file reference 4)

These activities overlap in some ways and have the potential of collaborating to form a planning continuum with a spectrum ranging from: identification and monitoring to building capacity and planning then ultimately to implementation. At the early stages of a planning process a community must build awareness. The LEO and 7 Generations programs build the community capacity to implement data collection (citizen science) and awareness, but at present don't collect data specifically for the purpose of engaging government officials in developing a methodology for action on climate change impacts. This activity would require additional funds

(see attached budget and schedule) leveraging ANTHC's original investment and ongoing program management costs to develop the next generation of the LEO mobile app. The development of this new tool would expand the environmental and public health event data collection capabilities at the local level. The expansion would include the ability to log geographic coordinates, designate specific transects or polygons of interest and to illustrate with audio, photo or video images. All captured content could then be transferred to a web and/or hand held map for analysis and/or sharing to appropriate planners, topical experts or responders. Features may also include GPS, polygon or track maker (which can be used to map coastal erosion), notifications and scheduling tools. Upon development, the enhancements will be tested within the NDRC targeted areas (first) to supplement the impact of the other proposed NDRC projects. This is particularly important in remote villages of Alaska where the ability to respond to disasters is limited by weather. The 7 Generations program curriculum currently focuses on providing communities with basic awareness of environmental impacts commonly observed in rural communities, including climate change. It introduces them to a community-based planning process that prepares them for and respond to these impacts. This activity will expand the climate change curriculum and host workshops in all three targeted tribal areas of the NDRC application (Dropbox file reference 5).

Following the identification and documentation portion of the continuum a community must build the capacity to monitor and assess the problem. The focus of the Alaska Institute for Justice (AIJ) NOAA grant is to collaborate with 5 imperiled coastal communities to collect information and monitor impacts of climate change with the specific goal of engaging government officials in an effort to take action to address climate change impacts in the community. Their efforts are a collaboration between AIJ, ANTHC and the Alaska Native Science Commission. The selection process for these five communities has not been completed. This will leverage the NOAA grant by adding two riverine communities to the scope, adding to the robustness of the research by comparing results for both riverine and coastal communities. The two riverine communities will be in NDRC target tribal areas (Dropbox file Reference 6).

The next step on the continuum is planning. This effort must engage government, community and regional leaders in direct discussion on choices that need to be made in determining a community's adaptive strategy to either defend in place or relocate. DCRA's Coastal Protection Project is an ongoing project in 4 communities, three of which are in two NRDC target tribal areas. This proposed activity will leverage the commitment DCRA has already made to expand the Inter-Agency Working Group model two other communities in NRDC target tribal areas, Teller and Emmonak. (Dropbox file reference 7).

The last activity is a summary report on the activities funded under this project. The report will develop a written comprehensive methodology that helps communities build awareness through observation and education, develop assessment and monitoring capacity and engage in a collaborative planning process to evaluate needs and combine resilience measures into alternative plans for comparison. The report will present an evaluation of the effort, detailing the changes in the metrics proposed. Direct metrics for this activity are related to community participation; the percentage increase in observations in the LEO system from 2013-2014 baseline of (28%); percentage increase in the number of youth observers; percentage increase in 7 Generations workshops held in prior year(2014); the change in participation rates in the engagement process of the AIJ study and DCRA's community strategy sessions; and ultimately the number of communities that begin an adaptation strategy process beyond the 4 DCRA is currently working with. Completion of all of the proposed activities will influence larger metrics for resilience, environmental, social and economic value.

The report will be a step-by-step guide which documents the transition process a community will go through, from awareness to action. It will be prepared through a professional contract, steered by a committee made up of ANTHC, AIJ, community stakeholders and DCRA. DCRA will serve as the project manager (Dropbox file reference 8).

Together, all the proposed activities will decrease risks to vulnerable populations and improve community resilience in a number of ways; 1) train local people in the "citizen science" needed to recognize and collect data on climate change and environmental issues; 2) reduce social stresses attributed to a lack of resilience

measures; and 3) using a proven stakeholder engagement process, give communities (local, regional, statewide) a clear methodology to assess and improve resilience.

This activity is a replicable model for a planning continuum that any community facing future certain impacts from climate change can use. At least one activity (LEO) is already being used by people in other countries and states. The activity is scalable in that positive outputs and outcomes related to adaptation planning will be achieved even if one or the other components aren't funded under NDRC. Funds would enrich collaboration between similarly focused programs which would offer more holistic resources to communities. It incorporates and builds upon these existing programs that have sustaining funding for current operations but without NDRC lack a comprehensive outcome.

This project is very feasible. From an implementation perspective; ANTHC has already successfully implemented both activities throughout Alaska by leveraging their relationships with Native communities and working with experienced software and curriculum developers. AIJ has already begun the NOAA grant using accepted research practices and methodologies in partnership with other agencies. DCRA has been conducting community engagement activities for many years with an experienced staff of Planners and Local Government specialists. This is a planning and research project using existing models. The $1.5 million budget estimate (Dropbox file reference 9) for all activities and the schedule of work are based on realistic estimates of previous work (ANTHC) (Dropbox file reference 10)) and current efforts (AIJ) (Dropbox file reference 11)and DCRA) (Dropbox file reference 12). From a "protection" perspective; the outputs from this activity (software and the step-by-step process to build a community based adaptation strategy) have no shelf life. They have a continuing usefulness far into the future. Preparation to address risks, rebounding faster from the next event will help each community reduce the threats and hazards of climate change.

ANTHC currently hosts the LEO network on its webpage and maintains the 7 Generations programming. The usefulness of these activities will be maintained as core programming of ANTHC. The results of the AIJ NOAA research project will be maintained in the final adaptation guide produced as a part of this project.

DCRA will host the guide on the State of Alaska Community and Regional Affairs on its website and use it as part of the stakeholder engagement process for community resilience planning. A minimal amount of resources will be needed to maintain these activities' usefulness over the long run.

Regional Consultation

Representatives from the Alaska and Louisiana NDRC teams met in August of 2015 and agreed to share information, research and outcomes from the NDRC projects regardless if one or both applications are funded. Coastal communities in Louisiana and Alaska are dealing with very similar issues of displacement by the impacts of climate change. Since 2005, indigenous people of Alaska and Louisiana have met in each other's homes to evolve a common vision of resettling their communities in the face of environmental catastrophes--climate change and loss of viable homeland – and challenges of resettlement implementation. The present HUD National Disaster Resilience Competition presents an opportunity for the communities of both states to continue and formalize this relationship, collaborate going forward and benefitting from each others' experiences as they work to preserve community integrity in a more resilient home space. The collaborative efforts will generate more configurations of needed relocation forms to benefit national resettlement policy for the nation (Dropbox file reference 13). A cooperation plan includes tribal group meetings together via teleconferences and Skype, and if the two states both receive the awards, provisions for face-to-face meetings through already-committed leveraged funds to continue robust collaboration.

In August of 2015, President Obama announced that the Denali Commission will be the federal coordinating agency for research on the environmental dangers facing climate impacted communities in Alaska. The Denali Commission has pledged $2 million towards this effort and re-affirmed its long standing commitment of coordination with the State of Alaska on programs and projects (Dropbox file reference 14). The coordination and leveraging of the Denali Commission funding, with the ANTHC, AIJ NOAA and DCRA activities will add substantial value to this project. The Denali Commission findings can be incorporated in these activities,

creating a community feedback loop to the Denali Commission. The citizen science produced through the LEO network will provide on the ground data to the Denali Commission improving the robustness of their research.