



**US Army Corps
of Engineers**

Alaska District

**RELOCATION PLANNING
PROJECT
MASTER PLAN**

Kivalina, Alaska



JUNE 2006

EXECUTIVE SUMMARY

The village of Kivalina, on a barrier island off the Chukchi Sea 80 miles north of the Arctic Circle, has been threatened by erosion caused by wave action and sea storms for several decades. It has long been apparent that the island would eventually succumb to natural forces, and that the village would have to be moved. To this end, village residents have pursued relocation for the last twenty years. Their efforts have been stymied by difficulties in choosing a new village site, funding the relocation effort, and social problems within the village stemming from overcrowding, poverty, and other difficult living conditions.

An increase in the frequency and intensity of sea storms, degradation and melting of permafrost, and accelerated erosion of the shoreline have recently forced the village into a state of emergency. Sea storms have eroded the shoreline out from underneath several structures and threatens the airstrip. Emergency erosion control measures are in place, but will only slow the sea's inevitable reclamation of the island. The relocation effort is now critical to the survival of the community.

The purpose of this report is to provide residents and stakeholders with the information necessary to make an informed decision regarding the best solution for the community of Kivalina. The current state of the community is discussed in detail in this report, as are each of the alternatives.

Kivalina is home to 402 residents, who live in very overcrowded conditions in just over 70 homes. The community is predominately Alaska Native, and residents depend on subsistence activities for a majority of their caloric intake. The community does not have a piped water or sewer system, except for running/piped water in its school and washeteria. Residents rely on self-haul water and on honey buckets for human waste.

The alternatives identified for this project are:

1. Do nothing,
2. Improve the current site, or
3. Move the village to a new site at:
 - Imnakuk Bluffs,
 - Simiq,
 - Tatchim Isua,
 - Kiniktuuraq,
 - Igrugaivik, or
 - Kuugruaq.

Kivalina residents have voted several times to choose a new village town site from the list of alternative sites. However, not only does a significant portion of the community disagree with the elected site, but the site chosen (Kiniktuuraq) has proven to be geotechnically inappropriate and strategically problematic with respect to the ongoing erosion of the northern Alaska coastline. Site selection and availability of funding are major obstacles to the progress of the project.

For the project to be successful in the long term, a site must be identified that is feasible in terms of:

- physical environment; including vulnerability to physical processes such as erosion, flooding, and weather;
- construction and utilities development, including cost of development and feasibility of cost efficient utilities;
- vulnerability to natural processes; and
- acceptable to community residents.

Relocation costs have been estimated for each relocation site. Costs include erosion protection at certain village sites. Section 5.3 includes a discussion of cost considerations. Costs for relocation, in 2006 dollars, not including engineering, permitting, and construction administration fees are shown below. Costs for the engineering are typically 8% of construction costs, with permitting and rural construction administration 5% and 6% respectively.

- Tatchim Isua - \$154.9 million
- Improve Kivalina - \$196.2 million
- Kuugruaq - \$245.6 million
- Igrugaivik - \$246.1 million
- Kiniktuuraq - \$248.2 million
- Imnakuk Bluffs - \$248.7 million
- Simiq - \$251.5 million

The “do nothing” option will result in the current village site being overtopped with water during a storm or eroded away over time, and ultimately having to be abandoned. Improvements to the current site are limited due to location, vulnerability to storm surge flooding, overcrowding/lack of room to expand, and funding. Several sites identified as potential new village sites have significant problems relating to geophysical incompatibility with development, susceptibility to erosion or flooding, permitting, and social and cultural objections.

Although site selection has proved problematic, it is important that the project overcome this obstacle. The current community is reaching a critical state in terms of its continued survival in its current location.

The next steps in the relocation process involve three sets of activities.

1. Pursue Temporary Erosion Protection Measures. Temporary measures are needed to protect the school and fuel facilities from erosion. The community of Kivalina, working with the Northwest Arctic Borough, Alaska District Corps of Engineers, and other entities such as the Denali Commission should work cooperatively to obtain funding, design and construct suitable erosion protection structures.
2. Confirm Community Selection for Relocation Site. The community needs to carefully review this report and the advantages and disadvantages associated with each sites, including relative risk and likelihood of receiving addition funding.

The choice of a site for relocation should then be confirmed in a formal referendum.

3. Initiate Next Steps in Implementing Community Relocation. The Master Relocation Schedule in Appendix C lays out the estimated phases and specific steps to proceed from site confirmation to completion of relocation. The next steps in Phase Three, Planning, are as follows:

- Obtain funding for selected site planning and design activities
- Initiate comprehensive master planning for the selected site
- Complete specific infrastructure and utility feasibility studies and initiate grant applications for design and construction
- Identify agency to lead future funding, design and construction efforts associated with relocation
- Acquire design and permitting phase funding

Completion of these steps will lead to initiation of project design phase (Phase 4).