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Kivalina Strategic Management Plan

Kivalina, Alaska

September 2016

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Kivalina Strategic Management Plan

Prepared for the State of Alaska
Department of Commerce, Community, and Economic Development (DCCED)
Division of Community and Regional Affairs
on behalf of the Community of Kivalina
by HDR with RIM First People

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Executive Summary

Kivalina is a traditional Inupiat community located in the Northwest Arctic Borough of Alaska. The community is located on a barrier island off the Chukchi Sea, 83 miles north of the Arctic Circle. Historically, the marine waters around Kivalina have been ice-free from early July through late October, but later freeze-up and earlier melting have resulted in longer ice-free periods during recent years. This has left Kivalina facing significant risks from storms, such as flooding and erosion.

Residents of the community have expressed concerns about storm surges and erosion for decades. The longer ice-free period that has resulted from the changing climate makes the village vulnerable to dangerous fall storms. Storm events in 2004 and 2005 eroded the Chukchi Sea shoreline, threatening critical infrastructure and facilities, including the community fuel tank farm, school, and airstrip. Chronic erosion on the lagoon side of the island has threatened homes, while on the sea side of the island, fall storm surges create annual coastal flooding and beach erosion.

It has long been apparent that the island will eventually succumb to natural forces and that the village will have to be moved. Extensive studies have been undertaken, alternative village sites have been identified, and cost estimates have been prepared.

Kivalina faces some considerable challenges as it charts its future course. While many people wish to relocate the community, little progress has been made since the since the first community election on relocation was held more than 50 years ago. The current emphasis is on developing an evacuation road so residents have a safe place of refuge to use in case of an emergency while they determine their long-term future.

The *Kivalina Strategic Management Plan* (SMP) is an 18-month project with the Alaska Department of Commerce, Community, and Economic Development (DCCED) and the community of Kivalina. The objective of the project is to increase community sustainability and resilience to the impacts of natural hazards while protecting the natural coastal environment. The project is based on the premise that careful planning, agency collaboration, and strong community leadership are essential to successfully addressing the needs of imperiled communities.

Photo courtesy: Millie Hawley

What is resilience?

This SMP will provide the "blueprint" for how the community and agencies will proceed to make Kivalina a more resilient community.

The term "resilience" is defined for the purposes of the SMP as the following (DCCED 2012):

> *Resilience is the capability to anticipate risk, limit impact, and bounce back rapidly through survival, adaptability, evolution, and growth in the face of turbulent change. A resilient community is not only prepared to help prevent or minimize the loss or damage to life, property and the environment, but also it has the ability to "bounce back," i.e., quickly return citizens to work, reopen businesses, and restore other essential services needed for a full and swift economic recovery.*

Creating a resilient community requires engaging a diverse range of stakeholders, integrating the planning process across disciplines and levels of government, and coordinating available funding with resilience needs. A resilient community has five basic dimensions:

- **Political and government systems** that promote leadership, inclusive decision making, stakeholder engagement, community involvement, and integrated planning,
- **Environment** that provides resources, does not worsen hazards, and enhances quality of life,
- **Social/culture** connection that creates a community identity, ties community residents together, honors their heritage, and promotes a willingness to accept other cultures,
- **Robust economy** that provides employment opportunities, financial well-being, and economic prosperity, and
- **Infrastructure** that meets basic needs, provides critical community services, reduces community vulnerability, and is within the community's ability to operate and maintain.

SMP Planning Process

The SMP provides a framework to accomplish Kivalina's goal of a more resilient community. The SMP process was performed in two phases. Phase 1 focused on issue identification, review of background information, development of guiding principles, and the creation of a *Background Planning Report*. Phase 2 focused on identifying the strategic actions to address the issues identified in Phase 1. Phase 2 is documented in this SMP.

Many residents of Kivalina, along with representatives from local, regional, state, and federal agencies and organizations contributed to the creation of this SMP. They participated in community meetings and agency meetings, completed surveys, and provided feedback to community leadership. A list of those invited to participate in the Kivalina Interagency Working Group can be found in Appendix A. Additional information about community involvement can be found in Appendix B.

Vision

During Phase 1, based on community input, the following Vision Statement was developed to provide direction to the SMP process. Our vision is:

> *Kivalina is a safe and resilient community. Kivalina will:*
>
> - *Develop an evacuation road and a new school that support the community's long-term desire to relocate.*
> - *Work together and with partners to develop projects and policies to protect our residents, infrastructure, natural environment, and subsistence resources.*

- *Increase resiliency while respecting our traditional values.*
- *Be a community where existing and future generations want to live.*

Guiding Principles

Guiding principles provide the overall direction for the Kivalina SMP. Combined with the Vision Statement, they are the foundation for the SMP and provide a context for decision making so that limited capital resources can be maximized. The guiding principles were developed based on information from a literature review and community input. These principles will be used to help Kivalina achieve its goals, as well as to evaluate potential actions, which should be consistent with the guiding principles.

The SMP's guiding principles are:

- Residents must be safe from natural hazards and growing threats of flooding and erosion
- Make decisions openly and as a community
- Include local input in the process
- Protect the natural environment
- Respect our traditional culture
- Develop in a manner that strengthens the community

Reasons to Develop a Strategic Management Plan

The SMP identifies what activities the community should pursue, who is responsible for each activity, when the activity should occur, the scale of financial resources needed, and what entities can assist with implementation of the strategic action item. Reasons to develop a SMP include:

- Establish priorities.
- Simplify decision making.
- Maintain focus.
- Lend credibility to the actions.
- Enhance communication.
- Promote efficiency.
- Create accountability.

The process used to develop Kivalina's SMP included the five steps outlined below.

Development of Strategic Management Plan

Identification of Issues

The development of the SMP started with the identification of issues in Phase 1 of the project. The key resiliency-related issues identified in Kivalina include:

- Lack of/Inadequate Community Infrastructure
- Air Quality
- Inadequate Housing
- Changes to Subsistence Resources
- Lack of Evacuation Shelter/Place of Refuge
- New School
- Concern Regarding Safety
- Funding

Strategic Focus Areas

Based on the issues from Phase 1, strategic focus areas were identified. Strategic focus areas expand on the vision and start to create a structure for how to achieve it. The following strategic focus areas were identified:

- Adaptable Built Environment
- Safe and Healthy Housing
- Jobs and Economic Development
- Proactive Emergency Management
- Strengthened Traditional Culture
- Leadership for the Future

- Relocation
- Other

Preliminary Planning Schedule

Based on the strategic focus areas and the known issues, a preliminary planning schedule was created. First, the project team identified action items that helped implement the vision and were consistent with the guiding principles. Each action item was then identified as short-term, medium-term, or long-term depending on when the action was likely to be needed and the likely availability of funding. The preliminary planning schedule was then refined based on community and agency input.

Work Breakdown Structure

The preliminary planning schedule was refined into a comprehensive work breakdown structure (WBS) framework to help implement Kivalina's resiliency vision. A WBS is used to break down a project into manageable actions. It helps with project organization, assists with assigning responsibilities, helps with estimating costs and scheduling, and can help project stakeholders by providing further definition and detail of each task. This WBS includes a discussion of strategic focus areas and lays out all the action items that should be undertaken over the next 20 years.

Identification of Imminent and Critical Actions

In an emergency, the highest priority is the health and safety of community residents. This involves making sure procedures, training, and equipment are available for a safe evacuation or to shelter in place. Imminent actions are those actions the community needs in place today to protect people from harm during a hazard event. The imminent actions identified for Kivalina are:

- **Emergency Drills and Exercises** – Emergency drills and exercises provide an opportunity to practice aspects of an emergency plan, allowing people to become familiar with what is expected of them during an emergency, and help identify whether the plan meets community needs or if changes need to be made. Kivalina has an emergency plan and an evacuation plan, but there has not been a community drill for either one in recent years.
- **Personal Emergency Kits** – During a storm, Kivalina will likely be cut off from the rest of the state and will need to **be** self-sufficient until outside assistance can arrive. Residents need personal emergency kits that will last 7 to 10 days until additional resources can be brought to the village. Kivalina can either work with partners to find sufficient funding to purchase kits, find organizations willing to donate supplies, or encourage residents to assemble their own kits.

Critical actions are those action items that, if not completed in 5 years, will result in a negative impact on community safety. Implementation of critical actions should be undertaken immediately with a goal of completing or substantially completing the action within 5 years. The identified critical actions are actions that are especially important for increasing community resiliency now.

Criteria for identifying critical actions were:

- Does it save lives?
- Does it protect property?
- Can it be re-used or re-purposed in another location?

Additional considerations for identifying critical actions were:

- Does it address immediate priorities (e.g., food, water, energy, shelter)?
- How does it reflect community priorities? Does it support "shelter in place?"
- Is there funding available?
- Can it be fully implemented within the next 5 years?

The critical actions identified for Kivalina are:

- Emergency Plans/Drills
- Protective Structures
- Family and Personal Emergency Kits
- Water/Wastewater Improvements
- Traditional Knowledge
- Relocation or evacuation emphasis?

The critical actions identified are summarized below. For information on the other action items identified, see Section 3 of the SMP.

CRITICAL ACTION – Water and Sewer Upgrades

The majority of homes in Kivalina rely on water hauled from the washeteria and honey buckets. Water and sewer upgrades were considered critical by the community to improve their quality of life and public health. Based on community needs, three key actions were identified:

- Improve delivery of drinking water and sewage disposal services.
- Obtain an additional water supply.
- Protect the water source.

Improving the delivery of drinking water and sewage disposal services does not mean simply installing a piped water and sewer system. Globally, a wide variety of innovative decentralized water and sewer systems have been developed that may meet Kivalina's needs.

An additional water supply is necessary to meet the community's basic sanitation needs. The existing water supply and

Water Stored in 55-gallon Buckets

storage tanks are not sufficient to store a year's worth of water for the community. Kivalina often has to ration water in the spring, which has impacted the health of the residents. Developing additional water storage would allow residents to better meet their needs and reduce sanitation-related illnesses. The Wulik River, Kivalina's water source, has been threatened by bank erosion and the introduction of beavers. There have also been equipment failures, delaying the pumping of water from the river into the storage tanks.

Protecting the water source and the related equipment is necessary for the community to have a clean, accessible water supply.

CRITICAL ACTION – School Access Road

The Department of Education & Early Development is planning to build a new school for Kivalina. However, the school will not be built at the existing village site; rather it was decided that the new school should be built in an area called Kisimigiuqtuq, approximately 7 miles away. Kivalina needs a school access road in order to start construction on the school and to transport students back and forth. The road would provide additional benefits such as better access to additional subsistence resources and would serve as an evacuation route, if needed. A contractor has been hired by the Northwest Arctic Borough on behalf of the Native Village of Kivalina and the City of Kivalina to construct the road. More detail is provided on page 20.

CRITICAL ACTION – Emergency Drills and Exercises

Emergency drills and exercises provide an opportunity to practice aspects of an emergency plan, allowing people to become familiar with what is expected of them during an emergency, and help identify whether the plan meets community needs or if changes should be made. Kivalina has an emergency plan and an evacuation plan, but no community drills for either plan have been conducted in recent years.

CRITICAL ACTION – Personal Emergency Kits

During a storm, Kivalina will likely be cut off from the rest of the state and will need to be self-sufficient until outside assistance can arrive. Residents need personal emergency kits to last 7 to 10 days until additional resources can be brought into the village. Kivalina can either work with partners to find sufficient funding to purchase these kits, find organizations willing to donate supplies, or encourage residents to assemble their own kits.

CRITICAL ACTION – Protective Structure for Airport

The airport is Kivalina's primary transportation connection to the rest of the state and is vulnerable to erosion. For example, an October 2015 storm caused substantial erosion near the runway and the community had to use supersacks as a temporary erosion control measure. The Alaska Department of Transportation and Public Facilities is working with Kivalina to develop a permanent solution and has requested $7 million in the State budget to construct a protective structure.

CRITICAL ACTION – Protective Structure for Landfill

The landfill is vulnerable to erosion and needs a protective structure. If the landfill erodes, a substantial amount of garbage would be released into the environment and have a negative impact on nearby subsistence resources.

CRITICAL ACTION – Increase Use of Traditional Knowledge

Alaska Natives have a unique understanding of the connections between people and their environment. Kivalina should work with its partner agencies to ensure that traditional knowledge is not discounted, and to encourage the blending of traditional knowledge and western science so that all organizations can develop a better understanding of climate change and community impacts.

Each critical action is described in additional detail, along with its responsible and potential/coordinating parties, timeframe, estimated cost, current status, and reference, in Section 3 of the SMP.

Strategic Management Plan

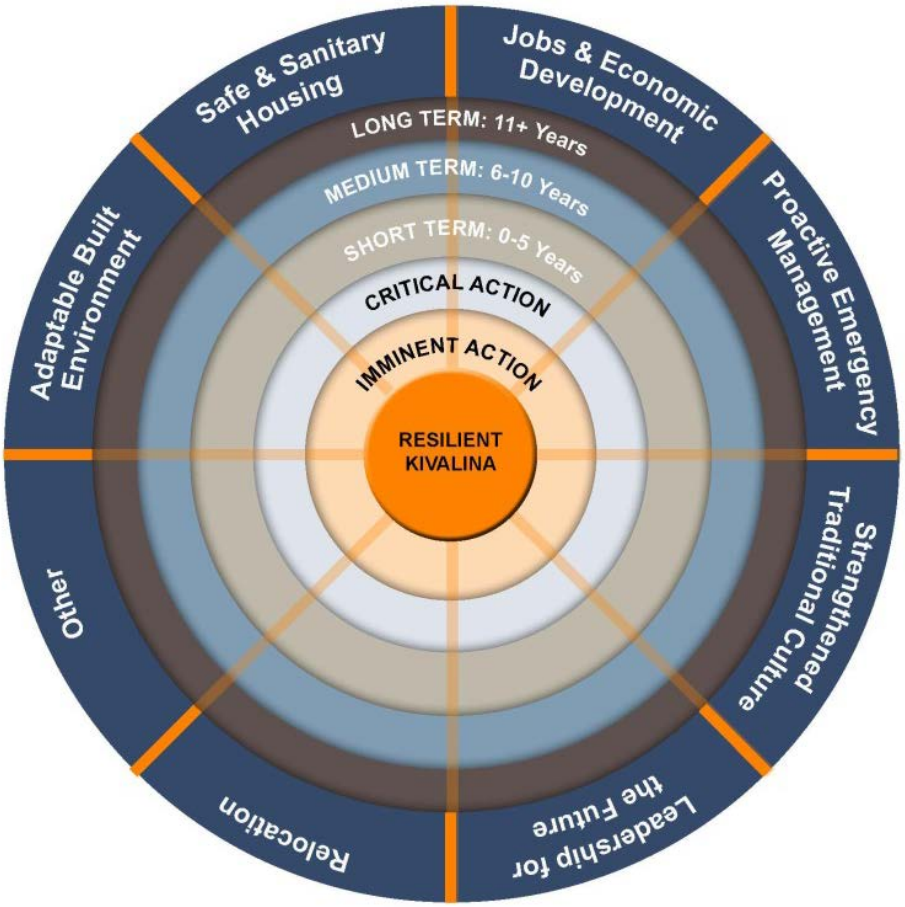
The SMP is organized by strategic focus areas. Within each focus area, critical action items are identified first, followed by short-, medium-, and long-term action items. For each action item, the following details were identified:

- **Responsible Party** – Which agency or organization has the primary responsibility for championing the action?
- **Potential Partners/Coordination** – What entities may be willing to partner with the responsible party and how can the partnership be coordinated?
- **Timeframe for Implementation** – When is the action item needed?
- **Estimated Cost** – What is the planning level cost estimate (when available)?
- **Current Status** – What is the current status of the project?
- **Reference** – What is the source of the action item, if it originated from another community plan?

The action items have been identified through the *Background Planning Report* and the first two Interagency Working Group Meetings. Completing these action items does not automatically mean Kivalina is a resilient community; resilience is a process of continual improvement. The SMP is a work in progress, and should be kept visible and revised periodically to meet changing community needs. As the community makes progress on current action items, the SMP should be updated to remove completed action items and add new ones.

Actions will trigger other actions and opportunities. The timelines are not meant to be a mandatory schedule; they are guidelines for future planning efforts. Implementation of actions will depend on availability of resources and community priorities.

Strategic Management Plan Overview



Next Steps

The next step is for the community to lead the implementation of the SMP. Specific steps include:

- **Accountability** – Having a plan is not the same as implementing the plan. To be successful, Kivalina needs to identify specific people to be responsible for each action item. These individuals should report back to the community on a regular basis.
- **Monitoring** – Kivalina should decide how they want to monitor and update the SMP. The SMP is a living document to help the community become more resilient. The community should work with their partners to assess the plan and update it at least annually. Keep the plan fluid – adapt to changes. Don't be afraid to change the plan if needed.
- **Support** – Gain support to implement action items from existing and new partners
- **Communication** – Keep people informed of progress. Kivalina should share with residents and agency partners the progress they have made in implementing the plan.
- **Celebration** – As action items are completed, or at substantial milestones, celebrate these accomplishments. Celebrations can help keep everyone excited and engaged.

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Appendices

A. Kivalina Interagency Working Group Invitees
B. Community Participation Reports
C. Preliminary Planning Schedule
D. Work Breakdown Structure
E. Potential Funding Sources

Abbreviations

ADEC	Alaska Department of Environmental Conservation
ADF&G	Alaska Department of Fish and Game
AEA	Alaska Energy Authority
AHFC	Alaska Housing Finance Corporation
ANTHC	Alaska Native Tribal Health Consortium
ATV	All-Terrain Vehicle
AVEC	Alaska Village Electric Cooperative
BIA	Bureau of Indian Affairs
CCHRC	Cold Climate Housing Research Center
DCCED	Alaska Department of Commerce, Community, and Economic Development
DGGS	Department of Geological and Geophysical Services
DHS&EM	Division of Homeland Security and Emergency Management
DHSS	Department of Health and Social Services
DOT&PF	Alaska Department of Transportation and Public Facilities
DPS	Distinct Population Segment
EOP	Emergency Operations Plan
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species List
FAA	Federal Aviation Administration
FTH	Flush Tank and Haul
FEMA	Federal Emergency Management Agency
GAO	Government Accountability Office
GED	General Educational Development
HUD	Department of Housing and Urban Development
ICDBG	Indian Community Development Block Grant
ICS	Incident Command System
IRA	Indian Reorganization Act
NAB	Northwest Arctic Borough
NABSD	Northwest Arctic Borough School District
NANA	NANA Regional Corporation, Inc.
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
RD	Rural Development
RurAL CAP	Rural Alaska Community Action Program, Inc.
SAMHSA	Substance Abuse and Mental Health Services Administration
SCERP	Small Community Emergency Response Plan
SMP	Strategic Management Plan
USACE	U.S. Army Corps of Engineers
USCG	U.S. Coast Guard
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
VPSO	Village Public Safety Officer
VSW	Village Safe Water
WBS	Work Breakdown Structure

1 Introduction

Kivalina is a traditional Inupiat community located in the Northwest Arctic Borough of Alaska. The community is located on a barrier island off the Chukchi Sea, 83 miles north of the Arctic Circle. Historically, the marine waters around Kivalina have been ice-free from early July through late October, but later freeze-up and earlier melting have resulted in longer ice-free periods during recent years. This has left Kivalina facing significant risks from storms, such as flooding and erosion.

