City of Alakanuk
Hazard Mitigation Plan

Adoption Date: -- October 9, 2007 --

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List of Acronyms and Abbreviations

AFG	Assistance to Firefighters Grant
ANA	Administration for Native Americans
BLM	Bureau of Land Management
CDBG	Community Development Block Grant
CFS	cubic foot per second
CHEMS	Community Health and Emergency Medical Services
DEC	Department of Environmental Conservation
DHS&EM	State of Alaska, Department of Homeland Security and Emergency Management
DHSS	Department of Health and Social Services
DMA2000	Disaster Mitigation Act of 2000 (Public Law 106-390)
DNR	Department of Natural Resources
DOF	Department of Forestry
DOT&PF	Department of Transportation and Public Facilities
FMA	Flood Mitigation Assistance
FEMA	United States Department of Homeland Security, Federal Emergency Management Agency
gpm	gallons per minute
HAZUS-MH	Hazards U.S. – Multi-Hazard
HMGP	Hazard Mitigation Grant Program
HMP	Hazard Mitigation Plan
NFIP	National Flood Insurance Program
NOAA	National Oceanic and Atmospheric Administration
NWS-NCDS	National Weather Service – National Climatic Data Center
PDM	Pre-disaster Mitigation
SPT	standard penetration test
STAPLE+E	Social, Technical, Administrative, Political, Legal, Economic and Environmental
USACOE	United States Army Corps of Engineers
USGS	United States Geological Survey

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Executive Summary

Across this land, natural and human-made disasters have led to increased levels of injury, property damage, interruption of business and government services and even death. The impact of disasters on families and individuals can be immense, and damages to businesses can result in economic consequences. The time, money and effort to respond to and recover from these disasters divert public resources and attention from other important programs and problems.

In 2000, Congress passed the Disaster Mitigation Act (Public Law 106-390) (DMA2000) to reinforce the importance of mitigation planning and emphasize planning for disasters before they occur. States, tribes, and local communities must have an approved natural hazard mitigation plan in place prior to receiving both pre-disaster mitigation and post-disaster funds. These plans must demonstrate that proposed mitigation measures are based on a sound planning process that accounts for the risks to and the capabilities of the individual communities.

Applying this knowledge, the City of Alakanuk has prepared a Local Natural Hazard Mitigation Plan (hereafter referred to as a Hazard Mitigation Plan [HMP]) that will guide the City of Alakanuk toward greater disaster resistance in full accord with the character and needs of the community and federal requirements. The potential hazards identified and assessed in this version of the HMP include; erosion, flooding, earthquake, severe winter storm, and earthquake. Tsunami was originally addressed as a potential hazard, but after further investigation was not carried forward through the risk assessment. Mitigation actions include a range of specific actions and projects that reduce the effects of each hazard, with particular emphasis on protecting new and existing buildings and infrastructure.

The Alakanuk HMP has been prepared to meet the Federal Emergency Management Agency's (FEMA's) requirements of the DMA 2000 and the Interim Final Rule, thus making it eligible for funding and technical assistance from State and Federal hazard mitigation programs. Following each major disaster declaration, the City of Alakanuk is required to review and update the mitigation strategy. Additionally, in compliance with FEMA regulations, this HMP must be reviewed, revised if appropriate, and resubmitted for approval every five years so that the City of Alakanuk continues to be eligible for various hazard mitigation grant-funding sources. This HMP was adopted by the City of Alakanuk on ***October 9, 2007***, reviewed by the State of Alaska, Department of Homeland Security and Emergency Management (DHS&EM), and approved by FEMA (Attachment E).

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Section 1 Public Planning Process

1.1 Narrative Description

The first step in the planning process included holding a teleconference with the Alakanuk planning team, DHS&EM, and URS (the planning team's hazard mitigation planning consultant). During the meeting, URS familiarized the Alakanuk planning team with DMA2000 requirements, the scope of this hazard mitigation planning project, and the estimated work schedule. During this meeting the planning team scheduled the first public meeting to present the project to the community and to identify and screen potential hazards. In addition, the planning team identified its members and primary point of contact for the planning effort and the public.

Once the planning team was formed, the following five-step process took place from April 2006 through October 2007.

1. Organize resources: Members of the planning team identified resources, including staff, agencies, and local community members, who could provide technical expertise and historical information needed in the development of the hazard mitigation plan.
2. Assess risks: The planning team identified the hazards specific to Alakanuk, and URS developed the risk assessment for the five identified hazards. The planning team reviewed the risk assessment, including the vulnerability analysis, prior to and during the development of the mitigation strategy.
3. Assess capabilities: The planning team reviewed current administrative and technical, legal and regulatory, and fiscal capabilities to determine whether existing provisions and requirements adequately address relevant hazards.
4. Develop a mitigation strategy: After reviewing the risks posed by each hazard, the planning team developed a comprehensive range of potential mitigation goals, objectives, and actions. Subsequently, the planning team identified and prioritized the actions to be implemented.
5. Monitor progress: The planning team developed an implementation process to ensure the success of an ongoing program to minimize hazard impacts to Alakanuk.

1.2 Planning Team Information

The planning team is lead by Allen Hanson with oversight from Mike James (previously Paul Joe and Martina Post) and assistance from Pat Phillip and Thomas Chikigak. URS is also providing assistance to the planning team along with DHS&EM. Table 1 identifies the Alakanuk Hazard Mitigation planning team.

Table 1. Alakanuk Hazard Mitigation Planning Team

Name	Title	Organization	Phone
Thomas Chikigak	Environmental Planner	City of Alakanuk	907-238-3313
Allen Hanson	Hazard Mitigation Plan Team Leader	City of Alakanuk	907-238-3313
Mike James	Grants Administrator	City of Alakanuk	238-3313
Paul Joe	Grants Administrator	City of Alakanuk	238-3313
Brent Nichols	Mitigation Officer	Alaska Homeland Security and Emergency Management	907-428-7085
Ervin Petty	Mitigation Officer	Alaska Homeland Security and Emergency Management	907-428-7015
Pat Phillip		Alakanuk Native Corporation	907-238-3419
Martina Post	City Administrator	City of Alakanuk	907-238-3313
Laura Young	Mitigation Planning Consultant	URS	907-261-9704

1.3 Public Involvement in Planning Process

Initial Public Meeting - On May 9, 2006, the Alakanuk planning team held a public meeting introducing the hazard mitigation planning project to the community and interested parties. An invitation was extended to all of the people identified on the project mailing list via a project newsletter describing the project process and announcing upcoming public meetings.

The newsletter was either faxed or emailed to each person on the mailing list. In addition, a copy of the newsletter was posted on the State of Alaska Department of Homeland Security and Emergency Managements website. Seven people attended the meeting.

During the meeting URS led the group through a hazard identification and screening exercise. During this process, the attendees identified six potential hazards (erosion, flood, earthquake, wildland fire, severe winter storm, and tsunami). *Through the hazard profiling exercise it was determined that Alakanuk is not at risk from a tsunami event and this hazard was not carried forward through the risk assessment.*

After the hazard screening process was completed, URS described the specific information needed from the planning team and public to complete the risk assessment including the location, value, and population of residents and critical facilities in the community.

After the community asset data was collected by the planning team over the summer and fall of 2006, a risk assessment was completed that showed what assets were vulnerable to which hazards. This data, in addition to a detailed narrative description of the hazards that impact Alakanuk, was reviewed by the planning team, and presented to village elders to collect any additional historic hazard events to present in the plan and to discuss mitigation actions to address the hazard events. The final steps included

reviewing and prioritizing mitigation actions, and submitting the plan to DHS&EM and FEMA for final approval.

1.4 Other Interested Party Involvement

This section describes the involvement of other interested parties in plan development.

Members of the community; both residents and businesses, neighboring communities, academia, non-profits, and local, State, and Federal agencies were invited to participate in the planning process by attending public meetings or commenting directly on the project. A copy of the Alakanuk Hazard Mitigation Plan mailing list is included as an attachment to this plan (Attachment A).

1.5 Review of Technical and Fiscal Resources

This section describes the review of technical and fiscal resources:

Local Capability Assessment

This section outlines the resources available to Alakanuk for mitigation and mitigation related funding and training.

First and foremost, Alakanuk uses local planning mechanisms such as land use planning to identify areas subject to damage from natural hazards. The Alakanuk Erosion and Land Use Plan was prepared to identify suitable, undeveloped land to relocate structures out of the erosion impact areas and to allow for community growth.

The City of Alakanuk, the Alakanuk Native Corporation, and the Village of Alakanuk are the local governing organizations within the community that provide resources to protect the people and property in Alakanuk.

Federal Resources

The federal government requires local governments to have a hazard mitigation plan in place to be eligible for funding opportunities through FEMA such as the Pre-Disaster Mitigation Assistance Program and the Hazard Mitigation Grant Program. The Mitigation Technical Assistance Programs available to local governments are also a valuable resource. FEMA may also provide temporary housing assistance through rental assistance, mobile homes, furniture rental, mortgage assistance, and emergency home repairs. The Disaster Preparedness Improvement Grant also promotes educational opportunities with respect to hazard awareness and mitigation.