This barrier island has long been subject to the processes of accretion and erosion. Residents of the community have expressed concerns about storm surges and erosion for decades. The longer ice-free period that has resulted from the changing climate makes the village vulnerable to dangerous fall storms. Storm events in 2004 and 2005 eroded the Chukchi Sea shoreline, threatening critical infrastructure and facilities, including the community fuel tank farm, school, and airstrip. Chronic erosion on the lagoon side of the island has threatened homes, while on the sea side of the island, fall storm surges create annual coastal flooding and beach erosion.

It has long been apparent that the island will eventually succumb to natural forces and that the village will have to be moved. Extensive studies have been undertaken, alternative village sites have been identified, and cost estimates have been prepared.

Kivalina faces some considerable challenges as it charts its future course. While many people wish to relocate the community, little progress has been made since the since the first community election on relocation was held more than 50 years ago. The current emphasis is on developing an evacuation road so residents have a safe place of refuge to use in case of an emergency while they determine their long-term future.

The *Kivalina Strategic Management Plan* (SMP) is an 18-month project with the Alaska Department of Commerce, Community, and Economic Development (DCCED) and the community of Kivalina. The objective of the project is to increase community sustainability and resilience to the impacts of natural hazards while protecting the natural coastal environment. The project is based on the premise that careful planning, agency collaboration, and strong community leadership are essential to successfully addressing the needs of imperiled communities.

Photo courtesy: Millie Hawley

1.1 What is resilience?

This SMP will provide the "blueprint" for how the community and agencies will proceed to make Kivalina a more resilient community.

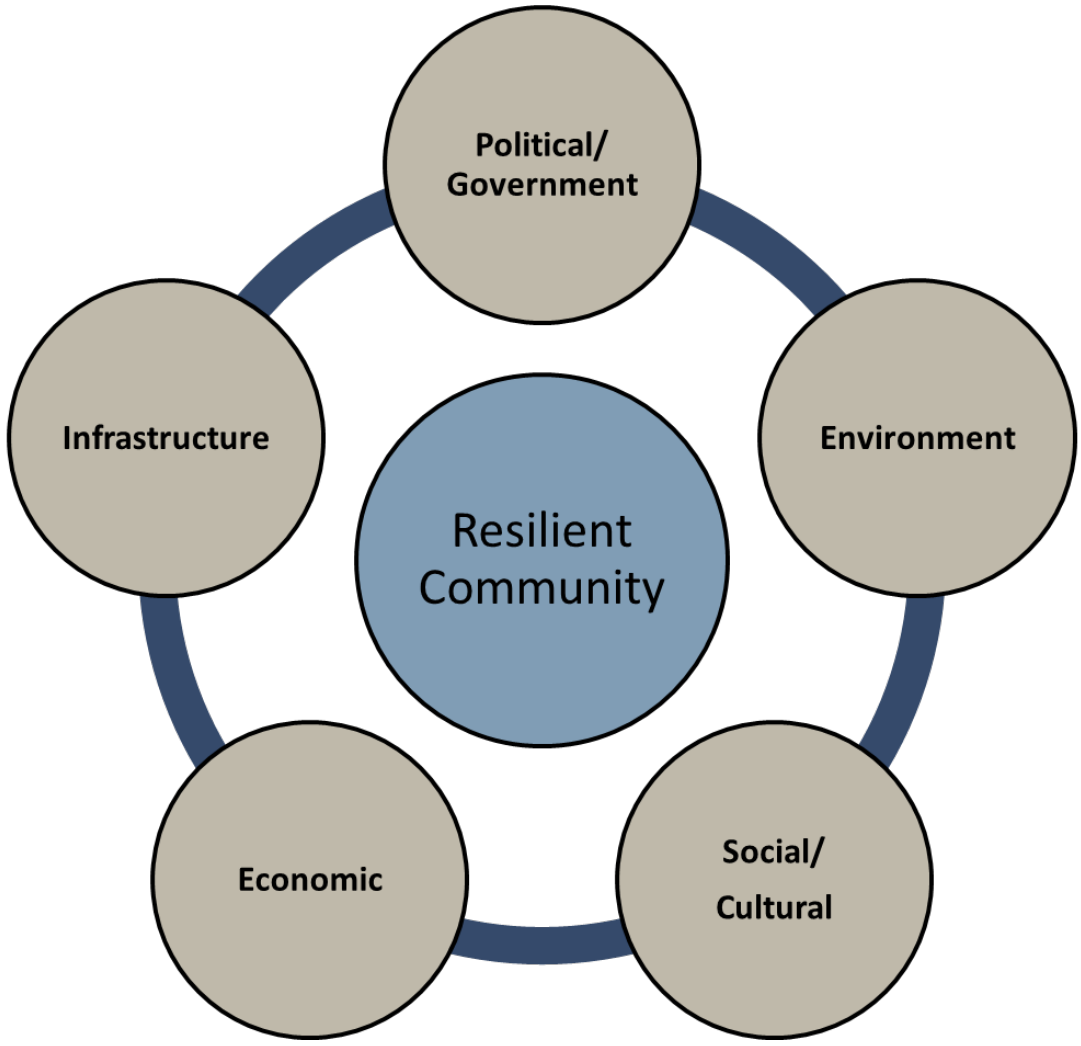
There is no universal definition of resilience. The term "resilience" has emerged from the field of ecology. It describes the capacity of a system to maintain or recover functionality after a disruption or disturbance. For the purposes of the SMP, the following definition is used (DCCED 2012).

> *Resilience is the capability to anticipate risk, limit impact, and bounce back rapidly through survival, adaptability, evolution, and growth in the face of turbulent change. A resilient community is not only prepared to help prevent or minimize the loss or damage to life, property and the environment, but also it has the ability to "bounce back," i.e., quickly return citizens to work, reopen businesses, and restore other essential services needed for a full and swift economic recovery.*

Creating a resilient community is not about following a series of defined action items; rather, it requires developing a new way of approaching issues. It requires engaging a diverse range of stakeholders, integrating the planning process across disciplines and levels of government, and coordinating available funding with resilience needs (see Figure 1). A resilient community has five basic dimensions:

- **Political and government systems** that promote leadership, inclusive decision making, stakeholder engagement, community involvement, and integrated planning,
- **Environment** that provides resources, does not worsen hazards, and enhances quality of life,
- **Social/culture** connection that creates a community identity, ties community residents together, honors their heritage, and promotes a willingness to accept other cultures,
- **Robust economy** that provides employment opportunities, financial well-being, and economic prosperity, and
- **Infrastructure** that meets basic needs, provides critical community services, reduces community vulnerability, and is within the community's ability to operate and maintain.

Figure 1. Resiliency Relationships



1.2 SMP Planning Process

The SMP provides a framework to accomplish Kivalina's goal of a more resilient community. The SMP process was performed in two phases. Phase 1 focused on issue identification, review of background information, development of guiding principles, and the creation of a *Background Planning Report*. Phase 2 focused on identifying the strategic actions to address the issues identified in Phase 1. Phase 2 is documented in this SMP. The process used to develop the *Background Planning Report* and *Strategic Management Plan* is shown in Figure 2.

Figure 2. Planning Process

Many residents of Kivalina, along with representatives from local, regional, state, and federal agencies and organizations, contributed to the creation of this SMP. They participated in community meetings and agency meetings, completed surveys, and provided feedback to community leadership. A list of those invited to participate in in the Kivalina Interagency Working Group can be found in Appendix A. Additional information about community involvement can be found in Appendix B.

1.3 Vision

During Phase 1, based on community input, the following Vision Statement was developed to provide direction to the SMP process. Our vision is:

> *Kivalina is a safe and resilient community. Kivalina will:*
>
> - *Develop an evacuation road and a new school that support the community's long-term desire to relocate.*

- *Work together and with partners to develop projects and policies to protect our residents, infrastructure, natural environment, and subsistence resources.*
- *Increase resiliency while respecting our traditional values.*
- *Be a community where existing and future generations want to live.*

1.4 Guiding Principles

Guiding principles provide the overall direction for the Kivalina SMP. The guiding principles, combined with the Vision Statement, are the foundation for the SMP and provide a context for decision making so that limited capital resources can be maximized. Based on information from a literature review and community input, guiding principles were developed. These principles will be used by the community and agencies in helping Kivalina achieve its goals, as well as to evaluate potential actions. If actions are not consistent with the guiding principles, they should not be undertaken. It is the hope and intent of residents that partners working to make Kivalina more resilient will respect and promote these principles.

The SMP's guiding principles are:

- Residents must be safe from natural hazards and growing threats of flooding and erosion
- Make decisions openly and as a community
- Include local input in the process
- Protect the natural environment
- Respect our traditional culture
- Develop in a manner that strengthens the community

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2 Reasons to Develop a Strategic Management Plan

To help Kivalina implement their vision and increase resiliency, the SMP was developed.

The SMP identifies what activities the community needs to pursue, who is responsible for each activity, when it should occur, what scale of financial resources are needed, and what entities can assist with implementation of the action item.

Reasons to develop the SMP include:

- **Establish priorities** – What should we be working on and what should we work on first?
- **Simplify decision making** – When faced with new ideas and potential projects, community leadership can use the SMP to determine if an idea or project helps implement the vision and is consistent with guiding principles.
- **Maintain focus** – This makes it easier to say no to items that may distract from the community's objectives.
- **Lend credibility to the actions** – The SMP demonstrates that the community and other stakeholders are organized and have thought about their future. Funding entities often want to see this.
- **Enhance communication** – The SMP allows everyone to see where the community is going and how the action items will be achieved.
- **Promote efficiency** – Efficiency will save time, energy, and resources in the long run.
- **Create accountability** – Accountability shows what entity is responsible for each item.

Reasons to develop a SMP include:

- Establish priorities
- Simplify decision making
- Maintain focus
- Lend credibility to the actions
- Enhance communication
- Promote efficiency
- Create accountability

The process used to develop Kivalina SMP's is shown in Figure 3.

Figure 3. Development of Strategic Management Plan

2.1 Identification of Issues

The development of the SMP started with the identification of issues in Phase 1 of the project. The key resiliency-related issues identified in Kivalina include:

- Lack of/Inadequate Community Infrastructure
- Air Quality
- Inadequate Housing
- Changes to Subsistence Resources
- Lack of Evacuation Shelter/Place of Refuge
- New School
- Concern Regarding Safety
- Funding

Additional information about the issues can be found in Section 6 of the *Background Planning Report*.

2.2 Strategic Focus Areas

Based on the issues, strategic focus areas were identified. Strategic focus areas expand on the vision and start to create a structure for how to achieve the vision. Based on the issues identified in the *Background Planning Report*, the following strategic focus areas have been identified:

- Adaptable Built Environment
- Safe and Healthy Housing
- Jobs and Economic Development
- Proactive Emergency Management
- Strengthened Traditional Culture
- Leadership for the Future
- Relocation
- Other

2.3 Preliminary Planning Schedule

Based on the strategic focus areas and the known issues, a preliminary planning schedule was created. First, the project team identified action items that helped implement the vision and were consistent with guiding principles. Each action item was then identified as short-term, medium-term, or long-term depending on when the action was likely to be needed and the likely availability of funding. The preliminary planning schedule was then refined based on community and agency input. The resulting preliminary planning schedule is shown in Appendix C.

2.4 Work Breakdown Structure

The preliminary planning schedule was refined into a comprehensive work breakdown structure (WBS) framework as a means to implement Kivalina's resiliency vision. A WBS is used to break down a project into manageable actions. A WBS is often used to make complex projects more manageable because it helps with project organization, assists with assigning responsibilities, helps with estimating costs and scheduling, and can help project stakeholders by providing further definition and detail of each task.

This WBS includes a discussion of strategic focus areas and lays out action items that should be undertaken by the community and their partners over the next 20 years. For each focus area, several strategies have been identified to provide additional guidance and focus. The implementation of the strategies through action items is how Kivalina will become a more resilient community.

The SMP WBS overview is shown in Appendix D.

2.5 Identification of Imminent and Critical Actions

In an emergency, the highest priority is the health and safety of community residents. This involves making sure procedures, training, and equipment are available for a safe evacuation or to shelter in place. Imminent actions are those actions the community needs in place today to protect people from harm during a hazard event. The imminent actions identified for Kivalina are:

- **Emergency Drills and Exercises** – Emergency drills and exercises provide an opportunity to practice aspects of an emergency plan, allowing people to become familiar with what is expected of them during an emergency, and help identify whether the plan meets community needs or if changes need to be made. Kivalina has an emergency plan and an evacuation plan, but there has not been a community drill for either one in recent years.
- **Personal Emergency Kits** – During a storm, Kivalina will likely be cut off from the rest of the state and will need to be self-sufficient until outside assistance can arrive. Residents need personal emergency kits that will last 7 to 10 days until additional resources can be brought to the village. Kivalina can either work with partners to find sufficient funding to purchase kits, find organizations willing to donate supplies, or encourage residents to assemble their own kits.

Critical actions are those action items that, if not completed in 5 years, will result in a negative impact on community safety. Implementation of critical actions should be undertaken by the community and their partners immediately with a goal of completing (or attaining substantial completion of) the project within the next 5 years. The identified critical actions are actions that are especially important for increasing community resiliency now.

Criteria for identifying critical actions were:

- Does it save lives?
- Does it protect property?
- Can it be re-used or re-purposed in another location?

Additional considerations for identifying critical actions were:

- Does it address immediate priorities (e.g., food, water, energy, shelter)?
- How does it reflect community priorities? Does it support “Shelter in Place?”
- Is there funding available?
- Can it be fully implemented within the next 5 years?

The critical actions identified for Kivalina are summarized below:

- **Water and Sewer Upgrades** – The majority of homes in Kivalina rely on hauling water from the washeteria and honey buckets. Water and sewer upgrades were considered critical by the community to improve their quality of life and public health. Based on community needs, three key actions were identified: improve delivery of drinking water and sewage disposal services, obtain an additional water supply, and protect the water source. Improving the delivery of drinking water and sewage disposal services does not mean installing a piped water and sewer system. Globally, a wide variety of innovative decentralized water and sewer systems have been developed that may meet Kivalina’s needs. Additional water supply is necessary to meet the basic sanitation needs of the community. The existing water supply and storage tanks are not sufficient to store a year’s worth of water for the community. Kivalina often has to ration water in the spring, and this has had a noticeable impact on the health of the residents. Developing additional water storage would allow residents to better meet their needs and reduce

sanitation-related illnesses. The Wulik River, Kivalina's water source, has been threatened by bank erosion and the introduction of beavers. There have also been equipment failures, delaying the pumping of water from the river into the storage tanks. Protecting the water source and the related equipment is necessary for the community to have a clean, accessible water supply.

- **School Access Road** – The Department of Education & Early Development is planning to build a new school for Kivalina. However, the school will not be built at the existing village site; rather it was decided that the new school should be built in an area called Kisimigiuqtuq, approximately 7 miles away. Kivalina needs a school access road in order to start construction on the school and to transport students back and forth. The road would provide additional benefits such as better access to additional subsistence resources and would serve as an evacuation route, if needed.
- **Protective Structure for Airport** – The airport is Kivalina's primary transportation connection to the rest of the state and is vulnerable to erosion. An October 2015 storm caused substantial erosion near the runway, and the community had to use supersacks as a temporary erosion control measure. The Alaska Department of Transportation and Public Facilities (DOT&PF) is working with Kivalina to develop a permanent solution. DOT&PF has requested $7 million in the State budget for this project.
- **Protective Structure for Landfill** – The landfill is vulnerable to erosion and needs a protective structure.
- **Increase Use of Traditional Knowledge** – Alaska Natives have a unique understanding of the connections between people and their environment. Kivalina should work with its partner agencies to ensure that traditional knowledge is not discounted. Rather, Kivalina needs to encourage the blending of traditional knowledge and western science so that all organizations can develop a better understanding of climate change and community impacts.

Each critical action is described in additional detail in the SMP.

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3 Kivalina's Strategic Management Plan

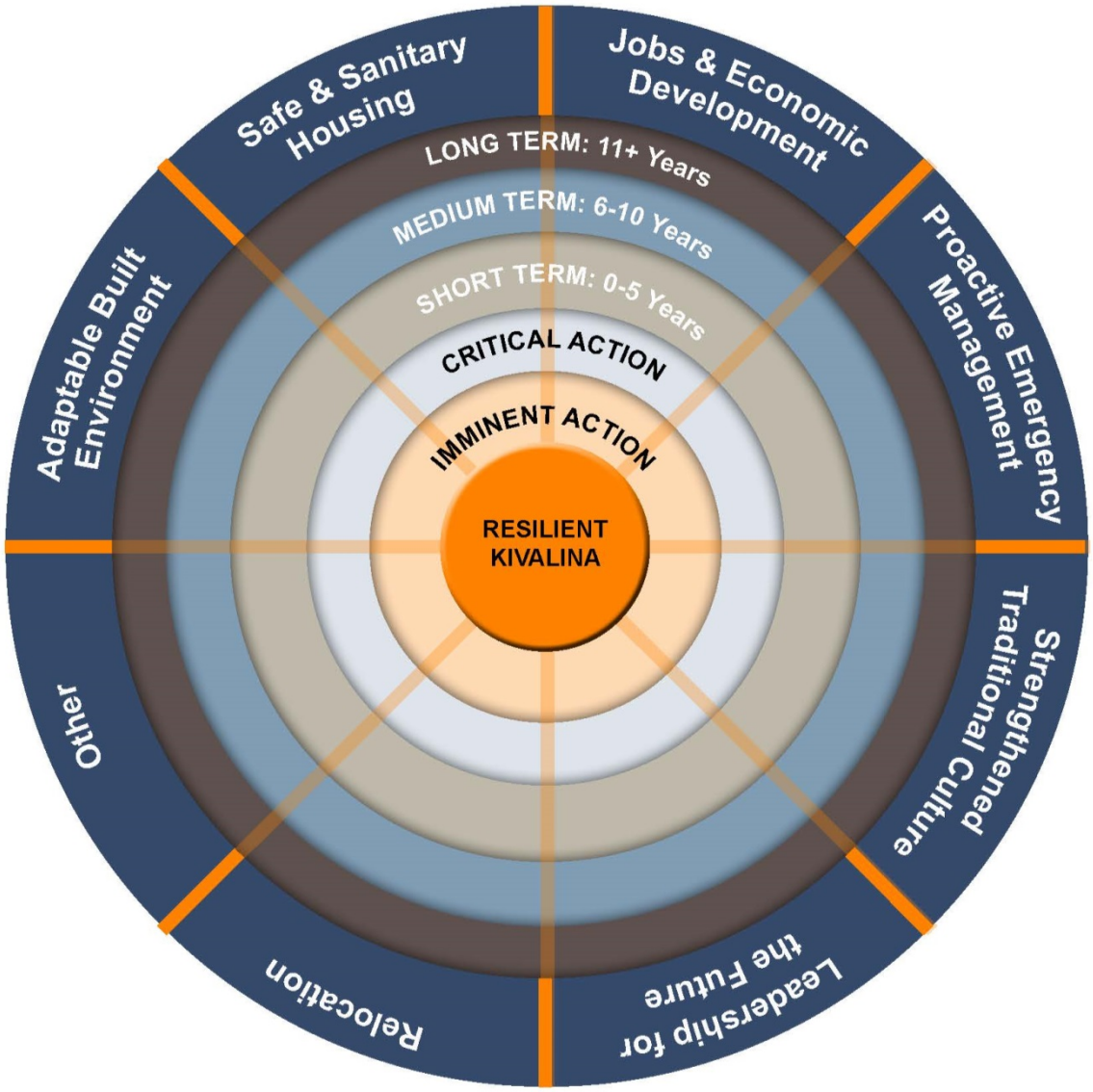
Kivalina's SMP is organized by strategic focus area. Within each focus area, imminent and critical action items are identified first, followed by short-, medium-, and long-term action items (see Figure 4).