FEMA, through its Emergency Management Institute, offers training in many aspects of emergency management, including hazard mitigation. FEMA has also developed a large number of documents that address implementing hazard mitigation at the local level.

Five key resource documents are available from FEMA Publication Warehouse (1-800-480-2520) and are briefly described below:

How-to Guides. FEMA has developed a series of how-to guides to assist states, communities, and tribes in enhancing their hazard mitigation planning capabilities. The first four guides describe the four major phases of hazard mitigation planning. The last five how-to guides address special topics that arise in hazard mitigation planning such as conducting cost-benefit analysis and preparing multi-jurisdictional plans. The use of worksheets, checklists, and tables make these guides a practical source of guidance to address all stages of the hazard mitigation planning process. They also include special tips on meeting DMA 2000 requirements (http://www.fema.gov/fima/planhowto.shtm).

Post-Disaster Hazard Mitigation Planning Guidance for State and Local Governments. FEMA DAP-12, September 1990. This handbook explains the basic concepts of hazard mitigation and shows state and local governments how they can develop and achieve mitigation goals within the context of FEMA's post-disaster hazard mitigation planning requirements. The handbook focuses on approaches to mitigation, with an emphasis on multi-objective planning.

Mitigation Resources for Success CD. FEMA 372, September 2001. This CD contains a wealth of information about mitigation and is useful for state and local government planners and other stakeholders in the mitigation process. It provides mitigation case studies, success stories, information about Federal mitigation programs, suggestions for mitigation measures to homes and businesses, appropriate relevant mitigation publications, and contact information.

A Guide to Federal Aid in Disasters. FEMA 262, April 1995. When disasters exceed the capabilities of state and local governments, the President's disaster assistance program (administered by FEMA) is the primary source of federal assistance. This handbook discusses the procedures and process for obtaining this assistance, and provides a brief overview of each program.

The Emergency Management Guide for Business and Industry. FEMA 141, October 1993. This guide provides a step-by-step approach to emergency management planning, response, and recovery. It also details a planning process that businesses can follow to better prepare for a wide range of hazards and emergency events. This effort can enhance a business's ability to recover from financial losses, loss of market share, damages to equipment, and product or business interruptions. This guide could be of great assistance to a community's industries and businesses located in hazard prone areas.

Other federal resources include:

Department of Agriculture. Assistance provided includes: Emergency Conservation Program, Non-Insured Assistance, Emergency Watershed Protection, Rural Housing Service, Rural Utilities Service, and Rural Business and Cooperative Service.

Department of Energy, Office of Energy Efficiency and Renewable Energy, Weatherization Assistance Program. This program minimizes the adverse effects of high energy costs on low-income, elderly, and handicapped citizens through client education activities and weatherization services such as an all-around safety check of major energy systems, including heating system modifications and insulation checks.

Department of Housing and Urban Development, Office of Homes and Communities, Section 108 Loan Guarantee Programs. This program provides loan guarantees as security for federal loans for acquisition, rehabilitation, relocation, clearance, site preparation, special economic development activities, and construction of certain public facilities and housing.

Department of Housing and Urban Development, Community Development Block Grants. Provides grant assistance and technical assistance to aid communities in planning activities that address issues detrimental to the health and safety of local residents, such as housing rehabilitation, public services, community facilities, and infrastructure improvements that would primarily benefit low-and moderate-income persons.

Department of Labor, Employment and Training Administration, Disaster Unemployment Assistance. Provides weekly unemployment subsistence grants for those who become unemployed because of a major disaster or emergency. Applicants must have exhausted all benefits for which they would normally be eligible.

Internal Revenue Service, Tax Relief. Provides extensions to current year's tax return, allows deductions for disaster losses, and allows amendment of previous tax returns to reflect loss back to three years.

United States Small Business Administration. May provide low-interest disaster loans to individuals and businesses that have suffered a loss due to a disaster. Requests for SBA loan assistance should be submitted to the DHS&EM.

Other resources: The following are Web sites that provide focused access to valuable planning resources for communities interested in sustainable development activities.

> Federal Emergency Management Agency, http://www.fema.gov - includes links to information, resources, and grants that communities can use in planning and implementation of sustainable measures.

American Planning Association, http://www.planning.org - a non-profit professional association that serves as a resource for planners, elected officials, and citizens concerned with planning and growth initiatives.

Institute for Business and Home Safety, http://ibhs.org - an initiative of the insurance industry to reduce deaths, injuries, property damage, economic losses, and human suffering caused by natural disasters.

Online resources provide information on natural hazards, community land use, and ways citizens can protect their property from damage.

State Resources

DHS&EM is responsible for improving hazard mitigation technical assistance for local governments for the State of Alaska. Providing hazard mitigation training, current hazard information, and the facilitation of communication with other agencies will enhance local hazard mitigation efforts. DHS&EM provides resources for mitigation planning on their Web site at http://www.ak-prepared.com.

Division of Senior Services: Provides special outreach services for seniors, including food, shelter and clothing.

Division of Insurance: Provides assistance in obtaining copies of policies and provides information regarding filing claims.

Department of Military and Veteran's Affairs: Provides damage appraisals and settlements for VA-insured homes, and assists with filing of survivor benefits.

The Community Health and Emergency Medical Services (CHEMS) is a section within Division of Public Health within the Department of Health and Social Services (DHSS). DHSS is charged with promoting and protecting the public health and one of CHEMS' responsibilities is developing, implementing, and maintaining a statewide comprehensive emergency medical services system. The department's statutory mandate (AS 18.08.010) requires it to:

1. Coordinate public and private agencies engaged in the planning and delivery of emergency medical services, including trauma care, to plan an emergency medical services system;
2. Assist public and private agencies to deliver emergency medical services, including trauma care, through the award of grants in aid;
3. Conduct, encourage, and approve programs of education and training designed to upgrade the knowledge and skills of health personnel involved in emergency medical services, including trauma care; and

4. Establish and maintain a process under which hospitals and clinics can represent themselves to be trauma centers because they voluntarily meet criteria adopted by the department, which are based on an applicable national evaluation system.

In addition to these responsibilities, the section is heavily involved in planning and responding to bioterrorist events.

Department of Commerce, Community, and Economic Development. The Department of Commerce, Community, and Economic Development administers the Community Development Block Grant (CDBG) program funds and administers various flood mitigation projects, including the acquisition of flood-prone homes and businesses, throughout the State. This department also administers programs for State "distressed" and "targeted" communities.

Department of Environmental Conservation (DEC). DEC primary roles and responsibilities concerning hazards mitigation are ensuring safe food and safe water, and pollution prevention and pollution response. DEC ensures water treatment plants, landfills, and bulk fuel storage tank farms are safely constructed and operated in communities. Agency and facility response plans include hazards identification and pollution prevention and response strategies.

Department of Forestry (DOF). The Department of Forestry participates in a statewide wildfire control program in cooperation with the forest industry, rural fire departments and other agencies. Prescribed burning may increase the risks of fire hazards; however, prescribed burning reduces the availability of fire fuels and therefore the potential for future, more serious fires.

Department of Transportation and Public Facilities (DOT&PF). DOT&PF personnel provide technical assistance to the various emergency management programs, to include mitigation. This assistance is addressed in the DHS&EM-DOT&PF Memorandum of Agreement and includes, but is not limited to: Environmental reviews; Archaeological surveys; and Historic preservation reviews.

In addition, DOT&PF and DHS&EM coordinate buyout projects to ensure that there are no potential right-of-way conflicts with future use of land for bridge and highway projects, and collaborate on earthquake mitigation.

DOT&PF provides safe, efficient, economical and effective operation of the State's highways, harbors and airports. DOT&PF uses it's Planning, Design & Engineering, Maintenance & Operations and Intelligent Transportation Systems resources to identify the hazard, plan and initiate mitigation activities to meet the transportation needs of Alaskans and make Alaska a better place to live and work. DOT&PF budgets for the temporary replacement bridges and materials necessary to make the multi-model transportation system operational following a natural disaster.

Alaska Department of Natural Resources (DNR). DNR administers various projects designed to reduce stream bank erosion, reduce localized flooding, improve drainage, and improve discharge water quality through the storm water grant program funds. Within DNR, the Division of Geology and Land Survey is responsible for the use and development of Missouri's mineral, land and water resources, and collaboration on earthquake mitigation.

Other Funding Sources and Resources

American Red Cross. Provides for the critical needs of individuals such as food, clothing, shelter, and supplemental medical needs. Provides recovery needs such as furniture, home repair, home purchasing, essential tools, and some bill payment may be provided.

Crisis Counseling Program. Provides grants to State and Borough mental health departments, which in turn provide training for screening, diagnosing and counseling techniques. Also provides funds for counseling, outreach, and consultation for those affected by disaster.

Potential financial resources for hazard mitigation also include:

Table 2. Hazard Mitigation Funding Resources

Financial Resource	Effect on Hazard Mitigation
EPA's Brownfields Program	This program can mitigate the effects of hazardous materials by providing direct funding for Brownfield assessment, revolving loans and environmental job training.
Administration for Native Americans (ANA) Grant Programs	These discretionary funds can be used to fund a variety of environmental management programs, including the identification and assessment of human and natural hazards and their associated risks, and the development and implementation of plans, policies and ordinances.
Department of Homeland Security Preparedness Technical Assistance Program	This grant provides direct assistance to communities to improve their ability to prevent, protect against, respond to and recover from major events. A primary objective of the program is to enhance the capacity of the community to develop, plan and implement effective strategies for human-made preparedness.
Assistance to Firefighters Grant (AFG) Program's Fire Prevention and Safety Grant	The AFG funds the Fire Prevention and Safety activity and the Firefighter Safety Research and Development activity. These grants are to be used for fire prevention or safety programs and activities.
FEMA Hazard Mitigation Grant Program (HMGP), Flood Mitigation Assistance (FMA) grants, and Pre Disaster Mitigation grants	HMGP grant funding is available to State, Tribal and local communities after a Presidentially-declared disaster. It can be used to fund both pre- and post-disaster mitigation plans (pre--PDM) and projects. PDM funding is available on an annual basis. This grant can only be used to fund PDM plans and projects. FMA grant funding assists States, tribes and communities in implementing measures to reduce or eliminate the long-term risk of flood damage to structures insurable under the National Flood Insurance Program (NFIP).
National Flood Insurance Program	The NFIP makes Federally backed flood insurance available to homeowners, renters and business owners in NFIP-participating states, tribes and communities.
Lindbergh Grants Program	Annual grants program that provides $10,580 per project to balance the advance of technology and the preservation of the natural/human environment. Can be used for conservation of natural resources (i.e., sustainable development codes) and public outreach/education projects.

Local Resources

Alakanuk has a number of planning and land management tools that will allow it to implement hazard mitigation activities. The resources available in these areas have been assessed by the hazard mitigation planning team, and are summarized below.

- The City of Alakanuk has a staff and the ability to adopt and enforce land use ordinances, apply for funding, and manage mitigation projects.
- The Alakanuk Erosion and Land Use Plan was developed to identify areas that are safe for future development from erosion hazards.
- The Alakanuk Native Corporation has staff, the ability to apply for funding, and manage mitigation projects.

1.6 Review of Existing Plans

This section describes the review and incorporation if appropriate of existing plans, policies, and ordinances:

This hazard mitigation plan was developed utilizing existing plans and studies as well as outside information and research. The following Alakanuk plans were reviewed during the preparation of this plan:

Alakanuk Airport Master Plan and Environmental Assessment, DOT&PF, 2000.

Alakanuk Community Plan, Yukon Delta Fisheries Development Association, 2005.

Alakanuk Erosion and Land Use Plan, Dames & Moore, 1998.

Alaska Regional Profiles, Volume VI, Yukon Region; Selcregg, Linda L.; AEIDC, University of Alaska; 1974.

Climatological Summary for Period 1977-1987; Arctic Environmental Information & Data Center (AEIDC); AEIDC, University of Alaska, 1987.

Cold Climate Utilities Manual, Canadian Society for Civil Engineering; Beauregard Press Limited; 1986.

Community Water, Sewer, and Solid Waste Master Plan for Alakanuk, Alaska, Dames & Moore, 1993.

Engineering Geology and Soils Report for Alakanuk Airport; Ottley, Thomas; DOT&PF Central Region Materials Section, Project No. 56384, DOT&PF; 1988.

Environmental Atlas of Alaska; Hartman, Charles W. and Johnson, Phillip R.; University of Alaska; 1978.

Foundation Investigation, AVCP Housing, Alakanuk, Eek, Hooper Bay, and St. Marys, Alaska; Duane Miller & Associates; prepared for Arctic Slope Consulting Group; 1992.

Geologic Map of the Kwiguk and Black Quadrangles; Condon, W.H. and Hoare, J.M.; 1966; USGS Miscellaneous Geologic Investigations, USGS.

Kwiguk (C-6), Alaska, Topographic Base Map #62164-E5-TF-063; USGS; USGS; 1952; with Minor Revision 1988.

Water and Wastewater System Feasibility and Cost Study; U.S. Department of Health & Human Services, Public Health Service, Indian Health Service, Alaska Area Native Health Service, Environmental Health & Engineering Branch; Alakanuk, Alaska - prepared for the City of Alakanuk; 1989.

Water Resources Reconnaissance of the Kwiguk (Emmonak) Area, Alaska; Feulner, Alvin J.; USGS Open File Report, USGS; 1970.

Section 2 Jurisdiction Participation Information

2.1 Adoption by Local Governing Body

2.1.1 Primary Point of Contact

Mike James *formerly Paul Joe and Martina Post)*
Grant Administrator
City of Alakanuk
P.O. Box 167
Alakanuk, AK 99554
(907) 238-3313 (Office)
(907) 238-3620 (Fax)
cityauk@unicom-alaska.com

Secondary Point of Contact
Allen Hanson, Planning Team Leader
(907) 238-3313
City of Alakanuk

2.1.2 Promulgation Authority Information

This Hazard Mitigation Plan was reviewed and approved by the following Promulgation Authorities:

Table 3. Alakanuk Promulgation Authority

Name	Title	Organization	Phone
Shelby Edmond	Mayor	City of Alakanuk	907-238-3313

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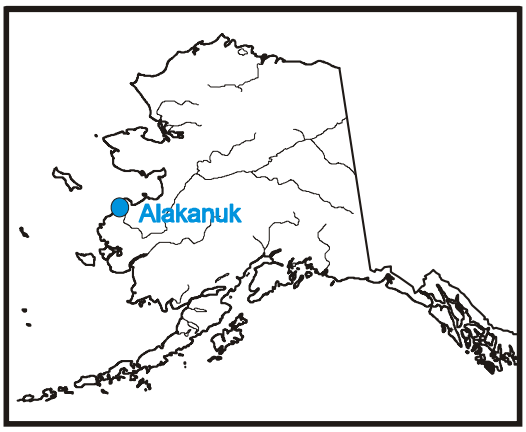
Section 3 Jurisdiction Information

This section provides a broad perspective, brief history, and describes the make up and development of the community.



Latitude: 62.6833333333333
Longitude: -164.616666666667

Topography: Alakanuk is situated on the Yukon River Delta at the confluence of Alakanuk Pass and Kwikluak Pass, which is the southernmost branch of the Yukon River. The community is located approximately eight miles upstream of the Bering Sea. The Alakanuk area is relatively flat with very little topographic relief, and consists of low floodplain river delta which is dotted by numerous small lakes, sloughs, and old river channels. Elevations in the area range from two to nine feet above mean sea level.

Climate: According to the Environmental Atlas of Alaska, Alakanuk lies within the Transitional Climactic Zone of Alaska. This zone is defined as an area with moderate seasonal temperature variation and less cloudiness, precipitation, and humidity than a maritime climate. The climate is sub-arctic, averaging 19 inches of precipitation per year, including 60 inches of snow. The Bering Sea influences the climate by keeping summer temperatures cooler and winter temperatures warmer than the Continental Climactic Zone of the interior of Alaska. Temperatures range from –25 degrees to 79 degrees Fahrenheit.

Demographics: The population of Alakanuk has fluctuated, but has generally increased over the last twenty years. Over that period, the population has exceeded a projected 3% annual growth-rate based on a 1990 population of 544 persons. The current population of Alakanuk is 678. Approximately 97.9% of the residents of Alakanuk are Alaska Native or part Native. Alakanuk is recognized as Yupik Eskimo community. A brief summary of the pertinent information found in the 2000 census includes the following.

Median age (years) 20.4
Total number of households 160
Average number of persons per household 4.69
Number of persons below poverty level 224
Total Potential Work Force (Age 16+) 389
Total Employment 139

The population of the entire Wade-Hampton census area in which Alakanuk is located is projected to grow at a rate of 3.1% per year which corresponds favorably to the projected average growth rate for Alakanuk.

Government: The City of Alakanuk is a member of the Calista Native Corporation, and was incorporated as a second class city in 1969. The city is currently governed by a seven member city council, which consists of a mayor, a vice mayor, a secretary/treasurer, and four council members. The community also has a traditional council whose members are elected to serve terms ranging from two to four years. The day to day operations of the City are supervised by a City Administrator.

Economy: The economy of the area is seasonal in nature, such that it is generally more active in the summer than in the winter. This economic instability is one reason for such modest population growth. A limited amount of permanent employment is provided by the government and local businesses. Other primary sources of income include revenue from seasonal commercial fishing and governmental assistance. Villagers also provide for themselves by hunting, fishing, trapping, and making native crafts.

As indicated by the 2000 U.S. Census, the average annual per capita income for the residents of Alakanuk was approximately $6,884, and the average per household income was approximately $26,346. Although the population continues to grow steadily, it is unlikely that many jobs will be created, thereby increasing the unemployment rate.