For each action item, the following details were identified:

- **Responsible Party** – Which agency or organization has the primary responsibility for championing the action?
- **Potential Partners/Coordination** – What entities may be willing to partner with the responsible party and how can the partnership be coordinated?
- **Timeframe for Implementation** – When is the action item needed?
- **Estimated Cost** – What is the planning level cost estimate (when available)?
- **Current Status** – What is the current status of the project?
- **Reference** – What is the source of the action item, if it originated from another community plan?

For critical actions, potential funding sources have been identified. Appendix E contains additional funding sources that could be used to implement the SMP. It is important to remember that funding levels can vary year to year and funding sources can change over time. It is also important for Kivalina to regularly review the SMP in light of funding changes and changing needs to ensure the SMP remains relevant.

Figure 4. Strategic Management Plan Overview



As the community makes progress on current action items, they should update the SMP to remove completed strategic action items and add new ones. That way, the SMP remains current and useful. The SMP is always a work in progress. It should be kept visible and revised periodically to meet changing community needs.

These action items have been identified through the *Background Planning Report* and the first two Interagency Working Group Meetings. It is important to note that the action items identified in this SMP are not intended to serve as a checklist. That is, completing the items on the list does not automatically mean Kivalina is a resilient community. Resilience is a process of continual improvement and plan updates are essential to keep moving down that path.

The SMP is meant to be a living document that needs to be reviewed and updated frequently in order to remain relevant. Actions will trigger other actions and opportunities. In addition, the timelines are not meant to be a mandatory schedule. They are guidelines for future planning efforts. Implementation of actions will depend on availability of resources and community priorities.

A SMP is a living document. It is not something you can write, put on a shelf, and forget about. Keep it visible. Display it prominently. As your organization changes and grows, you will want to continually revise your SMP to fit the changing needs of your group and community.

3.1 Adaptable Built Environment

Essentially, the term "built environment" refers to the structures and infrastructure built by people. Examples of the built environment include roads, schools, water systems, landfills, clinics, and government facilities. The built environmental plays an important role in the daily activities of all residents of Kivalina.

There are strong ties between a community's built environment and its resiliency. Where we build, what we build, and how it is built is essential to the resiliency of the built environment. For example, buildings in hazard-prone areas, facilities that take too much money to operate, and buildings that cannot withstand high winds show how a community is more vulnerable because of decisions regarding the built environment. Infrastructure that is kept in good condition often reduces operating costs. In addition, Kivalina needs its infrastructure to be functional and operational during an emergency, as this will allow the community to respond, recover, and bounce back better from an emergency.

The main strategies for Kivalina to have an adaptable built environment are:

- Reliable and affordable infrastructure
- Strong, safe, and healthy environment
- Responsible growth
- Strategic, collaborative partnerships

3.1.1 CRITICAL ACTION – Water and Sewer Upgrades

Based on community needs, three priority water and sewer upgrades have been identified. They are improved delivery of drinking water and sewage disposal services, increased water supply, and protection of the sewage lagoon. These are discussed in more detail below.

3.1.1.1 Improve delivery of drinking water and sewage disposal services

Rural communities throughout Alaska face unique challenges to addressing safe sanitation. Many homes in Kivalina do not have access to running water and flush toilets. The difficulty in implementing adequate waste disposal system stems from the harsh climate conditions. Permafrost keeps the ground frozen for the majority of the year and piped systems are expensive and may not be suitable for the climate. If piped systems are implemented, they are very expensive to operate. In many cases, communities do not have the financial resources to keep the system functioning.

Kivalina residents haul water from the water treatment plant and washeteria to their homes for drinking, cooking, and other household purposes. Water is often stored in buckets that are not made from food-grade plastic. Water stored in this manner is also at risk for contamination. Alternatively, residents purchase bottled water. Bottled water has to be flown into the community, making it prohibitively expensive for most residents. Due to the effort and cost associated with clean water, residents often try to conserve its use. In general, approximately 15 gallons of water per person per day is needed to remain clean and healthy (Estus 2015). In communities like Kivalina, residents use an

CDC studies show Alaskans without plumbing get invasive pneumococcal infections up to eleven times more often than other Alaskans.

average of 2 gallons per person per day. This water rationing often leads to health issues. For example, many households share a basin for hand washing, which makes it easier to spread viruses.

For sewage, the "honey-bucket" system is used. Plastic buckets are used as toilets, typically lined with a plastic bag and a toilet seat attached to the top. Once the container is filled, the plastic bag is closed and the bucket is transported to a waste site near the community where it is emptied. The waste may be disposed of in sloughs, beaches, rivers, tundra ponds, or sewage lagoon by way of four-wheeler or snow machine. Kivalina does not have a truck pick-up service for waste disposal.

One of the greatest problems associated honey buckets is the public health risk. Because of the frequent spills that occur while transporting human waste to the sewage lagoon, residents are vulnerable to sewage-related diseases such as Hepatitis A. Once spilled, sewage is easily carried throughout the community on shoes and paws of pets. Children are particularly vulnerable as they typically play outside in the community streets and are more likely to be exposed to spilled sewage.

Water and solid waste sanitation has greatly improved in rural Alaska in the last 25 years. There are ongoing construction projects in Alaska villages for piped and water services. However, Kivalina is faced with a conundrum of addressing immediate health risks, while considering relocation. The community and their partners should think of innovative ways to improve water supply and sewage disposal services to meet the immediate need while continuing to work on a longer term solution.

3.1.1.1.1 Honey-Bucket Alternatives

In recent years, a number of new decentralized water and wastewater treatment systems have been developed. These innovative systems have a lot of potential for used in rural Alaska.

Kivalina is currently participating in a test program where an In-Home Sanitation System designed by a collaboration between Cold Climate Housing Research Center, Alaska Native Tribal Health Consortium, and Lifewater Engineering (2015). This technology was installed in ten homes in the summer of 2015. To date, reports from the community have been mixed. Some residents have indicated that this technology is successful while others indicate multiple households have already removed the systems.

This technology is not the only one that Kivalina could use as an alternative to the existing honey-bucket system. A few cost-effective alternatives Kivalina can pursue to improve include the twin-bucket system, the urine-diverting dry toilet system, composting toilets, and the flush tank and haul (FTH) system. These options have been proven to be successful in other villages and may provide a viable and immediate intermediate solution to honey-bucket sanitation issues. Each is discussed in more detail below.

Twin-Bucket System

The twin-bucket system uses two buckets for human waste disposal. One bucket is used for urine, while the other is used to contain feces. By separating urine and feces, the twin-bucket toilet system reduces disease risks and odor, while making the contents of each bucket easier to handle. Except for conditions such as kidney infections and other sicknesses that may affect urine, it is typically sterile and can be

disposed of on a day-to-day basis. The feces bucket contains more pathogens and needs to be treated properly. Treatment includes adding dry mulch after every use of the bucket to keep the feces as dry as possible. The twin-bucket system is a step up from the single honey-bucket system because of the separation of human waste, but there is still a high chance of accidental spills of human waste occurring on the streets. There is also no direct guarantee that human excrements are properly separated as feces or urine in all cases (e.g., chronic diarrhea). However, with the separation of human waste there is less risk of disease outbreak.

Urine-Diverting Dry Toilet System

Urine-Diverting Dry Toilets (UDDTs) are widely used throughout the world and are especially popular in places where the climate is dry, sewer infrastructure is expensive, and septic tanks are difficult to install. UDDTs have been built in many developing countries and provide an alternative to pit latrines and flushing toilets. The UDDT system is similar to the twin-bucket system in that it separates human waste. Division of human excrements decreases the likelihood of disease outbreak.

UDDTs divert the urine though a draining basin, while fecal matter drops through a larger hole at the rear of the toilet. Dry mulch or matter is then placed over the feces to prevent odors. Waste can be collected in a biodegradable bag. The waste must be allowed to dry so that it can be more easily disposed of in landfill areas. A UDDT is considered more effective for places with very little water and is more affordable than a septic tank system. One of the hurdles of using a UDDT system is regular maintenance and operations (e.g., foul odors from the feces or urine vaults, handling clogged systems, or defecation in the wrong vault). Regular follow up, education, and support for UDDT projects will lead to success and community buy-in of the system.

Composting Toilet Systems

Composting toilet prototypes were first used in Alaska in the 1980s with little success. Although composting toilets were less effective in rural Alaska, technological improvements and affordability make them a viable option today. Keeping the composting chamber insulated or in a heated part of the home makes composting possible during cold months of the year. A variety of composting toilets specially made for cold climate regions are available. However, composting toilet systems are less likely to be efficient in cold weather regions, as the composting will stop if the temperature is too low. Insulating piping in unheated areas will prevent ice-blocking problems. Heating the indoor composter is an option, but additional energy is required to keep the chamber warm. Composting toilets also do not solve the problem of transporting waste or what to do with the compost during the winter. Because Kivalina has a short summer, this also presents the problem of what to do with the composting waste, as it does not provide enough time for the compost to be reused.

Flush Tank and Hauling System

Cowater Alaska's FTH System allows communities access to running water, flush toilets, and waste disposal. FTH systems are typically installed on a community-wide basis, with numerous installations at

one time. Several villages, such as Nunapitchuk and Nightmute, are completely serviced with an FTH system.

In an FTH system, the water and wastewater are stored in two holding tanks. Fresh water is delivered to the home by a water haul tank and pumped into the in-house holding tank. Water from the piped system may be used for drinking, provided a reliable water source is used, the water is transported hygienically, and the tank is cleaned regularly. The second tank, a holding tank for solid waste and sewage, is built outside the home and above ground. The holding tank is placed inside an insulated plywood box for protection. When the holding tank is full, a sewage vacuum hose is used to transfer the waste from the holding tank to the hauling tanks. These hauling tanks can be pulled by four-wheelers or snow machines to the disposal site or sewage lagoon.

3.1.1.1.2 Funding Sources

Potential funding sources for improving water and sewer services include:

- **Indian Health Service, Sanitation Facilities Construction Program –** The Indian Health Service (IHS) is responsible for providing federal health services to Alaska Natives and American Indians. The IHS is authorized to provide essential sanitation facilities as a preventive health measure. They can fund community and individual sanitation facilities, including interior plumbing for Native-owned homes. For more information: www.ihs.gov
- **EPA, Clean Water Act – Indian Set Aside –** This program provides funding to Indian tribes and Alaska Native Villages for wastewater infrastructure improvements. To be eligible for funding, community needs must be identified in the IHS Sanitation Deficiency System. Funds may be used for planning, design, and construction of wastewater collection and treatment systems. In 2015, this program funded 80 projects and had almost $29 million in funding. For more information: https://www.epa.gov/small-and-rural-wastewater-systems/clean-water-indian-set-aside-program
- **The U.S. Department of Agriculture, Rural Development (USDA, RD) –** USDA, RD has several programs available to improve water and waste disposal systems, including loan guarantees, planning grants, revolving loan funds, and technical assistance. For more information: http://www.rd.usda.gov/programs-services/programs-services-tribes
- **USDA Rural Alaska Village Grant Program –** This program helps rural villages provide drinking water and waste disposal services. This program helps communities with a dire sanitation condition such as a recurring waterborne communicable diseases or a lack of community system, requiring households to haul water and human waste from their homes. Eligible communities must have a population of 10,000 or less and have a median household income of less than 110 percent of the statewide non-metropolitan household income. The program can fund up to 75 percent of the project costs. For more information: http://www.rd.usda.gov/programs-services/grants-rural-and-native-alaskan-villages
- **Department of Agriculture Water and Waste Disposal Loan and Grant Program –** The water and waste disposal loan and grant program provides funding for clean and reliable drinking water systems, sanitary sewage disposal, and storm water drainage to households. Rural areas and towns with fewer than 10,000 people and tribal lands are eligible for the program. Long-

term, low-interest loans are available, which may be combined with grants. For more information: http://www.rd.usda.gov/programs-services/water-waste-disposal-loan-grant-program

- **National Rural Water Association –** The Rural Water Loan Fund is a funding program specifically designed to meet small water and wastewater utilities. Eligible projects include pre-development costs for infrastructure projects, equipment replacement, system upgrades, maintenance and small capital projects, and disaster recovery. Systems must be for public entities and can service only up to 10,000 persons. Loan amounts may not exceed $100,000 or 75 percent of the total project cost. For more information: http://nrwa.org/initiatives/revolving-loan-fund/

Responsible Party: Alaska Native Tribal Health Consortium **(**ANTHC)
Potential Partners/Coordination: City, Indian Reorganization Act (IRA), Village Safe Water (VSW), DCCED, Denali Commission, Bureau of Indian Affairs (BIA), Alaska Department of Environmental Conservation (ADEC), Maniilaq Health Corporation, U.S. Environmental Protection Agency (EPA), Alaska Department of Transportation and Public Facilities (DOT&PF), Indian Health Service, USDA
Timeframe for Implementation: Critical Action
Estimated Cost: To be determined
Current Status: New
Reference: N/A

3.1.1.2 CRITICAL ACTION – Additional Water Supply

A community needs sufficient water storage to have a source of water in case of emergencies, while keeping the water in safe from potential hazards. Safe water for drinking is necessary, and water tanks must be in good condition in order to keep the water clean.

Kivalina's Water Treatment Plant

The Wulik River is the main water source for the community of Kivalina, and was its traditional water source long before a water treatment facility was built. The river is typically frozen during the winter months, and pumping for water begins in the summer time (typically July) until before freeze-up begins in October. Kivalina currently draws water from the Wulik River through a 3-mile surface transmission line.

The water is stored in community water tanks, but they do not have enough capacity to meet Kivalina's annual needs. In the past, community health aides at the Kivalina Clinic have had to ration water for the community. During these periods, the community saw an increase in mouth sores, stomach flu, and skin infections. Residents also collect rainwater, untreated river water, sea ice, and lagoon ice to supplement their water needs.

Responsible Party: Alaska Native Tribal Health Consortium (ANTHC)
Potential Partners/Coordination: City, Native Village of Kivalina (Tribe), VSW, DCCED, Denali Commission, BIA, ADEC, Maniilaq Corporation, EPA, DOT&PF, USDA
Timeframe for Implementation: Critical Action
Estimated Cost: To be determined
Current Status: New
Reference: N/A

3.1.1.3 CRITICAL ACTION – Protection of Water Source

Having a reliable source of water is critical for any community. Kivalina's water source is the Wulik River. Water is pumped from the river to a set of storage tanks through a 3-mile transmission line. However, water can be pumped only if the equipment is operational, the river isn't frozen, and there are acceptable levels of turbidity.

In July 2013, there were equipment issues that resulted in water pumping operations starting several weeks late. In fall 2012, a storm damaged a water supply pipeline, leaving the school without water. Classes were postponed by several weeks and students ended up having 3 fewer weeks of instruction.

The water supply is being threatened in several ways. In recent years, beavers have colonized the Wulik River. Beaver feces carry microscopic protozoa that cause giardia. As a result, people have to boil water obtained directly from the river.

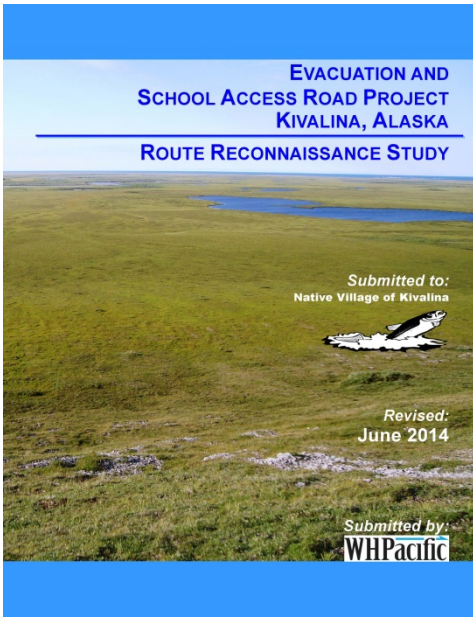
Residents are also concerned about the eroding river banks. When the banks collapse, organic material gets released into the water. This material reacts unfavorably with the chlorine injected at the water treatment plant and can result in the water needing additional treatment.

Kivalina needs to work together with its partners to ensure that they have access to a water source, a way to pump water to the water tanks, and a means to of proper water treatment.

Responsible Party: ANTHC
Potential Partners/Coordination: City, Tribe, VSW, DCCED, NAB, NANA, Denali Commission, BIA, ADEC, Maniilaq Association, EPA, DOT&PF
Timeframe for Implementation: Critical Action
Estimated Cost: To be determined
Current Status: New
Reference: N/A

3.1.2 CRITICAL ACTION – School Access Road

The Department of Education & Early Development is planning to build a new school for Kivalina. However, the school will not be built at the existing village site; rather, it was decided that the new school should be built in an area called Kisimigiuqtuq, approximately 7 miles away. Kivalina needs a school access road in order to start construction on the school and to transport students back and forth. The road would provide additional benefits such as better access to additional subsistence resources and would serve as an evacuation route, if needed.



Having the school access road available to serve as an evacuation route is important because the only way to leave the island is by sea or air. This road would allow residents to leave the island in the event the community needed to evacuate. Since 2000, the community has had three emergency evacuations: two to the existing school and one off the island.

A route reconnaissance study to identify potential routes was completed in 2014. From that study, the "Southern Route" was selected. This route begins near the northwest edge of the community near the southern end of the airport, crosses Kivalina Lagoon with a causeway and bridge(s), continues through a low, tidally influenced area and then the tundra, and ends near the lower slope of Kisimigiuqtuq Hill. The road is approximately 6.88 miles long and would require one water crossing and one or more bridges.

The Northwest Arctic Borough, on behalf of the Native Village of Kivalina and the City of Kivalina, has hired Remote Solutions to construct the road, following the construction, engineering and financial specifics outlined in the WH Pacific report. The project is outlined at the project website at http://www.kivalinaroad.org/

Responsible Party: City and Tribe
Potential Partners/Coordination: NAB, VSW, DCCED, NANA, Denali Commission, BIA, ADEC, Maniilaq Association, EPA, DOT&PF, ADF&G, AVEC, BLM, USACE, FAA, FHWA, NOAA, SHPO, USCG, USGS, USFWS, Department of Education & Early Development, NMFS
Timeframe for Implementation: Critical Action
Estimated Cost: $75 million
Current Status: New
Reference: N/A

3.1.3 Energy

3.1.3.1 Energy Audit

An energy audit assesses various energy needs and efficiencies of a building or buildings. An energy audit can include unplugging electronics in a room, low wattage lighting, window coverings that

minimize cold air drafting, sinks that have no leaks, and more insulation for the house to minimize heat loss and energy output. Energy audits can be done on many buildings, including the school, health clinic, and private homes.

Responsible Party: Facility operators, Alaska Housing Finance Corporation
Potential Partners/Coordination: U.S. Department of Energy, AEA, Alaska Housing Finance Corporation, CCHRC, RuralCAP, Denali Commission
Timeframe for Implementation: Short term (0–5 years)
Estimated Cost: Various
Current Status: New
Reference: N/A

3.1.4 Repair or Replace Fuel Tanks

A community needs sufficient fuel storage for many reasons. A tank that is in good repair is necessary to keep the community safe from potential hazards or accidents. Tanks also need sufficient holding capacity to meet the community needs. Typically, fuel is shipped to Kivalina only once a year. The community needs to have enough fuel to meet their daily needs as well as an emergency supply.