The City government is primarily funded by the State of Alaska and revenues from the Village Safe Water facility, bingo, and a 3% sales tax.

Industry: The economy in Alakanuk is primarily subsistence based, including hunting, trapping, fishing, and gathering. Some cash income is generated by commercial fishing in the Yukon River and the Bering Sea during the summer. Only a few full or part time year round jobs are available. Primary employers include the City, the Village Safe Water facility, the school, utilities, and local businesses. Nearly all households are represented at subsistence fish camps during the summer months.

Major Rivers and Watersheds:

Regional Hydrology: The Yukon Delta lowlands are generally poorly drained wetlands which have permanently ponded water in local depressions. The water table is located very close to the surface, within 3 feet in most areas. Sporadic surface frost and permafrost is present throughout the region, and standing water is common throughout the summer months. No stream discharge data is available for the area, but an average runoff is estimated in The Alaska Regional Profiles Vol. VI, Yukon Region at about one cubic foot per second (cfs) per square mile. The annual peak runoff is estimated at no greater than 10 cfs per square mile. Ice jam flooding is common in the spring during

breakup due to the climactic differences between the interior and the coast. Alakanuk is in an area rated as a high flood hazard by the USACOE, Flood Plain Management Branch. By definition this means that at least once every five years the entire village will be flooded; however, conversations with residents indicate that flooding usually occurs at least once each year. Typically, spring floods cover the community to a depth of three to four feet.

Rainwater, rivers, lakes, ice, and snow are the primary sources of water for communities in the region. The use of groundwater wells to supply water is not considered a viable option in this area for reasons discussed in the following subsection. The chemical quality of the river water is dependent upon several factors, including the time of year and upstream wastewater disposal practices. The raw quality of Yukon River water is generally fair, but the water should not be used for drinking unless it is disinfected first. The raw water is generally highly turbid during the summer months, and a substantial amount of time must be allowed for the solids to settle out. The waters of lakes and ponds in the area are generally of good quality, except that they are high in iron and organic content, and therefore may have an objectionable taste or color. In the summer, rainwater is commonly collected using roof drains and storage tanks at individual residences. In the winter, ice and snow are collected and melted as a source of drinking water.

Regional Hydrogeology: The groundwater table in the Alakanuk area is shallow and relatively saline due to the influence of the nearby Bering Sea. An experimental well drilled by the Bureau of Indian Affairs in nearby Emmonak in 1963 was saline at a depth of 194 feet, but when the screen was pulled back to a depth of approximately 80 feet, a lens of fresh water was found. The water was sodium bicarbonate type, high in iron, had a foul odor and taste, and was not suitable for drinking. According to the Alaska Regional Profiles, Vol. VI, Yukon Region, a well drilled in Alakanuk for the school also yielded saline water. Water for Alakanuk currently comes from the surface water of Alakanuk Pass and is flocculated, filtered, chlorinated, and fluoridated before use by the public.

The Yukon Delta lies on the thaw bulb of the Yukon River, and a three to four foot thick layer of surface frost is present approximately three feet below the ground surface. Since the underlying soils are mostly fine-grained silts and silty sands, the permeability of the ground is low. This is evident from the yield of the well drilled in Emmonak, which had a peak flow of three gallons per minute (gpm). Since this is an inadequate production rate for a community well, it is reasonable to conclude that groundwater would not be an effective supply of water for villages in the area. Surface water should be a more reliable source of fresh water.

Regional Geology: The geology of the Yukon River Delta, on which Alakanuk is situated, is fairly uniform. The area is composed of large, young floodplain deposits consisting chiefly of silt and sandy silt mixed with substantial amounts of organic material. No

mineralized rocks or areas altered by hydrothermal processes were observed during the geologic investigations of the area conducted by Condon and Hoare of the United States Geological Survey (USGS) from 1960 through 1963. The probability of petroleum in the sedimentary rocks in the area is slight, based on the impermeability and extensive deformation of the rocks.

The unconsolidated delta materials were generally deposited by water, and have been extensively reworked by the shifting currents of the Yukon River, its tributaries, and ocean currents and waves. No eolian (wind deposited) soils were observed during the USGS investigations, but it is likely that some eolian systems do exist on the delta. Shallow permafrost is present in most of the deposits of the Yukon Delta. Seasonal surficial thawing has formed numerous small lakes and ponds in the area.

The maximum thickness and age of the deposits is unknown, but Condon and Hoare of the USGS suggest that the soils are no greater than a few hundred feet thick and their age ranges from the Pleistocene epoch to the present (up to 1 million years old). Fossilized mammoth tusks over 10,000 years old have been discovered buried in the upper 20 feet of alluvial material in river banks in the area.

Geotechnical Information: Generally, the soils in the Lower Yukon subregion are described by the Alaska Regional Profiles, Volume VI, Yukon Region as poorly drained stratified loams, or silts and sands overlain by a thick mat of peat. Much of the area is underlain by permafrost, except in natural levees bordering major drainages and beneath lakes and ponds. The active layer of soil is almost constantly saturated during thaw. Ice mounds, polygons, and peat deposits in drainages and depressions are common features.

The soils of the Yukon River Delta are generally derived from old coastal deposits, marine deposits, or fine grained fluvial deposits. According to a report prepared by DOT&PF in 1988, and a report prepared by Duane Miller and Associates in 1992, the soils under Alakanuk consist of intermittently frozen silts to predominantly silty sands below the initial layer of surface organics common to the area. The surface organics are generally very wet brown peat to very wet organic silt. Sporadic permafrost was encountered, generally between a depth of three and seven feet, which is indicative of surface frost on top of the thaw bulb of the Yukon River. During the DOT&PF geotechnical drilling program, ice crystals and lenses up to 1.5 feet thick were encountered in the foundation soils under the airstrip. The foundation soils consisted of permanently frozen organics and organic silt. Standard penetration test (SPT) results in the permafrost layer yielded between 12 and 27 blows per foot, which indicates a weak frozen soil. SPT tests in the unfrozen soil yielded between 2 and 20 blows per foot, which indicates a loose soil. Groundwater was encountered below the frozen layer, and the soils were generally saturated below seven feet. The moisture content for the peat and organic silt ranged from 42 to 108%, and the moisture content of the silts ranged

from 37.4 to 64.4%. The soils in the Alakanuk area are very frost susceptible, and have the potential for substantial frost heaving.

Possible sources of borrow were identified during the DOT&PF investigation, but no materials were located that would meet the state specifications for runway base or subbase construction. Seven river bars on the Yukon River and Alakanuk Pass, all within five miles of Alakanuk, were investigated and found to contain sandy silt to silty sand with organics, which may be acceptable for both pipe bedding and trench backfill. The DOT&PF study indicated that the nearest source of material that was acceptable for airstrip construction purposes was the state owned quarry at the Saint Marys airport, approximately 75 miles upriver from Alakanuk.

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Section 4 Risk Assessment

The goal of mitigation is to reduce the future impacts of a hazard including property damage, disruption to local and regional economies, and the amount of public and private funds spent to assist with recovery; however, mitigation should be based on risk assessment.

A risk assessment is measuring the potential loss from a hazard event by assessing the vulnerability of buildings, infrastructure and people. It identifies the characteristics and potential consequences of hazards, how much of the community could be affected by a hazard, and the impact on community assets. A risk assessment consists of three components: hazard identification, vulnerability analysis and risk analysis. Technically, these are three different items, but the terms are sometimes used interchangeably.

4.1 Overall Hazard Ranking

Each hazard is assigned a likelihood rating based on the criteria and methods described below. This table gives the likelihood of event Probability "Rating" definitions. Based on history, using the definitions given, the likelihood of future events is "Quantified" which results in the classification within one of the four "Ranges" of likelihood.

Example: NWS-NCDS (National Weather Service - National Climatic Data Center) records show that 38 tornados were reported in Cleveland County between 01/01/1950 and 12/31/2003 (38 events divided by 54 years=0.70 (70%) which would make future occurrences "Highly Likely" to happen).

Table 4. Hazard Probability Characteristics

Probability	Characteristics
4 - Highly Likely	Event is probable within the calendar year. Event has up to 1 in 1 year chance of occurring (1/1=100%) History of events is greater than 33% likely per year. Event is "Highly Likely" to occur
3 - Likely	Event is probable within the next three years. Event has up to 1 in 3 years chance of occurring (1/3=33%) History of events is greater than 20% but less than or equal to 33% likely per year. Event is "Likely" to occur
2 - Possible	Event is probable within the next five years. Event has up to 1 in 5 years chance of occurring (1/5=20%) History of events is greater than 10% but less than or equal to 20% likely per year Event could "Possibly" occur
1 - Unlikely	Event is possible within the next ten years Event has up to 1 in 10 years chance of occurring (1/10=10%) History of events is less than or equal to 10% likely per year Event is "Unlikely" but is possible of occurring

Next, the magnitude of the hazard's effect is considered according to the severity associated with past events of the hazard. This table gives four classifications of Magnitude / Severity.

Table 5. Hazard Magnitude/Severity Characteristics

Magnitude / Severity	Characteristics
4 - Catastrophic	Multiple deaths Complete shutdown of facilities for 30 or more days More than 50% of property is severely damaged
3 - Critical	Injuries and/or illnesses result in permanent disability Complete shutdown of critical facilities for at least two weeks More than 25% of property is severely damaged
2 - Limited	Injuries and/or illnesses do not result in permanent disability Complete shutdown of critical facilities for more than one week More than 10% of property is severely damaged
1 - Negligible	Injuries and/or illnesses are treatable with first aid Minor quality of life lost Shutdown of critical facilities and services for 24 hours or less Less than 10% of property is severely damaged

Warning Time and Duration are given four ranges each, as shown in the following table. Also indicated is the "Weighting" factor for each of the four parts of the Calculated Priority Risk Index. The Probability factor is "Weighted" at .45, Magnitude / Severity at .30, Warning Time at .15, and Duration at .10. These "Weights" of significance are used to assign relative importance to each of these factors when combined to generate the Calculated Priority Risk Index value.

Table 6. Calculated Priority Risk Index

.45 Probability	.30 Magnitude / Severity	.15 Warning Time	.10 Duration
4 - Highly Likely	4 - Catastrophic	4 - Less Than 6 Hours	4 - More Than 1 Week
3 - Likely	3 - Critical	3 - 6-12 Hours	3 - Less Than 1 Week
2 - Possible	2 - Limited	2 - 12-24 Hours	2 - Less Than 1 Day
1 - Unlikely	1 - Negligible	1 - 24+ Hours	1 - Less Than 6 Hours

Following is a table representing the Calculated Priority Risk Index for each hazard facing the community:

Table 7. Alakanuk Calculated Priority Risk Index by Hazard

Hazard	Probability	Magnitude /Severity	Warning Time	Duration	Priority Risk Index
Earthquake	1 Unlikely	1 Negligible	4 < 6 Hours	1 < 6 Hours	1.45
Erosion	4 Highly Likely	3 Critical	1 24+ Hours	4 > One Week	3.25
Flooding	4 Highly Likely	3 Critical	- Not Specified -	3 < One Week	3
Severe Winter Storm	3 Likely	1 Negligible	1 24+ Hours	3 < One Week	2.1
Tsunami	1 Unlikely	1 Negligible	4 < 6 Hours	1 < 6 Hours	1.45
Wildfires	3 Likely	4 Catastrophic	4 < 6 Hours	- Not Specified -	3.15

4.2 Hazard Profile

4.2.1 Earthquake

A. Hazard Definition for Earthquake

An earthquake is a sudden, rapid shaking of the Earth caused by the breaking and shifting of rock beneath the Earth's surface. For hundreds of millions of years, the forces of plate tectonics have shaped the Earth as the huge plates that form the Earth's surface move slowly over, under, and past each other. Sometimes the movement is gradual. At other times, the plates are locked together, unable to release the accumulating energy. When the accumulated energy grows strong enough, the plates break free causing the ground to shake. Most earthquakes occur at the boundaries where the plates meet; however, some earthquakes occur in the middle of plates.

Ground shaking from earthquakes can collapse buildings and bridges; disrupt gas, electric, and phone service; and sometimes trigger landslides, avalanches, flash floods, fires, and huge, destructive ocean waves (tsunamis). Buildings with foundations resting on unconsolidated landfill and other unstable soil, and trailers and homes not tied to their foundations are at risk because they can be shaken off their mountings during an earthquake. When an earthquake occurs in a populated area, it may cause deaths and injuries and extensive property damage.

Earthquakes strike suddenly, without warning. Earthquakes can occur at any time of the year and at any time of the day or night. On a yearly basis, 70 to 75 damaging earthquakes occur throughout the world. Estimates of losses from a future earthquake in the United States approach $200 billion.

There are 45 states and territories in the United States at moderate to very high risk from earthquakes, and they are located in every region of the country. California experiences the most frequent damaging earthquakes; however, Alaska experiences the greatest number of large earthquakes--most located in uninhabited areas.

B. Previous Occurrences for Earthquake

On Good Friday, March 27, 1964, North America's strongest recorded earthquake, with a moment magnitude of 9.2, rocked central Alaska. On a global level, three of the ten strongest earthquakes ever recorded occurred in Alaska. There have been three magnitude 7 earthquakes within 50 miles of Fairbanks within the past 90 years.

C. Geographic Location for Earthquake

Following information identifies the geographic area(s) affected by each specified hazard.

The entire geographic area of Alaska is vulnerable to the effects of an earthquake. Figure 1 was generated using the USGS Earthquake Probability Mapping model and indicates a 4% probability of a greater than 5.0 magnitude earthquake occurring over the next 10 years in the vicinity of Alakanuk.

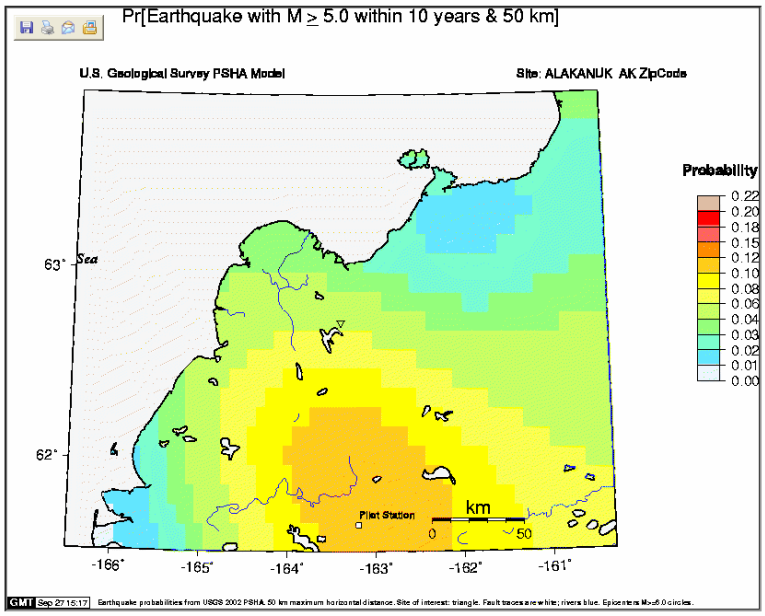

Figure 1. Alakanuk Earthquake Probability

Source – USGS Earthquake Probability Mapping – probability of a M>/=5.0 within 10 years. http://eqint.cr.usgs.gov/eq/cgi-bin/eqprob.cgi 2006.

D. Hazard Extent for Earthquake

Following information describes the magnitude and severity of each specified hazard.

Each year Alaska has approximately 5,000 earthquakes, including 1,000 that measure above 3.5 on the Richter scale. Alaska is vulnerable to three types of earthquakes. One type is called a subduction zone earthquake, which is caused by one crustal plate moving beneath another plate. This is the case in Southcentral Alaska and along the Aleutian Islands, the Pacific Plate dives beneath the North American plate. This type of action usually leads to the Earth's largest earthquakes, such as the Good Friday earthquake. Another type of earthquake that is common in Alaska is the "transform fault" earthquake. These earthquakes occur when crustal plates slide by each other. This is the geologic setting offshore of Southeastern Alaska, where the North American plate and the Pacific plate slide past each other on the FairweatherQueen Charlotte fault. This is the same type of movement as on the San Andreas Fault in California. Thirdly, Alaska can experience intraplate earthquakes which occur within a tectonic plate, sometimes at great distance from the plate boundaries. They can have

magnitudes into the 7s. Shallow earthquakes in the Fairbanks area would be considered intraplate earthquakes.

E. Hazard Summary for Earthquake

Following provides information on the probability of future events. In addition, the data provides an overall summary of Alakanuk's vulnerability and impact of each hazard.

Earthquakes occur on different parts, or segments, of faults at different times. The places on major faults with the highest potential earthquake hazard are where there have not been any recent large earthquakes; these are called "seismic gaps." The Yakataga seismic gap is one place in Alaska that is considered to have a very high probability of a major earthquake in the next few decades. Alakanuk is located in an area that is less active than others in the state, although the effects of earthquakes centered elsewhere are expected to be felt in Alakanuk. Impacts to the community would be considered negligible with minor injuries, less than 10% of property damaged, and little to no permanent damage to transportation or infrastructure or the economy.

While the probability of an earthquake is likely throughout the State of Alaska, based on it's geographic location, it is unlikely that an earthquake would be centered in an area around Alakanuk. Figure 1 was generated using the USGS Earthquake Probability Mapping model and indicates a 4% probability of a greater than 5.0 magnitude earthquake occurring over the next 10 years in the vicinity of Alakanuk.

Data Limitations

The vulnerability estimates provided herein use the best data currently available, and the methodologies applied result in an approximation of risk. These estimates may be used to understand relative risk from hazards and potential losses. However, uncertainties are inherent in any loss estimation methodology, arising in part from incomplete scientific knowledge concerning hazards and their effects on the built environment, as well as approximations and simplifications that are necessary for a comprehensive analysis.