Responsible Party: City and Tribe
Potential Partners/Coordination: NANA Regional Corporation, Denali Commission, U.S. Coast Guard (USCG), Northwest Arctic Borough, AVEC
Timeframe for Implementation: Short term (0–5 years)
Estimated Cost: Unknown
Current Status:
Reference:

3.1.5 Fuel Tank Assessment

A community needs sufficient fuel storage because fuel tanks contain flammable liquids that may be dangerous, and a good storage tank is necessary to keep the community safe from potential hazards or accidents. Tanks also must have adequate fuel set aside to use for emergency purposes.

Responsible Party: AVEC and Northwest Arctic Borough School District (NABSD)
Potential Partners/Coordination: City, Tribe, DCCED, ANTHC, USCG, AEA
Timeframe for Implementation: Short term (0–5 years)
Estimated Cost: To be determined
Current Status: New
Reference: N/A

3.1.5.1 Wind Feasibility Study

A wind feasibility study looks at the possibilities of a proposed wind project, and at whether completing the project is a viable option. The wind feasibility study looks at the strengths and weaknesses of harboring wind power for energy purposes and locations of potential sites depending on the available land area, exposure to the wind, existing land uses, and proximity to the local residents. This feasibility study would help the local community find energy alternatives to fuel that is freighted in.

Responsible Party: AEA
Potential Partners/Coordination: City, Tribe, NAB, NANA, EPA, AVEC, Red Dog Mine, ANTHC
Timeframe for Implementation: Short term (0–5 years)
Estimated Cost: $50,000–$150,000
Current Status: New
Reference: N/A

3.1.6 Water/Wastewater

3.1.6.1 Water Source Protection Ordinance

A water source protection ordinance is legislation or a ruling applied by the local authorities to protect the water sources within the village's boundaries. The ordinance should outline practices and activities that should be followed by community residents to prevent pollution of ground water and streams. For example, the ordinance could limit refueling of an all-terrain vehicle (ATV) within 100 feet of the water source to reduce the potential impact from a fuel spill, or prevent any major traffic or garbage dumping from occurring near the water site. An ordinance should be written protecting the Wulik River, the town site's primary water source. This water source is being threatened by the erosion occurring south of the village, which could result in contamination of the fresh water source with ocean water.

Responsible Party: City and Tribe
Potential Partners/Coordination: EPA, ADEC, VSW ANTHC, NAB, NANA
Timeframe for Implementation: Short term (0–5 years)
Estimated Cost: Under $10,000
Current Status: New
Reference: N/A

3.1.6.2 Rainwater Capture and Reuse Program

Rain water capture and reuse can help alleviate the stress put on the community's water supply. Under this program, community residents would collect rainwater and use it instead of piped water for certain activities, such as watering plants or dust suppression. Benefits of using rainwater include saving the water in the storage tanks for consumption purposes and saving the community money by having to treat less water.

It is important to note that in general, rainwater should not be used for drinking or cooking purposes. If rainwater is going to be used for drinking or cooking purposes, the water catchment system needs to be designed in such a way that the water does not come into contact with materials that could contaminate the water.

Responsible Party: Individuals
Potential Partners/Coordination: City, Tribe, Cold Climate Housing Research Center (CCHRC) VSW, EPA
Timeframe for Implementation: Short term (0–5 years)
Estimated Cost: Under $10,000
Current Status: New
Reference: N/A

3.1.6.2.1 Honey Bucket Haul Service

Residents are required to dispose of their honey bucket waste. Community residents have indicated that the community needs a haul service. A service would pick up waste from households and transport it to the dump on an established schedule. This service would help improve the environmental quality of the village because it would discourage the dumping of waste in prohibited locations and should reduce accidental spillage during transport. This would be especially helpful for Elders and people without transportation.

The community would need to purchase disposal units for households participating in the haul service. They would also have to purchase an appropriate vehicle unless they already own one. While the City would have to pay for these upfront capital costs, they can charge user fees to fund the operations and maintenance of the haul service. The service would also employ a small number of local residents.

Responsible Party: City
Potential Partners/Coordination: City, Tribe, ANTHC, DCCED, NANA, NAB, Denali Commission, BIA, ADEC, Maniilaq Association, EPA, DOT&PF
Timeframe for Implementation: Short-term (0-5 years)
Estimated Cost: To be determined
Current Status: New
Reference: N/A

3.1.6.2.2 Water Delivery Service

Currently, residents must haul their own water from the washeteria. Community residents have indicated that they need a water delivery service. This service could haul water from the washeteria on a regular basis or as requested. This would be especially helpful for Elders and people without transportation.

The community would need to obtain a vehicle suitable for hauling water. While the City would need to pay for the costs associated with starting the service, they could charge based on the gallons of water delivered to pay for the operations and maintenance costs. The service would also employ a small number of residents.

Responsible Party: City
Potential Partners/Coordination: City, Tribe, ANTHC, DCCED, NANA, NAB, Denali Commission, BIA, ADEC, Maniilaq Association, EPA, DOT&PF
Timeframe for Implementation: Short-term (0-5 years)
Estimated Cost: To be determined
Current Status: New
Reference: N/A

3.1.7 Implement Sanitation Master Plan Recommendations

The *Kivalina Sanitation Master Plan* includes a series of recommended sanitation improvements that should be implemented. ANTHC and the community should continue working on the remaining recommendations.

Responsible Party: ANTHC
Potential Partners/Coordination: City, Tribe, NAB, NANA
Timeframe for Implementation: Medium and Long Term (5+ years)
Estimated Cost: unknown
Current Status: In Progress
Reference: *Kivalina Sanitation Master Plan*

3.1.7.1 Update Sanitation Master Plan

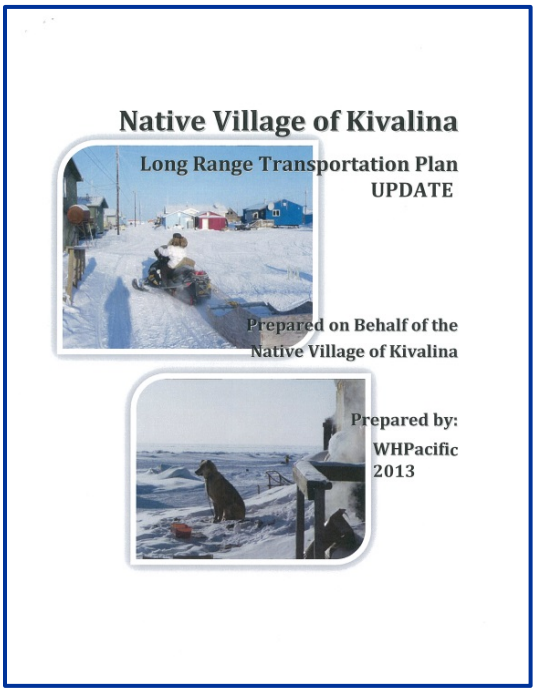
The *Kivalina Sanitation Master Plan* should be updated to reflect the recommended projects that have been completed and to reflect changing community needs.

Responsible Party: ANTHC
Potential Partners/Coordination: City, Tribe, NAB, NANA
Timeframe for Implementation: Medium term (6–10 years)
Estimated Cost: $100,000–$300,000
Current Status: New
Reference: *Kivalina Sanitation Master Plan*

3.1.8 Transportation

3.1.8.1 Update Long Range Transportation Plan

A Long Range Transportation Plan documents the existing transportation system and guides future transportation investments. The City is responsible for maintaining the roads within the boundaries of the municipality, but the DOT&PF holds responsibility for maintaining the road to the airport runway. The Native Village of Kivalina is responsible for any future road projects constructed under the Indian Reservation Roads program. The Native Village of Kivalina and City have developed an updated list of inventory roads that the community feels are needed over the next 20 years. Updating plans for road improvements will increase employment and enhance public safety in the community.



Responsible Party: Maniilaq Association
Potential Partners/Coordination: DOT&PF, City, Tribe, FAA, BIA, NAB, NANA, Denali Commission
Timeframe for Implementation: Medium term (6–10 years)
Estimated Cost: Under $250,000
Current Status: New
Reference: *Native Village of Kivalina Council Long Range Transportation Plan*

3.1.8.2 Dust Suppression Program

Dust can be kicked up by four-wheelers traveling around town during the summer months or on the roads leading out of town, or planes landing or taking off at the airport. Dust poses a health threat, especially for children, causing problems such as asthma. Dust mites can also flourish and cause allergies and other health problems for humans. A dust suppression program improves visibility and road safety, and provides cleaner air and homes. Implementing a program would reduce dust-related risks such as major allergy reactions, pneumonia, and asthma attacks. Some solutions include watering roads regularly prior to conduction and during and after earth-moving operations, establishing vegetation right after the process, sweeping roads or flushing with water, washing wheels after construction use, and staying on established routes during construction.

Responsible Party: City and Tribe
Potential Partners/Coordination: ADEC Division of Air Quality, Alaska Office of Rural Health, EPA, BIA, FAA, DOT&PF, ANTHC, NAB, NANA, Maniilaq Association
Timeframe for Implementation: Medium term (6–10 years)
Estimated Cost: Varies
Current Status: New
Reference: N/A

3.1.9 Road to Gravel Source

The community needs to find an adequate gravel source and adequate access to that source. Gravel is necessary to help build projects for the community. The rock and gravel would be used in building additional protective structures to help protect the community from future weathering caused by storms. Having these natural resources in proximity to the village also saves the community more money in the long term because they would not need to be transported from other areas. The development of a road to a gravel source should be coordinated with the efforts to build an evacuation road and the new school.

Responsible Party: City, Tribe
Potential Partners/Coordination: NAB, NANA, NABSD, DOT&PF, USACE, Red Dog, DGGS
Timeframe for Implementation: Short term (0–5 years)
Estimated Cost: To be determined
Current Status: Planning
Reference: *Native Village of Kivalina Council Long Range Transportation Plan*

3.1.9.1 Complete Garage Facility

The community has identified a need for a garage facility to provide a place for equipment maintenance and storage.

Responsible Party: BIA
Potential Partners/Coordination: City, Tribe, DOT&PF, BIA, NAB, NANA
Timeframe for Implementation: Short term (11+ years)
Estimated Cost: Unknown
Current Status: In process
Reference: N/A

3.1.9.2 Winter Travel Improvements

Provide route staking, shelter cabins, navigational upgrades, and signage to key routes to improve safety during winter travel, reduce disorientation, and assist in rescue operations.

Responsible Party: City and Tribe
Potential Partners/Coordination: NAB, NANA, DOT&PF, BIA
Timeframe for Implementation: Long term (11+ years)
Estimated Cost: Approximately $100,000 per mile
Current Status: New
Reference: N/A

3.1.9.3 Airport Shelter

Provide a shelter at the airport so people waiting for flights do not have to wait outdoors.

Responsible Party: DOT&PF
Potential Partners/Coordination: City, Tribe, NAB, NANA, FAA
Timeframe for Implementation: Long term (11+ years)
Estimated Cost: Unknown
Current Status: New
Reference: *N/A*

3.1.10 Health

3.1.11 Health Clinic Expansion/Replacement

The Kivalina health clinic is operated by the Maniilaq Association and is staffed with two community health aides. The clinic was built in the mid-1980s. The clinic has a reception area, two examining rooms, an office/communications/storage room, and a boiler room. Physicians have expressed that the clinic's current design and layout are difficult to navigate in. According to the 2005 USACE Relocation Plan, the building suffers from effective maintenance and is

undersized to meet current federal and state health care standards. The health clinic has piped water, but not piped sewer. The existing clinic is currently too small to serve Kivalina. For more extensive heath care, residents fly either to Kotzebue or to Anchorage for treatment. The clinic needs to be better equipped to handle emergencies and could be a point of information for the community on emergency planning.

Responsible Party: Maniilaq Association
Potential Partners/Coordination: Alaska Office of Rural Health, Denali Commission, NANA, City, Tribe, NAB, DCCED, AVEC, VSW, ANTHC
Timeframe for Implementation: Medium term (6–10 years)
Estimated Cost: Unknown
Current Status: Planned
Reference: N/A

3.1.12 Other

3.1.13 New School

As part of the July 2011 settlement of the Kasayulie v Alaska lawsuit regarding the fairness of school construction decisions, the State decided to build or renovate five schools, including one in Kivalina. Due to on-going erosion problems in the community, it was decided that the new school should be built in an area called Kisimigiuqtuq, approximately seven miles north of Kivalina. This site was chosen because it is on higher ground and may be a potential gravel source.

Kivalina's School

However, there is no access to this site. An access road would be needed but funding for the road would have to come from a different source. The community is also pursuing an evacuation road. Kivalina should work with its partners to determine if the evacuation road should also be used as a school access road. As developing access to a new school would encourage other development near that site, the community should consider developing the new school in a location that would support eventual community relocation.

Responsible Party: NABSD, City, Tribe
Potential Partners/Coordination: NAB, NANA, ADEC, DOT&PF, EPA, AVEC, USACE, **USFWS**, ADF&G, ANTHC, VSW, DHS&EM, Department of Education & Early Development

Timeframe for Implementation: Short-term (0–5 years)
Estimated Cost: $35-50 million
Current Status: Planned
Reference: N/A

3.1.14 Trash Haul Service

Residents are required to haul their own trash to the landfill. Community residents have indicated that the community needs a trash haul service. A service would pick up trash from households and transport it to the dump on an established schedule. This service would help make the village cleaner because trash would be removed on a regular basis. This would be especially helpful for Elders and people without transportation.

A trash haul service would also improve dump management, as personnel could be trained in proper waste-handling techniques.

Responsible Party: City and Tribe
Potential Partners/Coordination: ADEC, DOT&PF, NAB, NANA, EPA
Timeframe for Implementation: Medium term (6–10 years)
Estimated Cost: Under $50,000[1]
Current Status: New
Reference: N/A

3.1.15 New Landfill

The existing landfill is located just north of the airport. This site is too close to the airport and does not meet FAA requirements. It has no fence around it and is subject to visits from wild animals. The landfill also attracts birds, which are a threat to incoming planes. The landfill is also subject to wind, erosion, and flooding. The landfill appears to be at or beyond capacity.

The landfill is in the process of being relocated to a better site that will limit its harm to the community while allowing it to serve its purpose. The community should have meetings to discuss the new location for the land fill.

The community should also consider ways to reduce the waste stream to reduce the amount of materials entering the landfill.

Responsible Party: City and Tribe
Potential Partners/Coordination: ADEC, DOT&PF, NAB, NANA, FAA, AVEC, EPA, ANTHC
Timeframe for Implementation: Short term (0–5 years)
Estimated Cost: Unknown
Current Status: Planned
Reference: N/A

[1] The City would incur the initial capital costs associated with purchasing a vehicle suitable for trash hauling, if they do not already own one, as well as the cost of hiring personnel to operate the system. The service can charge customers a fee to offset the operations and maintenance cost.

3.1.16 Community Subsistence Building

The community has expressed a desire for a community subsistence building similar to the one in Kotzebue.

Responsible Party: City, Tribe
Potential Partners/Coordination: NAB, NANA, DOT&PF, VSW, ANTHC, EPA, USACE, NABSD, AVEC
Timeframe for Implementation: Long term (11+ years)
Estimated Cost: Unknown
Current Status: New
Reference: N/A

3.1.17 Playground

The community has indicated the desire for a playground to give kids a place to play and to encourage them to remain physically active.

Responsible Party: City, Tribe
Potential Partners/Coordination: NAB, NABSD, ANTHC, EPA
Timeframe for Implementation: Medium term (6–10 years)
Estimated Cost: Unknown
Current Status: New
Reference: N/A

3.2 Safe and Sanitary Housing

Housing and housing affordability are major challenges in rural Alaska. Housing is expensive because of Kivalina's remote location and the high cost of transporting construction materials. Kivalina, like many other communities, does not have enough housing to meet the community's need. Many of the existing housing units are overcrowded and need major repairs.

The lack of affordable housing can have a negative impact on a community. Without sufficient and affordable housing, residents may choose to leave Kivalina to seek better housing elsewhere. To address housing for a resilient Kivalina, there are several factors to consider:

- **Local environmental conditions** - A house that is not designed for cold weather, high winds, or other such conditions is harder to maintain and more likely to fall into disrepair. Housing design needs to be appropriate for the local conditions and include features such as extra insulation, adjustable foundations, self-contained sewer systems, and solar energy.
- **Energy costs** – Homes should be built using techniques and materials that reduce energy costs.
- **Location** – New homes should be located in less-vulnerable locations when possible.
- **Affordability** – Homes should be affordable to construct and maintain.

Key housing-related strategies for increasing Kivalina resiliency include:

- Affordable and diverse housing options
- Safe and healthy housing
- Accessible housing options

Access to safe, quality, and affordable housing is vital for any community. Community residents have expressed a need to improve the housing in Kivalina for a variety of reasons, including:

- **Overcrowding** – Studies have shown that overcrowding can have a negative impact on people and their quality of life. People who live in overcrowded conditions often have higher levels of anxiety, stress, and depression. The quality of interpersonal relationships suffers because of a lack of privacy. Children lack enough space to play and study. There is a lack of storage space for subsistence food and emergency supplies.
- **Inefficient and expensive energy use** – Housing units in rural Alaska use more energy to heat their homes than housing units in other areas. This is partially due to the colder conditions found in many rural communities, but it is also because most homes are not energy efficient. In

addition, many homes rely on fuel oil, which is often more expensive than other sources of electricity.

- **Affordability** – Housing costs in Kivalina are high and households often have to spend more than the federally suggested maximum of 30 percent of their total income on housing costs.
- **Poor conditions** – Many homes in Kivalina have mold and mildew problems due to poor ventilation and air circulation. This results in poor indoor air quality-related problems, which in turn can lead to respiratory health issues. Building structures are often exposed to high humidity and condensation, which can lead to the deterioration of the structure. This is often worse in homes that do not have washing facilities and hang wet clothes inside to dry.

Making housing improvements in rural Alaska is often challenging due to the lack of available construction materials, high cost of materials, and availability of skilled workers such as electricians and plumbers.

Poor housing conditions such as structural problems, chronic dampness, and poor ventilation can cause injury and illness, and increase energy consumption for the home. Health benefits of having an energy-efficient and safe home can reduce the potential for medical problems and bills associated with illnesses and other health impacts associated with poor housing conditions.

Responsible Party: Individuals, City, Tribe
Potential Partners/Coordination: AHFC, HUD, RurAL CAP, Denali Commission, EPA, CCHRC, NANA, NAB, Northwest Inupiat Housing Authority, Relocate Kivalina
Timeframe for Implementation: Critical Action
Estimated Cost: Varies
Current Status: New
Reference: N/A

3.2.1 Housing Needs Assessment

A housing needs assessment is a study of the structural characteristics and conditions of dwellings, the demographic structure of the community, and local housing and other issues related to housing in the area. It allows a community to develop an understanding of their housing issues and their most critical local housing issues. A housing needs assessment is helpful to Kivalina to quantify the number of additional housing units needed in the community, a comprehensive list of needed repairs, and identification of barriers to housing assistance.

As part of the assessment, homes that need to be elevated should be identified.