F. Vulnerability Analysis for Earthquake

This section serves to identify each hazard confronting the community and its vulnerabilities to that hazard.

a. Population

Approximately **100**% of the community's population is vulnerable.

b. Critical Facilities

(1) Approximately **100**% of the community's critical facilities are vulnerable.

(2) The specific critical facilities vulnerable are:

All critical facilities are equally at risk from the effects of an earthquake (61 structures valued at $63,708,560).

c. Non-Critical Facilities

(1) Approximately **100**% of the community's non-critical facilities is vulnerable.

(2) The specific non-critical facilities vulnerable are:

All non-critical facilities are equally at risk from the effects of an earthquake (138 structures valued at $19,834,500).

G. Hazard Economic Loss Estimation for Earthquake

This section describes the potential economic losses due to each hazard confronting the community.

a. Economic Loss

The economic loss resulting from this hazard is approximately **$83,543,060**.

b. Structure Loss

The loss from damage to structures from this hazard is approximately **$47,744,624**.

c. Following is the methodology for estimating losses

A conservative exposure-level analysis was conducted to assess the risks of an earthquake hazard. This analysis is a simplified assessment of the potential effects of the hazard on values at risk, without consideration of probability or level of damage.

Replacement values, or insurance coverage, were developed for critical and residential facilities. These values were obtained from HAZUS-MH (HAZUS-MH or *Hazards U.S. – Multi-Hazard*, is a FEMA hazard modeling

program used for estimating potential losses from natural hazards) and the Alakanuk planning team. For each residential structure and critical facility located within the earthquake hazard area, exposure was calculated by assuming the worst-case scenario (that is, the asset would be completely destroyed and would have to be replaced). Finally, the aggregate exposure, in terms of replacement value or insurance coverage, for each category of structure or facility was calculated. A similar analysis was used to evaluate the proportion of the population at risk. However, the analysis simply represents the number of people at risk; no estimate of the number of potential injuries or deaths was prepared.

H. Hazard Human Loss Estimation for Earthquake

As discussed above, human loss estimates (death and injuries) were not completed as part of this assessment, however the analysis does identify the number and percentage of the population at risk in Alakanuk.

a. Total Affected

The estimated total number of people affected by this hazard is approximately **678**.

b. Percentage of Population

The estimated total percentage of the community's population at risk associated with this hazard is approximately **100%**.

I. Vulnerability to Future Assets/Infrastructure for Earthquake

All future critical facilities and infrastructure are at risk from the effects of an earthquake.

4.2.2 Erosion

A. Hazard Definition for Erosion

Erosion is a process that involves the gradual wearing away, transportation, and movement of land. However, not all erosion is gradual. It can occur quite quickly as the result of a flash flood, coastal storm, or other event. Most of the geomorphic change that occurs in a river system is in response to a peak flow event. It is a natural process but its effects can be exacerbated by human activity.

Erosion is a problem in developed areas where the disappearing land threatens development and infrastructure. There are three main types of erosion that affect human activity in Alaska:

- Coastal erosion
- Riverine erosion
- Wind erosion

Alakanuk is primarily vulnerable to riverine erosion.

Riverine Erosion: Riverine erosion results from the force of flowing water in and adjacent to river channels. This erosion affects the bed and banks of the channel and can alter or preclude any channel navigation or riverbank development. In less stable braided channel reaches, erosion and deposition of material are a constant issue. In more stable meandering channels, episodes of erosion may only occur occasionally. Examples of riverine erosion are found throughout Alaska that threaten both public and private property. Riverine erosion threatens communities along other rivers including the Kenai, Kuskokwim, Koyukuk, and Yukon Rivers.

B. Previous Occurrences for Erosion

A 1971 USACOE study showed that just less than 11% of Alaska's coastline was undergoing "significant" erosion.

Riverine erosion problems also exist on other rivers including the Kuskokwim, Matanuska, and Kenai Rivers.

Examples of riverine erosion are found throughout Alaska that threatens both public and private property. Attempts to control erosion have met with very limited success. For example, armored dikes helped control erosion for a while but eventually failed.

In 1975, erosion destroyed the cannery in Alakanuk and forced the relocation of many homes. In 1993, 20 feet of bank eroded in one day. Figure 2 illustrates the extent of erosion that has occurred over the years (eroded land is depicted as lots within Alakanuk Pass).

C. Geographic Location for Erosion

Following information identifies the geographic area(s) affected by each specified hazard.

Alakanuk is located along the banks of Alakanuk Pass, a major southern channel of the Yukon Delta. It is 15 miles from the Bering Sea, and approximately 162 air miles northwest of Bethel. The community is build along the banks of Alakanuk Pass (Figure 2). All of the structures located along the banks of the river are subject to the effects of erosion.

D. Hazard Extent for Erosion

Following information describes the magnitude and severity of each specified hazard.

River erosion rarely causes death or injury. However, erosion causes significant destruction of property, development, and infrastructure.

Rivers constantly alter their course, changing shape and depth, trying to find a balance between the sediment transport capacity of the water and the sediment supply. This process, called riverine erosion, is usually seen as the wearing away of riverbanks and riverbeds over a long period of time.

Riverine erosion is often initiated by failure of a riverbank causing high sediment loads or heavy rainfall. This generates high volume and velocity run-off which will concentrate in the lower drainages within the river's catchment area. When the stress applied by these river flows exceeds the resistance of the riverbank material, erosion will occur. As the sediment load increases, fast-flowing rivers will erode their banks downstream. Eventually, the river becomes overloaded or velocity is reduced, leading to the deposition of sediment further downstream or in dams and reservoirs. The deposition may eventually lead to the river developing a new channel.

While all rivers change in the long-term, short-term rates of change vary significantly. In less stable braided channel reaches, erosion and deposition of material are a constant issue. In more stable meandering channels, episodes of erosion may only occur occasionally. The erosion rate depends on the sediment supply and amount of run-off reaching the river. These variables are affected by many things including earthquakes, floods, climatic changes, loss of bank vegetation, urbanization, and the construction of civil works in the waterway.

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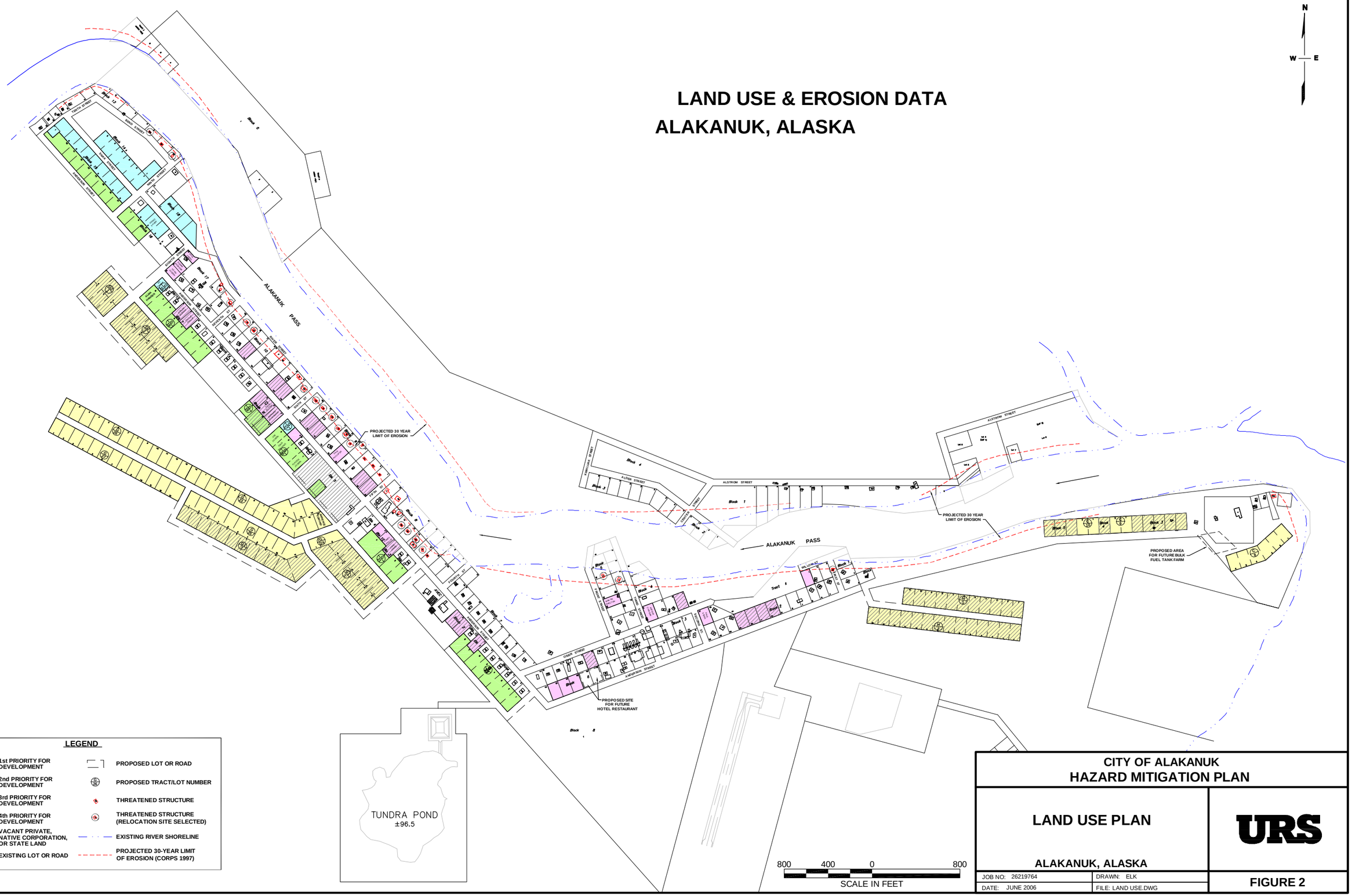
LAND USE & EROSION DATA
ALAKANUK, ALASKA



CITY OF ALAKANUK
HAZARD MITIGATION PLAN

LAND USE PLAN

ALAKANUK, ALASKA

URS

JOB NO: 26219764	DRAWN: ELK
DATE: JUNE 2006	FILE: LAND USE.DWG

FIGURE 2

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Erosion along the banks of Alakanuk Pass is generally caused by a combination of factors:

The natural process of a river to find the path of least resistance. Based on a review of historic aerial photographs, the river appears to be trying to straighten itself out. This is most noticeable on the north bank where it forms the "S" bend. Over the last 20 years, the "S" bend has straightened, causing the south bank in front of the city to erode.

Possible increased flow into Alakanuk Pass resulting from flow changes in the Yukon River.

Increased boat traffic close to the shoreline.

Ice scouring during spring breakup.

Runoff from snowmelt and rainfall.

This picture depicts the erosion problem adjacent to River Street where 20 feet of shoreline was lost in 1 day.

E. Hazard Summary for Erosion

Following provides information on the probability of future events. In addition, the data provides an overall summary of Alakanuk's vulnerability to erosion.

Based on studies completed by DOT&PF and the USACOE, and on a review of aerial photographs from 1951, 1965, 1975, 1991, and 1997, it is highly likely that all structures located along the banks of Alakanuk Pass are vulnerable to erosion. Impacts to the community are considered critical with the potential for injuries or illnesses resulting in permanent disability, complete shutdown of critical facilities for at least two weeks and more than 25% of property being severely damaged. Impacts include loss of land and any development on that land. It can cause increased sedimentation of harbors and river deltas. It can hinder channel navigation - affect marine transportation source. Other problems include reduction in water quality due to high sediment loads, loss of native aquatic habitats, damage to public utilities (roads, bridges and dams) and maintenance costs associated with trying to prevent or control erosion sites.

The Alakanuk planning team conducted an inventory in the summer and fall of 2006 of all residential structures and critical facilities vulnerable to erosion. A total of 58 people, 14 residential structures valued at $2,280,000 (including contents), and 1 critical facility valued at $300,000 (including contents) are at risk from the effects of erosion. The critical facility at risk is the Jorgensen Warehouse (Figure 2).

Data Limitations

The vulnerability estimates provided herein use the best data currently available, and the methodologies applied result in an approximation of risk. These estimates may be used to understand relative risk from hazards and potential losses. However, uncertainties are inherent in any loss estimation methodology, arising in part from incomplete scientific knowledge concerning hazards and their effects on the built environment, as well as approximations and simplifications that are necessary for a comprehensive analysis.

F. Vulnerability Analysis for Erosion

This section serves to identify each hazard confronting the community and its vulnerabilities to that hazard.

a. Population

Approximately **8.55%** of the community's population is vulnerable.

b. Critical Facilities

(1) Approximately **2**% of the community's critical facilities is vulnerable.

(2) The specific critical facilities vulnerable are:

Critical facilities at risk from the effects of erosion in Alakanuk include the Jorgensen Warehouse. The structure is valued at $120,000 and the estimated contents value is $180,000, with a total value of $300,000.

c. Non-Critical Facilities

(1) Approximately **10**% of the community's non-critical facilities are vulnerable.

(2) The specific non-critical facilities vulnerable are:

Residential structures at risk from the effects of erosion include the following house numbers (see Figure 3): 1, 8, 9, 10, 25, 77, 78, 88, 119, 133, 134, 136, 117, and 118.

The structures are valued at $760,000 and the estimated contents value is $1,520,000, with a total value of $2,280,000.

G. Hazard Economic Loss Estimation for Erosion

This section describes the potential economic losses due to each hazard confronting the community.

a. Economic Loss

The economic loss resulting from this hazard is approximately **$2,580,000**.

b. Structure Loss

The loss from damage to structures from this hazard is approximately **$880,000**.

c. Following is the methodology for estimating losses

An analysis was conducted based on the USACOE 30-year erosion zone to assess the risks of an erosion hazard. This analysis is a simplified assessment of the potential effects of the hazard on values at risk, without consideration of probability or level of damage.

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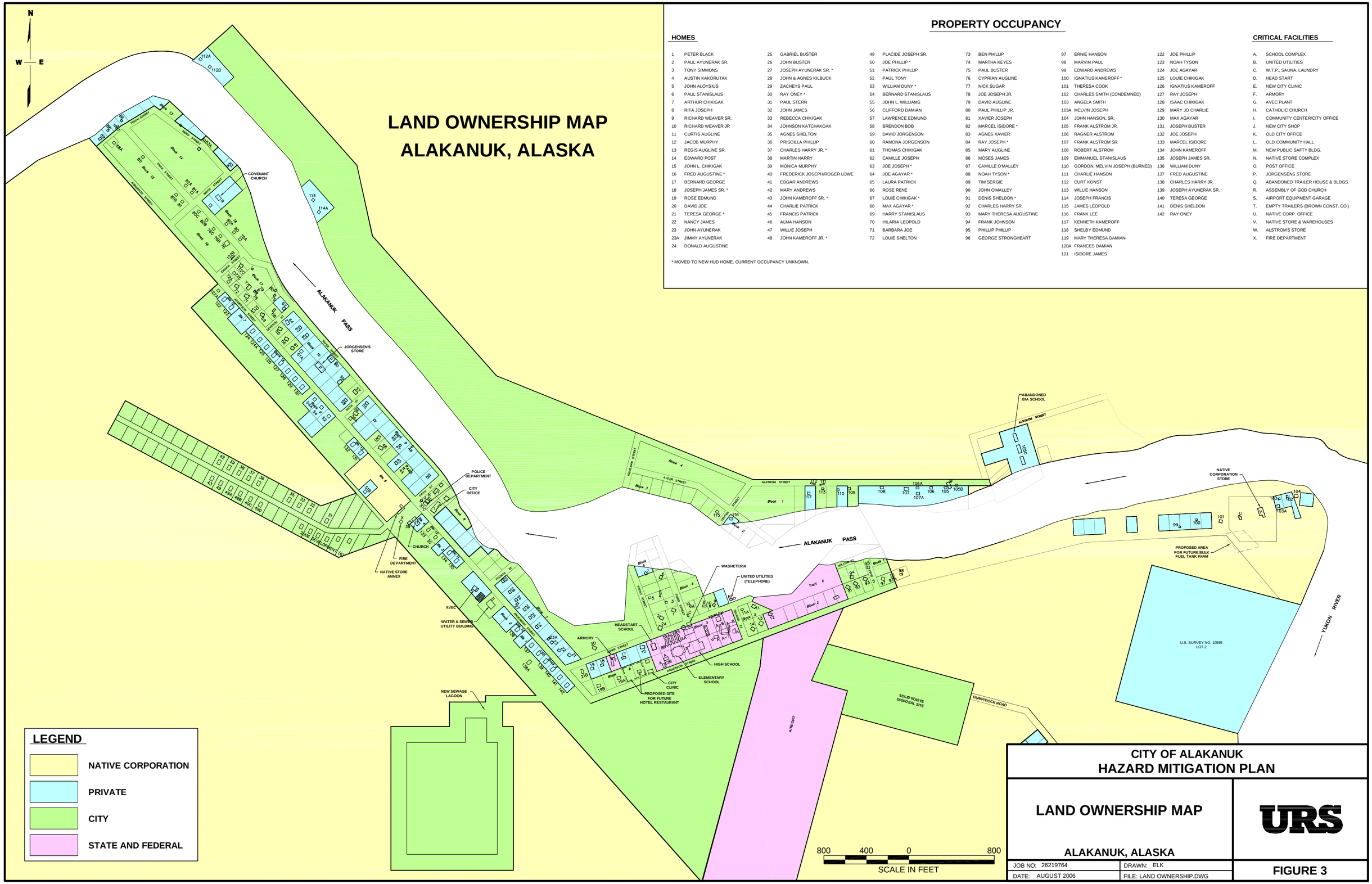
LAND OWNERSHIP MAP
ALAKANUK, ALASKA