Responsible Party: City, Tribe
Potential Partners/Coordination: Northwest Inupiat Housing Authority, AHFC, HUD, EPA, Relocate Kivalina, CCHRC
Timeframe for Implementation: Short term (0–5 years)
Estimated Cost:
Current Status: New
Reference: N/A

3.2.2 Develop Housing Strategy

A strategy to improve the existing housing stock and meet future housing needs will be developed as a result of the housing needs assessment. The housing strategy will lay out a plan on how to address various issues that currently exist, determine whether the options are feasible, identify appropriate housing types for the community, identify potential suitable locations for new housing, and identify a timeline for funding and construction. Specific issues that should be considered include ventilation systems that operate with very low maintenance and don't let cold air in, as well as ways to increase storage. Food storage is of particular importance to avoid cross-contamination and spoilage. As a short-term measure, storage sheds or a community storage facility may be an option.

The community and interested homeowners and renters should be involved in the strategy process, as this lays out the plan for housing in the village for the future. The housing strategy could be developed along with the needs assessment.

Responsible Party: City and Tribe
Potential Partners/Coordination: Northwest Inupiat Housing Authority, CCHRC, EPA, NAB, NANA, HUD, Relocate Kivalina
Timeframe for Implementation: Short term (0–5 years)
Estimated Cost: $100,000–$250,000
Current Status: New
Reference: N/A

3.2.3 Housing Upgrades

To address the known issues and those identified in the needs assessment and housing strategy, many existing housing units need to be upgraded. Typical improvements that are needed include improving energy efficiency, addressing mold and mildew issues to improve indoor air quality, caulk and sealing doors and windows, along with structural improvements. These upgrades are needed to ensure residents have a place to live that does not negatively impact their health.

The tribe is working with community members to upgrade housing in the community. As of June 2016, the tribe has completely renovated seven homes and is working on two additional houses. The improvements are being made with HUD/Native American Housing Assistance and Self Determination Act (of 1996) funding.

Responsible Party: Individuals, City, Tribe
Potential Partners/Coordination: Northwest Inupiat Housing Authority, CCHRC, EPA, HUD
Timeframe for Implementation: Short term (0–5 years)
Estimated Cost: Varies
Current Status: New
Reference: N/A

3.2.4 Low-Income/Elder Housing

In addition to a general need for additional housing, Kivalina specifically identified a need for additional low-income and elder housing. High housing costs, combined with a lack of employment opportunities, means there are some residents in Kivalina who cannot afford housing.

In addition to needing affordable housing, many elders have other special requirements. For example, they have mobility issues that prevent them from walking long distances or using stairs, they may be unable to operate an ATV or snowmachine, or they may need assistance with daily tasks. One issue of growing concern is the ability of elders to age in their village. Traditionally, they have relied on their families for any needed assistance. With more residents leaving the villages for more urbanized areas, elders may lack the support network they need in order to remain in Kivalina.

The community needs to work together and with housing providers to identify how to accommodate low-income and elder housing in the community. Specific issues that should be addressed include the appropriate location for each type of housing, how much of each type is needed, and how to fund these projects. In addition, the community should consider how best to address low-income and elder households in the community evacuation plan, as these households may lack access to transportation, which hinders their ability to evacuate if necessary.

Responsible Party: City and Tribe
Potential Partners/Coordination: Northwest Inupiat Housing Authority, AHFC, ICDBG, HUD, CCHRC, EPA, NANA, NAB
Timeframe for Implementation: Long term (11+ years)
Estimated Cost: Varies depending on number of housing units
Current Status: New
Reference: N/A

3.2.5 Construct Additional Housing

Construction of additional housing would reduce the problems of overcrowding that currently persist in Kivalina. There are not enough homes for the growing population, and thus many multi-generational family members live together. Additional housing construction would provide some jobs in the local economy, provide new, energy-efficient homes, and solve problems of overcrowding. Kivalina should also consider alternative housing styles to the single-family home. Multi-family housing, such as duplexes and mother-in-law suites, may be more suitable for the needs of some residents are they are better able to accommodate larger, multi-generational family units.

Responsible Party: City, Tribe, Individuals
Potential Partners/Coordination: Northwest Inupiat Housing Authority, NANA, AHFC, RurAL CAP, CCHRC, HUD
Timeframe for Implementation: Medium to long term (5+years)
Estimated Cost: $300,000–$500,000 per housing unit
Current Status: Planned (limited due to available land)
Reference: N/A

3.3 Jobs and Economic Development Opportunities

Jobs and economic development are important elements of resiliency. When residents have jobs that pay enough to meet their needs, they are able to stay in their community instead of moving elsewhere for employment. Residents are able to pay for their utilities, such as electricity, water, and sewer. Utility operators can then use those funds for system maintenance and upgrades. When people have money to spend locally, there is also a positive multiplier effect that benefits others in the community.

In short, communities that are economically resilient are better able to survive an emergency, can retain residents, and have a high quality of life.

The primary employment and economic development strategies to increase resiliency in Kivalina are:

- Residents have the skills necessary for jobs in the community.
- Economic diversity supports local businesses as well as new opportunities.
- Local residents have the right skills for jobs available in the community.
- Catalyst projects can support local residents.

3.3.1 Community Asset Mapping

Community asset mapping is when a community looks at its assets and concentrates on internal problem-solving through local determination and creativity. This process can lead to community empowerment, as opposed to always looking at issues on a needs-based approach and relying on external services to provide for the community. Assets can include various skills, knowledge, talents, and experience of local residents, businesses, schools, churches, community organizations and associations, physical structures, and natural resources. Many residents have traditional, technical, mechanical, and practical skills that would be useful during an emergency and on a day-to-day basis. Mapping can help identify unknown talents and skills and eventually lead the community to feel more empowered and have a stronger sense of direction.

Responsible Party: City or Tribe
Potential Partners/Coordination: NAB, NANA, Relocate Kivalina
Timeframe for Implementation: Short term (0–5 years)
Estimated Cost: under $50,000
Current Status: new
Reference: N/A

3.3.2 Grant Writing Workshop

Grants are an important source of income for a rural community. A grant writing workshop will teach community members how to identify grant opportunities, write grant applications, follow up with grants, and understand how they can apply grants to benefit the community or themselves. Grant writing workshops can be provided by a non-profit organization or through other regional or state organizations. Kivalina could host a workshop or send people to workshops elsewhere as funding allows. Recurring training may have to be provided, depending on staff turnover.

Responsible Party: City, Tribe
Potential Partners/Coordination: HUD, DCCED, NANA, NAB, Relocate Kivalina, EPA, Maniilaq Association
Timeframe for Implementation: Short term (0–5 years)
Estimated Cost: Less than $50,000 per occurrence
Current Status: New
Reference: N/A

3.3.3 Develop Economic Diversification Strategy

An economic diversification strategy looks at ways the community can be more diverse in the economies that create jobs or earn income. Kivalina's current economy is primarily based on subsistence with part-time wages earned, but the local fishing industry is growing and also provides some income.

Questions to be addressed as part of the strategy include: What are some ways Kivalina can diversify its economy? Are there locally made products that could be sold to residents or exported to other villages or communities for trading and commerce purposes? How can existing opportunities generate additional income? Examples of economic diversification strategies Kivalina could employ include increased tourism, selling locally grown produce, and ensuring that visitors know how to purchase art, jewelry, food, and other items locally.

Responsible Party: City, Tribe
Potential Partners/Coordination: NANA, NAB
Timeframe for Implementation: Short term (0–5 years). Strategy should be periodically reviewed and refreshed.
Estimated Cost: Under $50,000
Current Status: New
Reference: N/A

3.3.4 Develop Education and Training Programs

Residents may need additional education and training to be qualified for certain jobs in the community. Kivalina should develop education and training programs to ensure their residents have the right skills and certifications to quality for meaningful employment opportunities. Kivalina should consider bringing training opportunities to Kivalina (through distance learning or in-person training) as well as providing opportunities to send residents elsewhere for training.

Responsible Party: City, Tribe
Potential Partners/Coordination: NANA, NAB, NABSD, University of Alaska

Timeframe for Implementation: Short term (0–5 years)
Estimated Cost: To be determined
Current Status: New
Reference: N/A

3.3.5 General Educational Development

Residents have indicated that a high number of adults living in Kivalina do not have a high school or General Educational Development (GED) Diploma. Having a diploma can create new opportunities for employment and higher education.

The community should encourage residents to obtain their GED. The community should work with the school district and others to identify a place where people who want to obtain their GED can study and participate in online learning sessions. The can also distribute information about the various programs people can participate in to obtain their GED.

Responsible Party: City, Tribe
Potential Partners/Coordination: NANA, NAB, NABSD, University of Alaska, Department of Labor and Workforce Development, Adult Learning Programs of Alaska, Private sources
Timeframe for Implementation: Short term (0–5 years)
Estimated Cost: To be determined
Current Status: New
Reference: N/A

3.3.6 Local Economic Development Plan

A local economic development plan provides a community inventory of demographics, social conditions, economic conditions, public and private services, and would provide Kivalina with information on traditional resources and the planning process. The plan emphasizes the development goals for the economy and local resources and what capital improvement projects should be addressed. Updating the economic plan regularly will help ensure that the community keeps looking forward for more opportunities and adjusts the plan accordingly if there is a shift in perception and goals.

Responsible Party: City, Tribe
Potential Partners/Coordination: NANA, NAB, DCCED
Timeframe for Implementation: Ongoing (every 5 years)
Estimated Cost: under $250,000
Current Status: New
Reference: N/A

3.3.7 Teen Employment Strategy

Youth employment is beneficial for a community, as jobs can help teens develop their identities, have more autonomy with personal income, achieve new accomplishments, and obtain work experience while keeping youth out of trouble. This can be done by providing interesting opportunities for youth to perform outside training, take part in summer exchange programs with nearby villages, work for the school or village council, and become acquainted with leadership positions to gain more responsibilities

in the community. Local corporations and associations may also provide employment programs and opportunities for youth.

Responsible Party: City and Tribe
Potential Partners/Coordination: NANA, NAB, NABSD
Timeframe for Implementation: Medium term (6–10 years). Strategy should be periodically reviewed and refreshed.
Estimated Cost: To be determined
Current Status: New
Reference: N/A

3.4 Proactive Emergency Management

Emergency management encourages safer communities with the capacity to cope with hazards. It includes all activities to build, sustain, and improve the ability to mitigate, prepare for, respond to, and recover from disasters.

According to FEMA, emergency management must be:

1. **Comprehensive** – Emergency managers consider and take into account all hazards, all phases, all stakeholders, and all impacts relevant to disasters.
2. **Progressive** – Emergency managers anticipate disasters and take preventative and preparatory measures to build disaster-resistant and disaster-resilient communities.
3. **Risk-driven** – Emergency managers use sound risk management principles (hazard identification, risk analysis, and impact analysis) in assigning priorities and resources.
4. **Integrated** – Emergency managers ensure unity of effort among all levels of government and all elements of a community.
5. **Collaborative** – Emergency managers create and sustain broad and sincere relationships among individuals and organizations to encourage trust, advocate a team atmosphere, build consensus, and facilitate communication.
6. **Coordinated** – Emergency managers synchronize the activities of all relevant stakeholders to achieve a common purpose.
7. **Flexible** – Emergency managers use creative and innovative approaches in solving disaster challenges.
8. **Professional** – Emergency managers value a science- and knowledge-based approach based on education, training, experience, ethical practice, public stewardship, and continuous improvement.

Proactive emergency management means the community is planning ahead for anticipated disasters rather than just reacting should one occur. Kivalina knows they will be subjected to more coastal storms in the future. It is only a matter of when the next one will occur and how large it will be.

Key emergency management strategies for increasing Kivalina's resiliency include:

- Planning and Preparedness
- Education and Drills
- Protective Structures

Information on applying for emergency management training can be found at:
https://www.ready.alaska.gov/Preparedness/Training/Resources

3.4.1 IMMINENT ACTION – Emergency Drills and Exercises

Emergency drills and exercises provide an opportunity to practice something associated with an emergency plan. They are an important component of emergency preparedness because they help people become familiar with what is expected of them during an emergency and help identify whether the plan meets community needs or if changes need to be made.

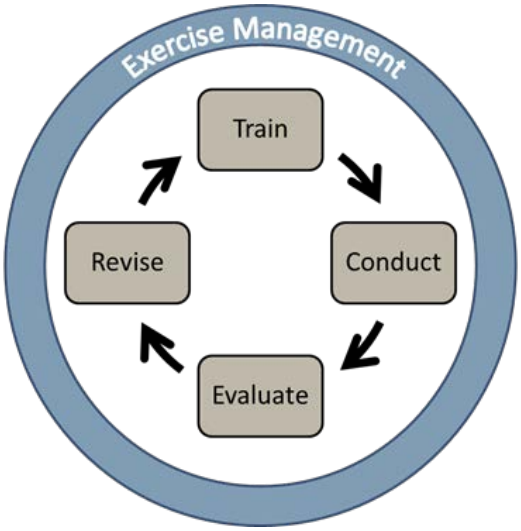
3.4.1.1 Exercise Methodology

While there is great value in conducting emergency drills and exercises, there are other important components associated with a drill/exercise that allow the community to benefit the most.

The common planning methodology followed for all exercise types includes exercise program management, design and development, conduct, evaluation, and improvement planning applicable to management of exercise programs and execution of individual exercises—regardless of the scope or scale of the exercise.

Design and Development

Figure 5. Emergency Drill/Exercise Cycle



When designing and developing individual exercises, exercise planning team members schedule planning meetings, identify and develop exercise objectives, design the scenario, create documentation, plan exercise conduct and evaluation, and coordinate logistics. At key points in this process, the exercise planning team engages elected and appointed officials to ensure that their intent is captured and that the officials are prepared to support the exercise as necessary.

Conduct

After design and development activities are finished, the exercise is ready to occur. Activities essential to conducting individual exercises include preparing for exercise play, managing exercise play, and conducting immediate exercise wrap-up activities.

Evaluation

Evaluation is an essential component of an exercise and must be considered throughout all phases of the exercise planning cycle, beginning when the exercise planning team meets to establish objectives and initiate exercise design. Effective evaluation assesses performance against exercise objectives, and identifies and documents strengths and areas for improvement relative to core capabilities.

Revision

Based on what was learned during the evaluation phase, plans, policies, and other aspects are revised to better meet community and organizational needs.

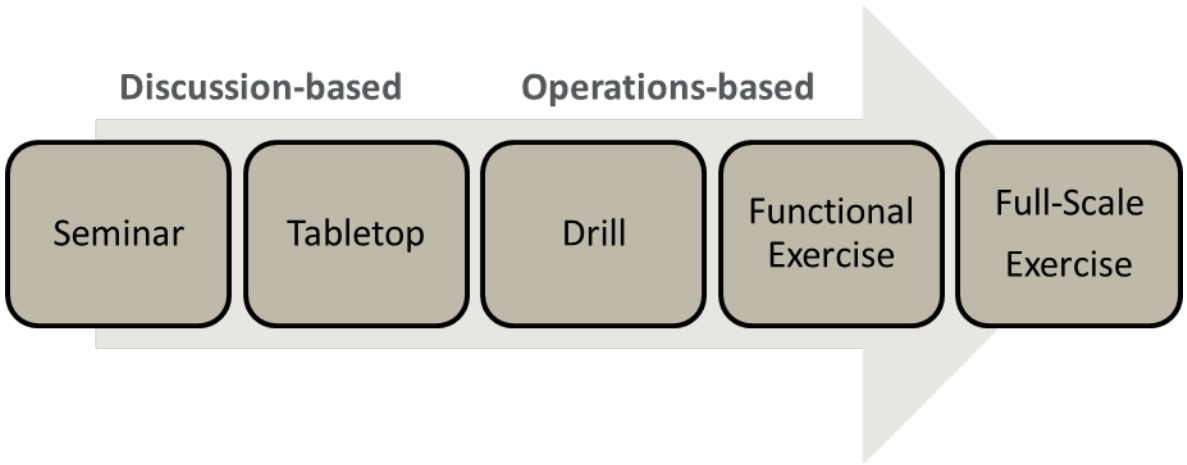
3.4.1.2 Building Block Approach

Before a drill or exercise is performed, the community needs to decide what needs to be practiced. That is, they need to decide the scope of the drill. Does the community need to practice emergency response activities? Evacuation efforts? Just one element of a plan?

While it is tempting to practice an entire plan, the community may find it easier to conduct drills in stages to keep the drill from becoming overwhelming. It is recommended that Kivalina use a building block approach to drills and exercises.

In the building block approach, activities are progressive in nature so participants build on skills and experiences from other activities. Participants start with basic specific, lower cost, and theoretical elements and then move onto bigger, more complex, more involved realistic exercises (see Figure 6).

Figure 6. Building Block Approach to Emergency Drills and Exercises



Discussion-based activities familiarize people with current plans, policies, agreements, and procedures, or may be used to develop new plans, policies, agreements, and procedures. They can include seminars, or similar training sessions, and tabletop exercises. Seminars and other training activities are opportunities for people to learn about existing or new plans, policies, operations, and procedures. These activities are designed to increase people's knowledge in a low-stress situation and encourage participant interaction. Tabletop exercises involve emergency responders and others discussing hypothetical emergency scenarios in an informal setting. Tabletop exercises can be used to assess plans, procedures, or systems; promote an understanding of concepts; identify strengths and gaps; and achieve changes in approach to a particular situation.

Operations-based exercises are typically designed to test actual reactions to a simulated emergency, identify gaps in resources, improve individual and team performance, and include the mobilization of resources and personnel. During an operations-based exercise, participants must act out their response instead of just talking about how they would respond to mirror real events. As they are more complex, operations-based exercises typically take more time to plan and are more expensive to conduct.

Three types of operations-based exercises include:

- **Drill** – a coordinated, supervised exercise activity, normally used to test a single specific operation or function.

- **Functional Exercise** – an exercise is designed to validate and evaluate individual capabilities, multiple functions, activities within a function, or interdependent groups of functions.
- **Full-Scale Exercise** – multi-agency, multi-jurisdictional, multi-organizational exercises that validate many facets of preparedness.

It can typically take 2–4 months to prepare for a table top exercise and up to 1 year for a full-scale exercise. The community should work with DHS&EM to develop a multi-year training and exercise plan to ensure community needs are being met.

Responsible Party: City, Tribe
Potential Partners/Coordination: DHS&EM, NAB, NANA, DCCED, AVEC, Village Public Safety Officer (VPSO), Maniilaq Association, NABSD, FEMA, DOT&PF, NOAA, VSW, ANTHC
Timeframe for Implementation: Critical Action
Estimated Cost: Under $50,000
Current Status: New
Reference: N/A

Reasons Exercises Fail

- Scenarios are not tailored to the local area
- Scenarios are too complex to manage successfully
- Inadequate time is allocated for exercise
- There is no honest critique of the exercise afterwards
- Safety issues are not addressed properly
- Exercise is planned and initiated too quickly
- Some essential agencies are not included
- Results of evaluation are not implemented

3.4.2 IMMINENT ACTION – Personal Emergency Kits

Personal emergency kits contain a small number of items that may be helpful during an emergency. Everyone in the village should have a kit created with enough food, water, and essential supplies to last for 7 to 10 days. The kit can be used at home, in the evacuation shelter, or during an evacuation. The kit should contain warm clothing, a space blanket, socks, a hat, gloves, extra food, Band-Aids or other emergency supplies, medicine, a flashlight, gauze, and more. A grant may provide funding for emergency kits.

Kivalina can pursue funding that would allow them to purchase kits, or supplies to make kits, for everyone in the community. Alternatively, they can encourage individual households to develop kits by sharing educational material and supply lists. Regardless of the approach Kivalina takes, it is important for residents to personalize their kits based on their family needs. Examples of personalization include medications, baby supplies, and pet supplies.

Instructions on building a 7-day emergency kit can be find at:
https://www.ready.alaska.gov/Documents/Alaska%207-day%20Emergency%20Kit.pdf

Responsible Party: Individuals
Potential Partners/Coordination: City, Tribe, DHS&EM, FEMA, American Red Cross (ARC), Private Sources
Timeframe for Implementation: Critical Action

Estimated Cost: Varies
Current Status: New
Reference: N/A

3.4.3 CRITICAL ACTION – Protective Structure for Airport

The airport is vulnerable to erosion because it is not currently protected by a sea wall. In October 2015, a storm caused substantial erosion to the coastline (approximately 10 feet in one day) near the runway. The volunteers were able to fill supersacks and place them along the airport beach to stabilize the area and protect the runway as a temporary erosion control measure.

Plane at Kivalina Airport

DOT&PF is currently working with the community to develop a longer term solution to protect the airport, which is Kivalina's primary transportation link to the rest of Alaska and is essential for medevac services.

Responsible Party: DOT&PF and City
Potential Partners/Coordination: Tribe, NAB, NANA, EPA, USACE, FAA
Timeframe for Implementation: Critical Action
Estimated Cost: $7 million
Current Status: In progress
Reference: N/A

3.4.4 CRITICAL ACTION – Protective Structure for Landfill

Community residents have indicated that a protective structure is needed at the landfill to protect it from erosion. If the landfill erodes, a substantial amount of garbage would be released into the environment. This would have a negative impact on nearby subsistence resources.

As it could take several years before a protective structure is built, the community should develop a response plan to address the potential failure of the landfill.

The NAB has a Coastal Impact Assistance Program (CIAP) grant to assist with this effort.

Responsible Party: City, Tribe
Potential Partners/Coordination: NAB, NANA, EPA, ANTHC, USACE, VSW, USFWS, ADF&G, NOAA, USCG
Timeframe for Implementation: Critical Action
Estimated Cost: Unknown

Current Status: In progress
Reference: N/A

3.4.5 Emergency Plans and Drills

3.4.5.1 Update Emergency Operations Plan

The emergency operations plan (EOP) provides a strategy and outline of action steps that should be taken during an emergency event. The updated emergency operations plan should address preparedness, mitigation, evacuation, response, and recovery. The plan accommodates for the range of needs and issues of diverse community members, including children, Elders, and people with disabilities. The plan will need a regular review and revision cycle, and the community must hold a meeting to educate everyone on the plan. How will the village communicate to other community residents? To other levels of government? Who does the village call? Coordinated with other groups? School? Clinic?

Kivalina is currently developing a Small Community Emergency Response Plan (SCERP). A SCERP is intended for small communities (under 2,000) and acts a quick response reference tool to assist the community's response during a disaster. A SCERP is not intended to replace an EOP; rather it is intended to supplement the EOP and assist during an emergency. Due to the nature of the SCERP, it is typically easier to update and keep current than the EOP. Kivalina should coordinate with the NAB to ensure their plan is consistent with the NAB plan.

Responsible Party: City and Tribe
Potential Partners/Coordination: NAB, NANA, DHS&EM, FEMA, DCCED, American Red Cross
Timeframe for Implementation: Ongoing (should be reviewed annually to determine if updates are required)
Estimated Cost: under $50,000
Current Status: Planned
Reference: *Kivalina Emergency Operations Plan*

3.4.5.2 Update Evacuation Plan

An evacuation plan describes conditions in which an evacuation will be necessary or when to shelter-in-place, what routes and exits are in the area, how to assist family, friends, and coworkers to evaluate, and how to account for everyone after the evacuation process. Specific issues that should be included in the evacuation plan are evacuation routes, location of emergency shelters, who will assist residents with special needs or no transportation, and how to ensure all residents are accounted for.

The community has an evacuation plan, but it has not been implemented thoroughly or practiced by local community members. The school may be a resource in guiding the

Evacuation Guidelines

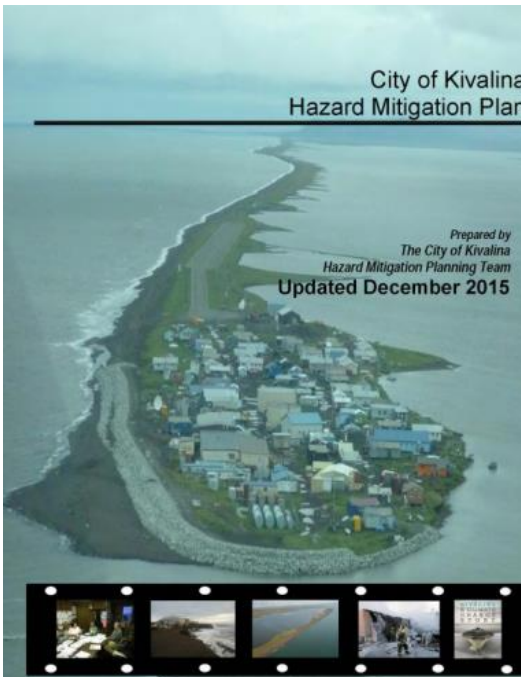
- Know the evacuation routes
- Know where to go
- Leave early enough to avoid being trapped by bad weather
- Listen to VHF/radio for updates
- Wear sturdy clothing
- Bring an emergency kit
- If you don't have an ATV or boat, make arrangements for transportation

evacuation plan and drills for the students and their families.

Responsible Party: City and Tribe
Potential Partners/Coordination: NAB, NANA, DHS&EM, FEMA, NABSD
Timeframe for Implementation: Ongoing (should be reviewed annually to determine if updates are needed)
Estimated Cost: under $50,000
Current Status: New
Reference: N/A

3.4.5.3 Update Local Hazard Mitigation Plan

The *Kivalina Local Hazard Mitigation Plan* contains information that will assist local government and residents with planning to avoid disaster-related losses. The plan provides information on natural hazards that affect the village. There is a list of past disasters and projects that may help the community prevent loss. The plan is updated every 5 years. Updating the local hazard mitigation plan regularly adds new information on ongoing projects or whether other disasters need to be added to the list of events. Updated information will also help the community make decisions regarding natural hazards that affect the village. As more knowledge is compounded into the hazard mitigation plan, the more knowledgeable policy makers will be to make decisions for their community.



Responsible Party: City, Tribe
Potential Partners/Coordination: NAB, NANA, FEMA, DHS&EM, DGGS, NOAA, DCCED, BIA, HUD, Denali Commission, DHHS, DNR, DOT&PF, EPA, FAA, NOAA, NWS, VSW, ANTHC
Timeframe for Implementation: Ongoing (FEMA requires the mitigation plan to be updated every 5 years)
Estimated Cost: Less than $50,000
Current Status: In progress
Reference: City of *Kivalina Hazard Mitigation Plan*

3.4.6 Emergency Energy Backup Plan

An emergency energy backup plan enlists strategies and information on accessing backup energy and fuel during an emergency. This plan lists basic energy sources in the village—water, fuel, generators—and how to access these sources. What are the backup energy options in important community facilities such as the school, village council building, and store? Do families keep extra wood for wood burning stoves? What are backup options for fuel and heating in homes in case of emergencies?

Responsible Party: AVEC
Potential Partners/Coordination: Individuals, businesses, NAB, NANA, NABSD, Tribe, City, Maniilaq Association, AEA, DHS&EM, FEMA, EPA
Timeframe for Implementation: Short term (0–5 years)
Estimated Cost: Under $10,000
Current Status: New
Reference: N/A

Potential Evacuation Center Needs:

- Sleeping area
- Communication center
- Power/Heat
- Infirmary
- Water
- Garbage facility
- Bathroom facilities
- Emergency supplies
- Kitchen
- Dining area
- Living space
- Ventilation
- Pet area
- Access

3.4.7 Utility Assessments

Utilities include electricity, water, landfill, fuel tank farm, and sewage systems that are consumed or used by the public. The community should work with the service providers to conduct a utility assessment of these systems to determine how well the system would perform in an emergency. Questions to be asked as part of a utility assessment include: Will it survive an emergency? Do people know who to contact if there is an emergency? The utility assessment and inventory will help answer pertinent questions related to emergency strategy and planning. Each utility assessment should include a list of recommended projects and an implementation plan.

Responsible Party: City and Tribe
Potential Partners/Coordination: AVEC, NAB, NANA, EPA
Timeframe for Implementation: Short term (0–5 years)
Estimated Cost: To be determined
Current Status: New
Reference: N/A

3.4.8 Evacuation Center

One of the biggest concerns in Kivalina is having a safe place to be during storms. An evacuation road was previously studied and was found to be impractical due to the cost, potential flooding of the evacuation road, lack of transportation for residents, and need for a shelter at the road terminus.

The community has indicated a need for an evacuation center, which would be a central point where everyone in the community convenes during an emergency. The evacuation center should be build within the community in a location away from the coastline. The structure also needs to be elevated to be out of the floodwater. The community should evaluate making the facility relocatable.

The evacuation center needs to be self-sufficient during an emergency. The center will need to have a generator, water supply, and sewage lagoon, as well as enough emergency supplies (e.g., food, water, emergency communication devices, medical supplies, sleeping cots, blankets) to last for several days.

Planning for the evacuation center will need to be done by the community. Information about what type of supplies are needed, emergency food, who can open the shelter, extra keys, and alarm codes to the system is necessary to create a successful system. Who can support the creation of the center? Where will the funding come from? How will the center be utilized, aside from evacuation purposes?

The community is currently pursuing the development of a school access road. If a suitable location for an evacuation center cannot be found within the existing village, the community should consider a site along the access road.

Responsible Party: City, Tribe
Potential Partners/Coordination: NAB, NANA, Federal Emergency Management Agency (FEMA), USACE, DCCED, Maniilaq Association, NABSD, DHHS, VSW, ANTHC, NOAA, CCHRC
Timeframe for Implementation: Short term (0–5 years)
Estimated Cost: $10–$40 million
Current Status: New
Reference: N/A

3.4.8.1 Emergency Preparedness Education

It is important that residents are educated about how to prepare for an emergency. Information brochures are quick guides that can provide general information in a fast reading format. The goal of information brochures is to share the information in the most direct and succinct manner. Information brochures would be accessible to community members at no cost and can be placed readily throughout the household, school, or office if necessary. The information brochures should have specific guidelines to follow during an emergency and information on how to prepare for unexpected events.

Responsible Party: City and Tribe
Potential Partners/Coordination: DHS&EM, FEMA, DCCED, NAB, NANA
Timeframe for Implementation: Short term (0–5 years)
Current Status: New
Reference: N/A

3.4.9 Early Warning System

An early warning system can issue advance warnings of an incoming storm that alert people to be prepared and save lives. A warning system can be put together in cooperation with the National Weather Service and the local radio/walkie talkie network. The community should establish an early warning system and apply for funding of a project. Regular tests and alerts should also be conducted in conjunction with regular drills. Make sure people know what the signal is and how to respond. Make sure there is a way to include people with specific challenges such as cognitive, physical, or other disabilities, or lack of transportation. The storm warning system should have a way to alert people who are not within hearing range, such as people out hunting or doing other activities.

Responsible Party: City and Tribe
Potential Partners/Coordination: NAB, NANA, NOAA, DGGS, FEMA, DHS&EM, DCCED, NABSD, National Weather Service

Timeframe for Implementation: Short term (0–5 years)
Estimated Cost: To be determined
Current Status: New
Reference: N/A

3.4.10 Develop Adequate First-Response Capacity

Developing a first-response capacity in the local community is important so that individuals in the community can help prevent fatalities during a catastrophe. Members of the community can get trained with emergency first response by various organizations and online as well. When more people are trained and aware, the faster the community can recover from a disaster or emergency. Trainings can also be done for youth in the school classroom through a variety of student training modules available from the Red Cross. The community is currently working on building VPSO housing and trying to get a VPSO located at Kivalina. The VPSO can be a source of guidance and also provide trainings to the locals on first response.

Responsible Party: Individuals, City, Tribe
Potential Partners/Coordination: DHS&EM, FEMA, DCCED, American Red Cross, VPSO, DPS, NANA, NAB, Maniilaq Association
Timeframe for Implementation: Short term (0–5 years)
Estimated Cost: Varies
Current Status: New
Reference: N/A

3.4.11 Work with Local Businesses

Businesses will also need to have personal emergency action plans that address what workers can do to protect themselves and their customers during an unexpected event. What can local businesses contribute during an emergency? Will they have special needs? Do they need a business continuity plan after an emergency occurs? Management courses on saving for the future emergencies?

Responsible Party: City, Tribe, local businesses
Potential Partners/Coordination: Alaska Partnership for Infrastructure Protection, DHS&EM
Timeframe for Implementation: Short term (0–5 years)
Estimated Cost: Under $10,000
Current Status: New
Reference: N/A

3.4.12 Individual and Household Preparedness

3.4.12.1 Family Evacuation and Disaster Communication Plans

Family evacuation plans are created by families according to their own needs, addressing what to do in case of an emergency. The community can encourage each family to have an evacuation and disaster communication plan. The family evacuation plan can also outline out what to do when there are family members out of the village and beyond communication reach; i.e., during subsistence hunting. It can identify a safe place to meet, who to contact, a list of important contact information, other important

information (e.g., Social Security numbers, bank account numbers), and locations of spare warm clothing, money, and food stashed in the house so the entire family is informed in case of major or long-term emergencies.

Responsible Party: Individuals, DHS&EM
Potential Partners/Coordination: City, Tribe
Timeframe for Implementation: Short term (0–5 years)
Estimated Cost: Under $10,000
Current Status: New
Reference: N/A

3.4.12.2 Smoke and Fire Detectors

Smoke detectors indicate when there is a fire in a building, and an alarm will be activated if the detector senses smoke or fire, alerting people to evacuate the building. The city and council should encourage residents to have working smoke and fire detectors in every home and building in the community, as this increases safety and reduces the likelihood of fires causing significant damage. A grant may need to be pursued from the Red Cross or FEMA to acquire necessary material. An informational meeting on the use and maintenance of smoke detectors may be needed to acquaint residents with the value of fire alarms to homes.

Responsible Party: Individuals, City, Tribe
Potential Partners/Coordination: FEMA, ARC, DHS&EM, NANA, NAB, Private Sources
Timeframe for Implementation: Short term (0–5 years)
Estimated Cost: Varies
Current Status: New
Reference: N/A

3.4.13 Research and Data Collection

3.4.13.1 Erosion Monitoring

The community should conduct erosion monitoring to help identify erosion rates at different locations near the village and determine whether the erosion rates are changing. A community-based erosion monitoring program can be developed fairly easily. The community should work with the school to determine if a class would like to conduct erosion monitoring as part of their science studies. Alternatively, the community can find a volunteer or hire someone to conduct erosion monitoring. Ideally, monitoring should be done on a monthly basis and after any storm event.

Responsible Party: Tribe and City
Potential Partners/Coordination: SNC, ANTHC, DGGS, USACE, DCCED, DOT&PF, EPA, BSSD,
Timeframe for Implementation: Long term (11+ years)
Estimated Cost: Varies
Current Status: New
Reference: N/A

3.4.13.2 Participate in Local Environmental Observer Program

The Local Environmental Observer Network consists of local experts who share knowledge and experiences to describe unusual environmental change. Experts can apply traditional knowledge, western science, modern mapping, and communication technology to raise awareness about the changing climate. By participating in the Local Environmental Observer program, community members can exchange information and seek help from other communities dealing with similar erosion and problems and find solutions that apply to their community's needs.

Responsible Party: Individuals, City, Tribe
Potential Partners/Coordination: ANTHC, Center for Climate and Health, EPA, Landscape Conservation Cooperatives
Timeframe for Implementation: Short term (0–5 years)
Estimated Cost: Under $10,000
Current Status: New
Reference: N/A

3.4.14 Additional Heavy Equipment

The community needs heavy equipment for the construction and maintenance of the community improvements such as seawall maintenance and new community facilities. The first step is to develop an inventory of existing heavy equipment and determine the remaining useful life of each piece. A list of needed equipment can then be created and prioritized based on what equipment the community does not already have and what will need to be replaced in the near future.

Kivalina's Seawall in Winter

One way communities have traditionally obtained heavy equipment is through capital projects in the village. When the project is done, equipment is often left behind because it would cost more to ship it out of the community than to replace it. However, the equipment left behind is often in poor condition, making it of little use. The community then has to identify a way to dispose of the equipment. Kivalina should work with its partners to continue this practice in a way that allows the community to end up with equipment that is in working order.

Responsible Party: City, Tribe
Potential Partners/Coordination: NAB, NANA, DOT&PF, ANTHC, EPA
Timeframe for Implementation: Medium term (6–10 years)

Estimated Cost: Various
Current Status: New
Reference: N/A

3.4.15 Emergency Funding

The village needs an emergency funding plan in place in order to make sure that there is an adequate amount of money in case of emergencies and for rebuilding purposes. Organizations and agencies often have emergency funds to pay for emergency actions. The community can create a list of agencies and organizations to contact for emergency funding and relief. The city and village council can also set aside money toward an internal emergency fund.

Responsible Party: City and Tribe
Potential Partners/Coordination: NAB, NANA, FEMA, DHS&EM, DOT&PF, ANTHC, BIA, HUD
Timeframe for Implementation: Medium term (6–10 years)
Estimated Cost: To be determined
Current Status: New
Reference: N/A

3.4.16 Incident Command System Training

The Incident Command System training is a standardized management tool for meeting the demands of small or large emergency and non-emergency situations. The training provides information on planning and command processes for when an emergency occurs. Members of the community can attend Incident Command System training or access the trainings online through the FEMA website.

Responsible Party: City, Tribe
Potential Partners/Coordination: NAB, NANA, DHS&EM, FEMA, Red Cross
Timeframe for Implementation: Short term (0–5 years)
Estimated Cost: Under $50,000
Current Status: Planning
Reference: N/A

3.4.17 Outdoor Education Program

Outdoor education programs provide critical thinking skills for how to survive in the outdoors, build self-esteem and self-confidence, and encourage a healthy lifestyle for people of all ages. Survival training programs can take youth out for training. The program can be incorporated with traditional skills in the classroom.

Responsible Party: NABSD
Potential Partners/Coordination: City, NAB, NANA, Camp Fire USA Rural Program, Girl Scouts Rural Summer Program, Alaska Best Beginnings Program, Private sources
Timeframe for Implementation: Short term (0–5 years)
Estimated Cost: Under $100,000
Current Status: New
Reference: N/A

3.4.18 Hire Village Public Safety Officer

The VPSO program is a way to provide public safety services in rural Alaska communities. The program trains and employees people residing in rural villages to serve as first responders to public safety emergencies. The VPSOs have had a significant impact in increasing public safety and quality of life in participating communities.

Responsible Party: NAB
Potential Partners/Coordination: City, Tribe, NANA, Department of Public Safety
Timeframe for Implementation: Short term (0–5 years)
Estimated Cost: Less than $10,000[2]
Current Status: New
Reference: N/A

[2] VPSO would work for NAB and receive training through the Department of Public Safety. These two entities incur the costs associated with the training and employment of the VPSO. The City and IRA are not responsible for these costs.

3.5 Strengthened Traditional Culture

Having a strong traditional culture means residents know where they come from and know who they are, and are proud to be Inupiat. Kivalina's traditional culture is an important part of who they are; it is an essential part of their identity. Their traditional culture is the basis for their shared values, beliefs, attitudes, and way of life.

Alaska Native communities have always been resilient. For generations, they have been able to adapt to changing conditions such as the introduction of missionaries and outsiders to their community, outmigration of people to urban centers, and changing technology. However, with the introduction of new goods and ideas into the community, it can become easy to forget the traditional ways. For example, many villages have realized that the number of people who can speak their traditional language is dwindling.

Whale Bone Arch

A community with a strong culture is more resilient because the people are able to maintain their identities and critical knowledge and practices while incorporating new technologies, products, and ideas into their lives. For example, many communities now use snow machines to help them with hunting because snow machines allow them to travel farther and increase their productivity. A resilient community can preserve and embrace its heritage while evolving to meet current needs.

The main strategies to increase Kivalina's resiliency through its traditional culture are:

- Connected and engaged community
- Inclusive and welcome community
- Arts, cultural, and recreation opportunities
- Cultural preservation

3.5.1 CRITICAL ACTION – Increase use of Traditional Knowledge

Alaska Natives have a unique understanding of the connections between people and their environment learned through generations of living with the land and learning how to adapt to environmental changes to survive. These understanding are general known as traditional knowledge.

Traditional knowledge is defined by the International Council for Science (2002) as:

> *A cumulative body of knowledge know-how, practices and representations maintained and developed by peoples with extended histories of interaction with the natural environment. These sophisticated sets of understandings, interpretations and means are part and parcel of a cultural complex that encompasses language, naming and classification systems, resource use practices, ritual, spirituality and worldview.*

Using Traditional Knowledge can:

- Provide historical information
- Better identify potential environmental impacts
- Help build relationships between organizations
- Lead to better decision making
- Increase capacity within a community
- Build an awareness of and appreciation for traditional knowledge

Alaska Native communities have expressed concerns about government agencies not incorporating traditional knowledge into the decision-making process. Some believe this leads to traditional knowledge being discounted, compared to "western science" information. In recent years, more agencies have acknowledged the importance of traditional knowledge and are working on how to integrate the information. It is not a case where one type of knowledge is superior to the other. By combining both, we are able to develop a better understanding of climate change and community impacts. We are also able to design resiliency solutions that are scientifically sounds and also connect to the local values, needs, and priorities.

Responsible Party: Various

Potential Partners/Coordination: City, Tribe, NAB, NANA, Maniilaq Association, BIA, DCCED, DOT&PF, USFWS, ADF&G, NOAA, EPA, ANTHC, VSW, University of Alaska
Timeframe for Implementation: Critical Action
Estimated Cost: Unknown
Current Status: New
Reference: N/A

3.5.2 Continue Community Events

Community events are important because they bring residents together to engage with their community and each other. There are several existing community events in Kivalina such as the end of school year lunch, village health fair, a fall carnival, first catch community feast, youth/Elders camp, and Family Fun Night.

Continuing to have community events will help everyone interact positively with each other, and will promote healthy principles and happier residents. Communities with high participation in community activities tend to have more community cohesion and fewer negative social issues such as alcohol and drug problems.

Responsible Party: Various
Potential Partners/Coordination: City, Tribe, NAB, NANA, Maniilaq Association, Red Dog
Timeframe for Implementation: Short term (0–5 years)

Estimated Cost: Existing funding
Current Status: Ongoing
Reference: N/A

3.5.3 New Community Events that Celebrate Traditional Culture

Community events bring people together for positive reasons. Local events celebrating traditional culture exist, but new events can bring family, Elders, and children together to celebrate subsistence and other traditions. New events can also provide opportunities for residents to gain leadership skills by volunteering to help organize and run an event.

Responsible Party: To be determined
Potential Partners/Coordination: City, Tribe, NAB, NANA, Maniilaq Association, Red Dog
Timeframe for Implementation: Short term (0–5 years)
Estimated Cost: Varies
Current Status: New
Reference: N/A

3.5.4 Community Story Project

A community story project is an opportunity for youth to ask Elders about Kivalina's history and then encapsulate their stories in web, radio, or written media. Community story projects are important, as they help young people connect with Elders and instill a sense of pride over the region's cultural heritage. A community story project is also a way to share community values.

Responsible Party: To be determined
Potential Partners/Coordination: City, Tribe, NANA, NAB, NABSD, Relocate Kivalina
Timeframe for Implementation: Short term (0–5 years)
Estimated Cost: Under $50,000
Current Status: New
Reference: N/A

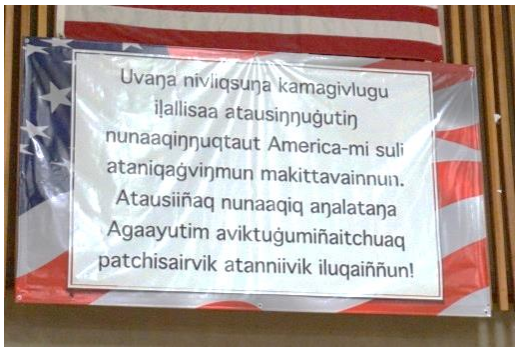
3.5.5 Elders in School Program

Elders are teachers, mentors, and role models in the community. They have a vital role in promoting the integration of traditional language and culture into the school curriculum. They have important skills and knowledge they can share with Kivalina's children and youth. It is also a way for Elders to continue giving back to the community and a way for them to share their wisdom and experiences.

The community should work with the school district to have Elders from the community involved in the classroom. Elders can have the chance to speak with children about local history, geography, wildlife, plants, sustainable resources management, and other topics. Elders in the classroom sharing stories and knowledge will also help young people learn more and respect their cultural heritage. This program would also provide some students with an Elder in their life (for those who may not otherwise have one). In addition, Elders can also help strengthen the relationship between teachers, students, parents, and the general community.

Responsible Party: Tribe, NABSD
Potential Partners/Coordination: NANA, City
Timeframe for Implementation: Short term (0–5 years)
Estimated Cost: Under $50,000
Current Status: New
Reference: N/A

3.5.6 Increase Use of Traditional Language



The community has expressed a concern that residents are losing their traditional language. They have indicated that they would like to increase the use of Inupiaq in the community. The community should work together to identify the most appropriate ways to increase usage of Inupiaq. Potential ways include offering Inupiaq lessons at the school for both youth and adults, providing written resources and public notices written in both in English and Inupiaq, maintaining a list of volunteer translators, and conducting community meeting in English and Inupiaq.

Responsible Party: City and Tribe
Potential Partners/Coordination: NANA, NAB
Timeframe for Implementation: Short term (0–5 years)
Estimated Cost: To be determined
Current Status: New
Reference: N/A

3.5.7 Develop Elders Program

Elder Programs consist of supporting the traditional Elders who still live a rural subsistence lifestyle but need help living on the land in the traditional way as they get older. An Elder program can help provide food, medicine, clothing, transportation, and other assistance. The program can be on a voluntary basis, but students and the community may be able to organize a small stipend or receive credit for helping. A Native Elder program is beneficial for locals, as it helps connect different age groups and helps the community come together for

something positive.

Responsible Party: City and Tribe
Potential Partners/Coordination: NANA, NAB
Timeframe for Implementation: Short term (0–5 years)
Estimated Cost: To be determined
Current Status: New
Reference: N/A

3.5.8 Community Food Assessment

Subsistence is an important part of Kivalina's traditional culture. Eating traditional foods and passing on the skills and knowledge necessary to subsist is one way to maintain their cultural existence. Subsistence is also essential because of the cost and availability of other food. In rural villages, food sold in the store is typically flown in and costs much more than it does in urban communities.

As a result, food security is an important part of being a resilient community. A community food assessment surveys the existing food products and sources to determine if the community has a sufficient food supply during an emergency.

The community needs to assess what the food sources are, whether people have emergency food, whether there is the ability to subsist locally and what the local game can bring, and whether food can be set aside for future catastrophic emergencies.

Fish on Drying Rack under Tarp

Responsible Party: City and Tribe
Potential Partners/Coordination: NANA, NABSD
Timeframe for Implementation: Short term (0–5 years)
Estimated Cost: To be determined
Current Status: new
Reference: N/A

3.6 Leadership for the Future

Confident leadership can lead to a more cohesive and resilient community. Understanding how leadership operates is essential for residents to be able to support leadership decisions and is an important part of holding leadership accountable to their constituencies.

Leadership also means ensuring the community has the financial resiliency to allow it to withstand potential economic downtowns. Leadership needs to protect the community by ensuring the financial position of the community is strong through responsible and transparent fiscal practices.

Key leadership strategies to support Kivalina's resiliency are:

- Open, accountable, and responsive government
- Collaborative, engaged leadership
- Proactive financial management
- Organizational practices
- Opportunities for positive community building
- Support for all residents

3.6.1 Continue Strong Local Leadership and Governance

The City of Kivalina and the Native Village of Kivalina have a long history of working together to lead the community. Their working relationship has had a positive impact on the community and results in projects and programs being implemented.

By continuing the strong local leadership and governance, the community will continue to thrive. The community can encourage good leadership by recognizing their leaders and encouraging mentorship programs so that everyone has the opportunity to make a difference in Kivalina. Communities can continue to support their local leaders by being active in their public affairs and involved in community projects.

Responsible Party: City and Tribe
Potential Partners/Coordination: N/A
Timeframe for Implementation: Ongoing
Estimated Cost: Under $50,000
Current Status: Ongoing
Reference: N/A

3.6.2 Continue to Support Youth Leadership Programs

Youth involvement is essential to growing successful future leaders in the community. The community needs to continue to support youth leadership programs as they help grow future community leaders. Leadership programs can include job shadowing, youth representatives on City boards, and other community involvement activities. These opportunities will teach youth the values of hard work, responsibility, reward, and stewardship to their community.

Responsible Party: Individuals, Tribe, City
Potential Partners/Coordination: NABSD, NANA, NAB
Timeframe for Implementation: Ongoing
Estimated Cost: Under $50,000
Current Status: Ongoing
Reference: N/A

3.6.3 Having City and Tribe Council Meetings Open to the Public

Kivalina should continue having City and Tribal council meetings open to the public and encourage community residents to participate in the meetings. Listening to the public and being responsive to their needs are important parts of responsible governance and promote transparency.

Ways to increase participating include:

- Having a community-wide annual meeting/celebration that can bring everyone together and also provide more transparency between these governing groups with the public.
- Producing meeting minutes that can be easily accessible to everyone via email, website, or social media outlets.
- Providing translators, transportation, and other assistance so that people who traditionally have difficulties participating in meeting have a way to contribute to important community discussions despite barriers.
- Having a meeting schedule established for the entire year so people know when meetings occur.

Responsible Party: Tribe and City
Potential Partners/Coordination: NAB, NANA
Timeframe for Implementation: Short term (0–5 years)
Estimated Cost: Under $50,000
Current Status: Ongoing
Reference: N/A

3.6.4 Improve Government-to-Government Relations

Improving government-to-government relations will help elicit trust among different government levels—tribal council, city, regional, state level—as well as various state agencies. Continued interaction and correspondence will help make sure everyone is on the same page with the same ideas and no relationships are destroyed through the process.

Responsible Party: Tribe and City

Potential Partners/Coordination: NANA, NAB, DOT&PF, ANTHC, DCCED, DOT&PF, BIA, EPA, USFWS, ADF&G, USACE, DHS&EM, FEMA, HUD, Maniilaq Association, Northwest Inupiat Housing Authority
Timeframe for Implementation: Short term (0–5 years)
Estimated Cost: under $50,000
Current Status: Ongoing
Reference: N/A

3.6.5 Organizational Mapping

An organizational network mapping is a comprehensive tool with which leaders can connect with each other in the community and in the region so that there is more communication and information exchange between the communities. Mapping key leaders, groups, and organizations helps the community mainstream who to contact appropriately, depending on the crisis.

Responsible Party: Tribe and City
Potential Partners/Coordination: NANA, NAB, DCCED, DHS&EM, NABSD, FAA, FEMA, USFWS, ADF&G, NOAA, EPA, DNR, AVEC, VSW, ANTHC, Maniilaq Association, Northwest Inupiat Housing Authority
Timeframe for Implementation: Short term (0–5 years)
Estimated Cost: Under $50,000
Current Status: Ongoing
Reference: N/A

3.6.6 Continue Joint City and Native Village of Kivalina IRA Council Meetings

Kivalina currently has several joint City and Native Village of Kivalina IRA Council meetings every year. This should continue because it increases interaction between the two governing groups, helps eliminate possible communication barriers, and helps ensure that the City and IRA Council coordinate on how to address various community issues. Coordination is critical because the City and Native Village of Kivalina IRA Council both have access to different funding sources. By working together, the community can be more strategic and creative about how to implement needed projects.

Responsible Party: Tribe and City
Potential Partners/Coordination: N/A
Timeframe for Implementation: Ongoing
Estimated Cost: Under $50,000
Current Status: Ongoing
Reference: N/A

3.6.7 Develop Communication Plan

The communication plan lays out the necessary information for the City and Tribe on how they will communicate the latest plans and ordinances or updates of the relocation process to the community. The communication plan can incorporate flyers at key public facilities and use social media as a way of dispersing information to the rest of the community.

Responsible Party: Tribe and City
Potential Partners/Coordination: NANA, NAB, DCCED

Timeframe for Implementation: Short term (0–5 years)
Estimated Cost: Under $50,000
Current Status: Ongoing
Reference: N/A

3.6.8 Review/Establish Procurement Policy

A procurement policy lists the process and regulations that guide the acquisition of goods and services the City and Tribe need. The policy aims to communicate the process of purchasing goods and services to everyone within the organizations.

Responsible Party: Tribe and City
Potential Partners/Coordination: NAB
Timeframe for Implementation: Short term (0–5 years)
Estimated Cost: Under $50,000
Current Status: Ongoing
Reference: N/A

3.6.9 Continue Elders Advisory Committee

Kivalina should retain its Elders Advisory Committee. The Elders Advisory Committee could provide counsel to the City and Tribe on community issues. Elders can share their traditional wisdom with community leadership and provide input on Elder needs.

Responsible Party: Tribe, City
Potential Partners/Coordination: NANA, NAB
Timeframe for Implementation: Short term (0–5 years)
Estimated Cost: Under $50,000
Current Status: Ongoing
Reference: N/A

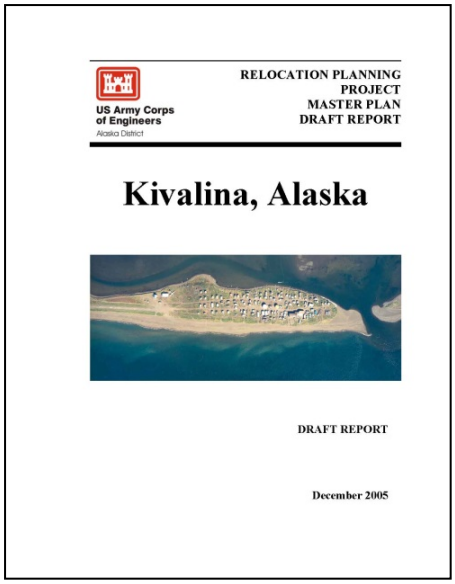
3.6.10 Develop Strategy to Include Local Business in Decision-Making Process

Develop a strategy to include input from local businesses in decisions made by community leadership.

Responsible Party: Tribe and City
Potential Partners/Coordination: NAB, NANA, DCCED
Timeframe for Implementation: Medium term (6–10 years)
Estimated Cost: Under $50,000
Current Status: Ongoing
Reference: N/A

3.7 Relocation

Rising sea levels, coastal erosion, and extreme storms are expected to continue in Kivalina. Sea ice that used to protect the island from winter storms no longer forms early enough in the fall to prevent rising waters and storm surge from reaching the community. One report indicated that Kivalina may be uninhabitable by 2025. Over the past few decades, Kivalina residents and community leaders have given considerable thought how to deal with their changing environment and the likelihood that they will eventually have to relocate to a safer location.



3.7.1 Identify Criteria for Potential New Village Site

Before a village site can be chosen, the community needs to identify which aspects of the land they think are important, such as nearby water source, higher ground that would not be affected by large flooding, good subsistence hunting grounds, and direct access from existing village site. Creating criteria for needs will help the community narrow the options for the number of potential sites. The community needs to come together to initiate discussion and go through the process of developing criteria for the new village site.

Responsible Party: City and Tribe
Potential Partners/Coordination: DCCED, DOT&PF, FAA, USFWS, DNR, ADF&G, DGGS, DHS&EM, USACE, EPA, BIA, NOAA, Denali Commission, HUD, NABSD, NANA, VSW, USCG, AEA, ADEC, AVEC, TeleAlaska, Maniilaq Association, ANTHC, CCHRC
Timeframe for Implementation: Short term (0–5 years)
Estimated Cost: To be determined
Current Status: New
Reference: N/A

3.7.2 Site Selection Study

A site selection study identifies different locations that have the developmental potential to become the selected site. Village community members and local government will need to consult with the state or hire contractors to help with the selection study while having public meetings and adding input throughout the process.

Responsible Party: City and Tribe
Potential Partners/Coordination: DCCED, DOT&PF, DGGS, USACE, USFWS, ADF&G, VSW, ANTHC, EPA, NOAA, DHS&EM, AVEC, AEA
Timeframe for Implementation: Medium term (6–10 years)
Estimated Cost: To be determined
Current Status: New
Reference: N/A

3.7.3 Site Selection

Site selection occurs when the community has decided on a location and there is agreement that the location will be ideal, based on the criteria identified at the beginning of the relocation process. The specific site must meet all the needs of the community, including higher ground, safe water source, subsistence opportunities, stable ground, minimized risk from the onslaught of larger storms during the year, and less likelihood of flooding.

As part of the site selection process, educating community residents about the new site and addressing their concerns about the site relocation process is vital so people can make an informed decision. Concerns that have been expressed so far include how the community would still access the coast and what would happen to the cemetery.

Responsible Party: City and Tribe
Potential Partners/Coordination: DCCED, DOT&PF, FAA, USFWS, DNR, ADF&G, DGGS, DHS&EM, USACE, EPA, BIA, NOAA, Denali Commission, HUD, NABSD, NANA, VSW, USCG, AEA, ADEC, AVEC, Maniilaq Association, ANTHC, CCHRC, DNR
Timeframe for Implementation: Long term (11+ years)
Estimated Cost: To be determined
Current Status: New
Reference: N/A

3.7.4 Acquire Title

A title is a document which refers to having the rights to own a specific property. The title gives the owner exclusive rights. The City and Tribe would need to acquire title to the land on which the selected site is located in order to gain the exclusive rights to live there and use the land.

Responsible Party: City and Tribe
Potential Partners/Coordination: DCCED, DOT&PF, NANA, BIA, DNR, landowners
Timeframe for Implementation: Long term (11+ years)
Estimated Cost: To be determined
Current Status: New
Reference: N/A

3.7.5 Survey Site

A site survey is when an area of proposed work or project is surveyed and inspected. The information from this survey determines which areas are most suitable for access and building while also laying out the constraints of the site. The surveying process helps determine which areas within the site are suited for the best design.

Responsible Party: City and Tribe
Potential Partners/Coordination: DCCED, DOT&PF, VSW, NANA, DGGS, DNR, landowners
Timeframe for Implementation: Long term (11+ years)
Estimated Cost: To be determined
Current Status: New

Reference: N/A

3.7.6 Identify Quarry Site

A quarry site is an open excavation or pit from which rock is obtained. The process typically uses cutting and blasting of an area. A quarry source is important as it provides rocks and other heavy material used for building rip rap, barriers, smaller gravels, and road construction projects. The community needs to identify a quarry site that is relatively close to the village site.

Responsible Party: City and Tribe
Potential Partners/Coordination: DCCED, DOT&PF, DNR, DGGS
Timeframe for Implementation: Long term (11+ years)
Estimated Cost: To be determined
Current Status: New
Reference: N/A

3.7.7 Identify and Prioritize Community Needs

What are the community's goals and needs when it comes to relocating? It's important to have dialogue and include all community members, have regular meetings to ensure that community needs are identified throughout the site selection process and there is an opportunity to express sentiments when new ideas are exchanged.

Responsible Party: City and Tribe
Potential Partners/Coordination: DCCED, DOT&PF, FAA, USFWS, DNR, ADF&G, DGGS, DHS&EM, USACE, EPA, BIA, NOAA, Denali Commission, HUD, NABSD, NANA, VSW, USCG, AEA, ADEC, AVEC, TeleAlaska, Maniilaq Association, ANTHC, CCHRC
Timeframe for Implementation: Long term (11+ years)
Estimated Cost: To be determined
Current Status: New
Reference: N/A

3.7.8 Develop Community Layout Plan

A community layout plan determines where important buildings, homes, the clinic, and the school will be laid out in the proposed relocated site. The planning process will determine specific project sites such as how the village's school, community center, and clinic be located in relation to housing, water facilities, and the landfill or airport runway. The community must conduct a series of meetings and discuss the layout they hope to achieve.

Responsible Party: City and Tribe
Potential Partners/Coordination: DCCED, DOT&PF, FAA, USFWS, DNR, ADF&G, DGGS, DHS&EM, USACE, EPA, BIA, NOAA, Denali Commission, HUD, NABSD, NANA, VSW, USCG, AEA, ADEC, AVEC, TeleAlaska, Maniilaq Association, ANTHC, CCHRC
Timeframe for Implementation: Long term (11+ years)
Estimated Cost: To be determined
Current Status: New

Reference: N/A

3.7.9 Infrastructure Feasibility Studies

An infrastructure feasibility study attempts to objectively assess a site and whether it can accept infrastructure projects by understanding the project site's strength and weaknesses. Infrastructure feasibility studies help determine what areas are better, easier to work on, and the most cost-effective for the project. The community can discuss and seek additional help for this from other agencies.

Responsible Party: City and Tribe
Potential Partners/Coordination: DCCED, DOT&PF, AA, USFWS, DNR, ADF&G, DGGS, DHS&EM, USACE, EPA, BIA, NOAA, Denali Commission, HUD, NABSD, NANA, VSW, USCG, AEA, ADEC, AVEC, TeleAlaska, Maniilaq Association, ANTHC, CCHRC
Timeframe for Implementation: Long term (11+ years)
Estimated Cost: To be determined
Current Status: New
Reference: N/A

3.7.10 Environmental Studies

As part of developing the new village site, environmental studies are an important part of the process. They identify and document environmental issues that need to be considered as part of the development process. Typical environmental studies include wetland delineations, geotechnical investigations, cultural resource studies, hydrology studies, and fish and wildlife studies. These studies can be done independently or in conjunction with the development of community facilities.

Environmental studies are frequently performed as part of the National Environmental Policy Act process or as part of the permitting process.

Prior to conducting any environment studies, agency coordination should occur to identify the specific studies that should be conducted, the methodology to be used for the studies, and the potential to share studies among different agencies that require environmental information.

Responsible Party: Various
Potential Partners/Coordination: DCCED, DOT&PF, FAA, VSW, AEA, NOAA, USFWS, ADF&G, USACE, BLM, USCG, State Historic Preservation Officer, ADEC, ADNR, NMFS, EPA, NANA
Timeframe for Implementation: Long term (11+ years)
Estimated Cost: To be determined
Current Status: New
Reference: N/A

3.7.11 Identify Water Source

A safe, uncontaminated water source is necessary for the existence of any community. Determining whether there is a viable water source at the new site is important because water is also necessary for many household and community purposes. When identifying water sources, the community needs to

consider several questions: Is the ground stable? Are there possibilities of contamination or runoff and erosion near the water source? What are some steps to prevent these problems?

Responsible Party: City and Tribe
Potential Partners/Coordination: DCCED, DOT&PF, VSW
Timeframe for Implementation: Long term (11+ years)
Estimated Cost: To be determined
Current Status: New
Reference: N/A

3.7.12 Identify Resources that can be Reused

Identifying which resources can be reused will be helpful for the community to determine the importance of these resources. What are subsistence opportunities at the site? Are there reindeer that can be herded and the community can use to subsist on? Are there ample whitefish, blackfish, or burbot species to fish for? Is there an area where firewood may be accessible?

Responsible Party: City and Tribe
Potential Partners/Coordination: DCCED, DOT&PF, FAA, USFWS, DNR, ADF&G, DGGS, DHS&EM, USACE, EPA, BIA, NOAA, Denali Commission, HUD, NABSD, NANA, VSW, USCG, AEA, ADEC, AVEC, Maniilaq Association, ANTHC, CCHRC
Timeframe for Implementation: Long term (11+ years)
Estimated Cost: To be determined
Current Status: New
Reference: N/A

3.7.13 Detailed Construction and Financing Plan

A detailed construction and financing plan is important to organize. Laying out a plan will help keep costs lower on the construction projects while also meeting specific timed deadlines for construction. How will the community consider paying for the relocation process? Impact fees? Loans? The financing plan will determine the best ways to accommodate the community's needs.

Responsible Party: City and Tribe
Potential Partners/Coordination: DCCED, DOT&PF, FAA, USFWS, DNR, ADF&G, DGGS, DHS&EM, USACE, EPA, BIA, NOAA, Denali Commission, HUD, NABSDNANA, VSW, USCG, AEA, ADEC, AVEC, TeleAlaska, Maniilaq Association, ANTHC, CCHRC
Timeframe for Implementation: Long term (11+ years)
Estimated Cost: To be determined
Current Status: New
Reference: N/A

3.7.14 Leadership Agreement

Local leading organizations in the existing village need to come together to write a leadership agreement document for the new community that outlines the specific responsibilities that hold leading

organizations accountable for their actions. The City, Tribe, and Corporation must come together with the rest of the community to write an agreement to which local leaders will adhere.

Responsible Party: City and Tribe
Potential Partners/Coordination: DCCED
Timeframe for Implementation: Long term (11+ years)
Estimated Cost: To be determined
Current Status: New
Reference: N/A

3.7.15 Relocation Committee

The relocation committee will be in charge of organizing meetings, working with contractors, and act as liaison to the rest of the community on the relocation process. The relocation committee can be comprised of people from the City, Tribe, and Corporation, state agencies, and regional corporations who can provide input and assistance as well as leadership during the relocation process.

Responsible Party: City and Tribe
Potential Partners/Coordination: DCCED, DOT&PF, FAA, USFWS, DNR, ADF&G, DGGS, DHS&EM, USACE, EPA, BIA, NOAA, Denali Commission, HUD, BSSD, NANA, VSW, USCG, AEA, ADEC, AVEC, TeleAlaska, Maniilaq Association, ANTHC, CCHRC
Timeframe for Implementation: Long term (11+ years)
Estimated Cost: To be determined
Current Status: New
Reference: N/A

3.7.16 Develop Access to New Site

Access to the new site needs to be developed in order for relocation and the construction process to occur. Where can a road be built? What is the best site for a runway? Is there access to the site location by barge or boat? Is there a lake nearby that can be used for plane landings in the winter and summer?

Responsible Party: City and Tribe
Potential Partners/Coordination: DCCED, DOT&PF, FAA, USF&WS, DNR, ADF&G, DGGS, DHS&EM, USACE, EPA, BIA, NOAA, Denali Commission, HUD, BSSD, NANA, VSW, USCG, AEA, ADEC, AVEC, ANTHC
Timeframe for Implementation: Long term (11+ years)
Estimated Cost: To be determined
Current Status: New
Reference: N/A

3.7.17 Develop Long Range Transportation Plan

The long range transportation plan identifies the community's transportation needs and goals. This planning process should also meet the current and future land use, economic, and environmental goals. The transportation plan considers a full range of transportation modes, which may include 4x4 or snow machine, bicycle, and pedestrian travel. The planning process also determines funding opportunities and recommendations for implementing the plan.

Responsible Party: Maniilaq Association
Potential Partners/Coordination: City, Tribe, DCCED, DOT&PF, FAA, BIA, NAB, NANA, Denali Commission
Timeframe for Implementation: Long term (11+ years)
Estimated Cost: To be determined
Current Status: New
Reference: N/A

3.7.18 Build Initial housing

The community needs to determine what kind of housing will be built at the relocation site. Who will go into the first homes built? What do families want to have considered in the housing construction process? Who will help pay for the cost of these homes?

Responsible Party: City and Tribe
Potential Partners/Coordination: DCCED, HUD, EPA, VSW, AVEC, DOT&PF, DHS&EM, NANA
Timeframe for Implementation: Long term (11+ years)
Estimated Cost: To be determined
Current Status: New
Reference: N/A

3.7.19 Develop Initial Infrastructure

The community needs to lay out the initial infrastructure that will be used as the foundation that guides the growth of the community. Initial infrastructure could include sewage, water, and other utility lines, roads, an airport, wastewater location, public housing, a school, and a city building site.

Responsible Party: City and Tribe
Potential Partners/Coordination: DCCED, DOT&PF, FAA, USFWS, DNR, ADF&G, DGGS, DHS&EM, USACE, EPA, BIA, NOAA, Denali Commission, HUD, BSSD, NANA, VSW, USCG, AEA, ADEC, AVEC, TeleAlaska, Maniilaq Association, ANTHC, CCHRC
Timeframe for Implementation: Long term (11+ years)
Estimated Cost: To be determined
Current Status: New
Reference: N/A

3.7.20 Well at New Site

A water well is an excavation or structure created in the ground by digging, driving, or drilling to access ground water located in underground aquifers. The well water is drawn by pump or raised mechanically or brought up by hand in some regions. Developing a well in the new site is important because it provides a local water source for the community.

Responsible Party: City and Tribe
Potential Partners/Coordination: DCCED, DOT&PF
Timeframe for Implementation: Long term (11+ years)
Estimated Cost: To be determined
Current Status: New

Reference: N/A

3.7.21 Develop Remaining Infrastructure

Finish building the remaining infrastructure needed for the relocation site. Examples may include critical emergency infrastructure that may mitigate potential for severe storms and floods, emergency services available, other public works buildings, and a potential site for a storm shelter or a multi-purpose building to store construction equipment and other hard equipment used in the relocation process.

Responsible Party: City and Tribe
Potential Partners/Coordination: DCCED, DOT&PF, FAA, USFWS, DNR, ADF&G, DGGS, DHS&EM, USACE, EPA, BIA, NOAA, Denali Commission, HUD, BSSD, NANA, VSW, USCG, AEA, ADEC, AVEC, TeleAlaska, Maniilaq Association, ANTHC, CCHRC
Timeframe for Implementation: Long term (11+ years)
Estimated Cost: To be determined
Current Status: New
Reference: N/A

3.7.22 Develop Remaining Housing

Finish building the remaining housing needed for the village site. This may include low-income housing, elder housing, multi-family housing, and single family homes. Determining what is needed in the new village and what can be left behind in the old site location is necessary in the development of housing.

Responsible Party: City and Tribe
Potential Partners/Coordination: DCCED, HUD, EPA, VSW, AVEC, DOT&PF, DHS&EM, NANA, NAB, Northwest Inupiat Housing Authority
Timeframe for Implementation: Long term (11+ years)
Estimated Cost: To be determined
Current Status: New
Reference: N/A

3.7.23 Restoration of Old Village Site

Restore the old village site so that garbage, waste, and wastewater is covered, evacuated, or put down properly. The townsite should be restored to its natural condition and look like the surrounding landscape.

Responsible Party: City and Tribe
Potential Partners/Coordination: DCCED, DOT&PF, FAA, USFWS, DNR, ADF&G, DGGS, DHS&EM, USACE, EPA, BIA, NOAA, Denali Commission, HUD, VSW, USCG, AEA, ADEC, AVEC, TeleAlaska, Maniilaq Association, ANTHC, CCHRC, NANA, NAB, NABSD, Relocate Kivalina
Timeframe for Implementation: Long term (11+ years)
Estimated Cost: To be determined
Current Status: New
Reference: N/A

3.8 Other

This section documents action items that are not included in one of the other strategic focus areas.

3.8.1 Establish Communication with Potential Future Residents

In recent years, there has been a migration from rural Alaska to larger urban centers. Some people would prefer to remain living in Kivalina but have to leave for work, education, or other purposes. The community should develop ways to keep in touch with people who may want to return to Kivalina. By communicating with people about what is going on in the community, education, and work opportunities, people who have moved away may find it easier to return.

Responsible Party: City and Tribe
Potential Partners/Coordination: NANA, NAB, Relocate Kivalina
Timeframe for Implementation: Short term (0-5 years)
Estimated Cost: To be determined
Current Status: New
Reference: N/A

3.8.2 Increase Awareness about Existing Substance Abuse Programs

The community wants to encourage residents to choose healthy lifestyles. A topic of particular concern to community residences is substance abuse. Substance abuse programs help local residents get assistance from programs that have the capacity to help. The community should work with local partners such as the school district and the Maniilaq Association to increase awareness about existing substance abuse programs.

Responsible Party: City and Tribe
Potential Partners/Coordination: DHSS, SAMHSA, Maniilaq Association, ANTHC
Timeframe for Implementation: Short term (0–5 years)
Estimated Cost: To be determined
Current Status: New
Reference: N/A

3.8.3 Continue Wellness Program

Kivalina participates in the Maniilaq Association's Wellness Program. This program is designed to make participating communities healthier places. One key focus of the program is suicide prevention.

Responsible Party: Maniilaq Association
Potential Partners/Coordination: City, Tribe, NANA, NABSD
Timeframe for Implementation: Ongoing
Estimated Cost: Unknown
Current Status: Ongoing
Reference: N/A

3.8.4 Continue Community Cleanup Day

A community cleanup day refers to a program in which the community selects one day each year when volunteers work together to clean up public spaces. Typically people donate their time, but the City will donate trash bags and then takes the trash to the landfill.

Responsible Party: City
Potential Partners/Coordination: Tribe, NANA, NABSD, NAB, Red Dog, ANTHC, AVEC, Relocate Kivalina, Maniilaq Association
Timeframe for Implementation: Short term (0–5 years)
Estimated Cost: Under $5,000
Current Status: new
Reference: N/A

3.8.5 Implement Walking School Bus

A walking school bus is a form of student transportation where students would walk to school accompanied by one or two adults. It operates similarly to a traditional school bus with an identified route and designated "bus stops" and "pick up times" at which they pick up children. The only difference is that students walk instead of ride in a vehicle. Advantages of a walking school bus include:

- Increased physical activity
- Improved air quality
- Cost saving (no money spent to fuel ATV or snowmachine)
- Opportunity for children to spend time with adults
- Helps children arrive at school safely and on time

Responsible Party: NABSD
Potential Partners/Coordination: City, Tribe, NAB, NANA, Maniilaq Association, ANTHC
Timeframe for Implementation: Long term (11+ years)
Estimated Cost: Under $5,000
Current Status: new
Reference: N/A

4 Next Steps

The next step is for the community to lead the implementation of the SMP. Specific steps include:

- **Accountability** – Having a plan is not the same as implementing the plan. To be successful, Kivalina needs to identify specific people to be responsible for each action item. These individuals should report back to the community on a regular basis.
- **Monitoring** – Kivalina should decide how they want to monitor and update the SMP. The SMP is a living document to help the community become more resilient. The community should work with their partners to assess the plan and update it at least annually. Keep the plan fluid – adapt to changes. Don't be afraid to change the plan if needed.
- **Support** – Gain support to implement action items from existing and new partners.
- **Communication** – Keep people informed of progress. Kivalina should share with residents and agency partners the progress they have made in implementing the plan.
- **Celebration** – As action items are completed, or at substantial milestones, celebrate these accomplishments. Celebrations can help keep everyone excited and engaged.

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5 References

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Appendix A

Kivalina Interagency Working Group Invitees

Kivalina Interagency Working Group Invitees

The following individuals and organizations were invited to participate in the Kivalina Interagency Working Group.

Agency/Group	Representative
Alaska Department of Commerce, Community, and Economic Development, Division of Community and Regional Affairs	Katherine Eldemar
	Sally Russell Cox
	Diane Sam
	Jimmy Smith
	Melissa Taylor
Alaska Department of Fish and Game	Jim Dau
Alaska Department of Military and Veterans Affairs Division of Homeland Security and Emergency Management	Alex Fonteyn
	Ann Gravier
	Scott Nelson
	Kim Weibl
Alaska Department of Natural Resources, Division of Geological and Geophysical Surveys	Deanne Stevens
	Gabriel Wolken
Alaska Department of Transportation and Public Facilities	Alexa Green
	Steve Delehanty
	Ruth Carter
Alaska Institute for Justice	Robin Bronen
	Denise Pollock
Alaska Native Tribal Health Consortium	Michael Black
	Brad Blackstone
	Mia Heavener
	Michael Brubaker
Bureau of Indian Affairs (Department of the Interior)	David Harman
	Dan Metzger
	Greg Smith
Cold Climate Housing Research Center	Aaron Cooke
	Jack Hebert
Denali Commission	Chris Allard
	Jay Farmwald
	Joel Neimeyer
DOWL	Chase Nelson
	Adison Smith
Kivalina City Council	Leroy T. Adams
Maniilaq Association	Anthony Cravalho
	Jackie Hill
MJ King and Associates	Margaret King
NANA	Rosie Barr
	Liz Moore
	Jeff Nelson
	Dean Westlake
Native American Rights Fund	Erin Dougherty Lynch

Agency/Group	Representative
Native Village of Kivalina Community Coordinator	Dollie A. Hawley
Native Village of Kivalina IRA Council	Millie Hawley
	Isabella Booth
Native Village of Shishmaref Community Coordinator	Fred Eningowuk
Northwest Arctic Borough	Brad Reich
	Pat Savok
	Brendan Ryan
	Christine Hess
	Clement Richards
	Fred Smith
Northwest Arctic Borough School District	Kathy Christy
	Craig McConnell
	Zoe Theoharis
Office of the Governor	Albert Kookesh
Red Dog Mine	Verna Westlake
	Janine Bedford
Teck Alaska	Wayne Hall
U.S. Department of Housing and Urban Development	Colleen Bickford
	Bill Zachares
U.S. Environmental Protection Agency	Tami Fordham
	Catherine Villa
U.S. Fish and Wildlife Service	Craig Perham
	Don Dragoo
U.S. National Park Service	David Marshall
	Frank Hays
	George Helfrich
U.S. National Oceanic and Atmospheric Administration	Amy Holman
	Barbara Mahoney
U. S. Army Corps of Engineers	Tina McMaster
	David P. Williams
Western Alaska Landscape Conservation Cooperative	Karen Murphy
WH Pacific	Jackie Schaeffer
	Suzanne Taylor