PROPERTY OCCUPANCY

HOMES

1 PETER BLACK
2 PAUL AYUNERAK SR.
3 TONY SIMMONS
4 AUSTIN KAKORUTAK
5 JOHN ALOYSIUS
6 PAUL STANISLAUS
7 ARTHUR CHIKIGAK
8 RITA JOSEPH
9 RICHARD WEAVER SR.
10 RICHARD WEAVER JR
11 CURTIS AUGLINE
12 JACOB MURPHY
13 REGIS AUGLINE SR.
14 EDWARD POST
15 JOHN L. CHIKIGAK
16 FRED AUGUSTINE *
17 BERNARD GEORGE
18 JOSEPH JAMES SR. *
19 ROSE EDMUND
20 DAVID JOE
21 TERESA GEORGE *
22 NANCY JAMES
23 JOHN AYUNERAK
23A JIMMY AYUNERAK
24 DONALD AUGUSTINE
25 GABRIEL BUSTER
26 JOHN BUSTER
27 JOSEPH AYUNERAK SR. *
28 JOHN & AGNES KILBUCK
29 ZACHEYS PAUL
30 RAY ONEY *
31 PAUL STERN
32 JOHN JAMES
33 REBECCA CHIKIGAK
34 JOHNSON KATCHAKOAK
35 AGNES SHELTON
36 PRISCILLA PHILLIP
37 CHARLES HARRY JR. *
38 MARTIN HARRY
39 MONICA MURPHY
40 FREDERICK JOSEPH/ROGER LOWE
41 EDGAR ANDREWS
42 MARY ANDREWS
43 JOHN KAMEROFF SR. *
44 CHARLIE PATRICK
45 FRANCIS PATRICK
46 ALMA HANSON
47 WILLIE JOSEPH
48 JOHN KAMEROFF JR. *
49 PLACIDE JOSEPH SR.
50 JOE PHILLIP *
51 PATRICK PHILLIP
52 PAUL TONY
53 WILLIAM DUNY *
54 BERNARD STANISLAUS
55 JOHN L. WILLIAMS
56 CLIFFORD DAMIAN
57 LAWRENCE EDMUND
58 BRENDON BOB
59 DAVID JORGENSON
60 RAMONA JORGENSON
61 THOMAS CHIKIGAK
62 CAMILLE JOSEPH
63 JOE JOSEPH *
64 JOE AGAYAR *
65 LAURA PATRICK
66 ROSE RENE
67 LOUIE CHIKIGAK *
68 MAX AGAYAR *
69 HARRY STANISLAUS
70 HILARIA LEOPOLD
71 BARBARA JOE
72 LOUIE SHELTON
73 BEN PHILLIP
74 MARTHA KEYES
75 PAUL BUSTER
76 CYPRIAN AUGLINE
77 NICK SUGAR
78 JOE JOSEPH JR.
79 DAVID AUGLINE
80 PAUL PHILLIP JR.
81 XAVIER JOSEPH
82 MARCEL ISIDORE *
83 AGNES XAVIER
84 RAY JOSEPH *
85 MARY AUGLINE
86 MOSES JAMES
87 CAMILLE O'MALLEY
88 NOAH TYSON *
89 TIM SERGIE
90 JOHN O'MALLEY
91 DENIS SHELDON *
92 CHARLES HARRY SR.
93 MARY THERESA AUGUSTINE
94 FRANK JOHNSON
95 PHILLIP PHILLIP
96 GEORGE STRONGHEART
97 ERNIE HANSON
98 MARVIN PAUL
99 EDWARD ANDREWS
100 IGNATIUS KAMEROFF *
101 THERESA COOK
102 CHARLES SMITH (CONDEMNED)
103 ANGELA SMITH
103A MELVIN JOSEPH
104 JOHN HANSON, SR.
105 FRANK ALSTROM JR.
106 RAGNER ALSTROM
107 FRANK ALSTROM SR.
108 ROBERT ALSTROM
109 EMMANUEL STANISLAUS
110 GORDON, MELVIN JOSEPH (BURNED)
111 CHARLIE HANSON
112 CURT KONST
113 WILLIE HANSON
114 JOSEPH FRANCIS
115 JAMES LEOPOLD
116 FRANK LEE
117 KENNETH KAMEROFF
118 SHELBY EDMUND
119 MARY THERESA DAMIAN
120A FRANCES DAMIAN
121 ISIDORE JAMES
122 JOE PHILLIP
123 NOAH TYSON
124 JOE AGAYAR
125 LOUIE CHIKIGAK
126 IGNATIUS KAMEROFF
127 RAY JOSEPH
128 ISAAC CHIKIGAK
129 MARY JO CHARLIE
130 MAX AGAYAR
131 JOSEPH BUSTER
132 JOE JOSEPH
133 MARCEL ISIDORE
134 JOHN KAMEROFF
135 JOSEPH JAMES SR.
136 WILLIAM DUNY
137 FRED AUGUSTINE
138 CHARLES HARRY JR.
139 JOSEPH AYUNERAK SR.
140 TERESA GEORGE
141 DENIS SHELDON
142 RAY ONEY

* MOVED TO NEW HUD HOME. CURRENT OCCUPANCY UNKNOWN.

CRITICAL FACILITIES

A. SCHOOL COMPLEX
B. UNITED UTILITIES
C. W.T.P., SAUNA, LAUNDRY
D. HEAD START
E. NEW CITY CLINIC
F. ARMORY
G. AVEC PLANT
H. CATHOLIC CHURCH
I. COMMUNITY CENTER/CITY OFFICE
J. NEW CITY SHOP
K. OLD CITY OFFICE
L. OLD COMMUNITY HALL
M. NEW PUBLIC SAFTY BLDG.
N. NATIVE STORE COMPLEX
O. POST OFFICE
P. JORGENSENS STORE
Q. ABANDONED TRAILER HOUSE & BLDGS.
R. ASSEMBLY OF GOD CHURCH
S. AIRPORT EQUIPMENT GARAGE
T. EMPTY TRAILERS (BROWN CONST. CO.)
U. NATIVE CORP. OFFICE
V. NATIVE STORE & WAREHOUSES
W. ALSTROM'S STORE
X. FIRE DEPARTMENT

CITY OF ALAKANUK
HAZARD MITIGATION PLAN

LAND OWNERSHIP MAP

ALAKANUK, ALASKA

URS

JOB NO: 26219764	DRAWN: ELK
DATE: AUGUST 2006	FILE: LAND OWNERSHIP.DWG

FIGURE 3

G:\PROJECTS\26219764 ALAKANUK\LAND OWNERSHIP.DWG ; Revised 8/15/2006 1:11:08 PM; Printed 5/26/2004 12:23:31 PM

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Replacement values, or insurance coverage, were developed for critical and residential facilities. These values were obtained from HAZUS-MH and the Alakanuk planning team. For each residential structure and critical facility located within the erosion hazard area, exposure was calculated by assuming the worst-case scenario (that is, the asset would be completely destroyed and would have to be replaced). Finally, the aggregate exposure, in terms of replacement value or insurance coverage, for each category of structure or facility was calculated. A similar analysis was used to evaluate the proportion of the population at risk. However, the analysis simply represents the number of people at risk; no estimate of the number of potential injuries or deaths was prepared.

H. Hazard Human Loss Estimation for Erosion

As discussed above, human loss estimates (death and injuries) were not completed as part of this assessment, however the analysis does identify the number and percentage of the population at risk in Alakanuk.

a. Total Affected

The estimated total number of people affected by this hazard is approximately **58**.

b. Percentage of Population

The estimated total percentage of the community's population at risk associated with this hazard is approximately **8.55%**.

I. Vulnerability to Future Assets/Infrastructure for Erosion

Any future assets and infrastructure constructed within the 30-year erosion zone would be vulnerable to the effects of erosion. Alakanuk has implemented zoning ordinances to prevent any new construction in high hazard erosion areas.

4.2.3 Flooding

A. Hazard Definition for Flooding

Flooding is a natural event from which no State in this country is immune. It occurs when rain, snow, or glacial melt causes a waterway to exceed its capacity. It is of great concern in Alaska because there are more than 3,000 rivers, three million lakes with over 5% of the State (29,000 square miles) of glaciers. The Yukon River is almost 2,000 miles long and the third longest river in the United States. These sources provide a multitude of opportunities for flooding.

While there are many different types of flooding, Alakanuk primarily experiences rainfall-runoff, snowmelt, and ice jam floods. Rainfall-runoff flooding, the most common, usually occurs in the late summer and early fall. Snowmelt flooding occurs in the spring.

Ice jam floods occur after an ice jam develops, causing water to rise upstream behind the jam. When the jam fails (releases), the stored water causes downstream flooding. Damage from ice jam floods is usually worse than from rainfall-runoff or snowmelt floods because the floods are usually higher, the water levels change more rapidly, and the ice causes physical damage. Ice jams usually develop where the channel slope decreases, gets shallower, or where constrictions occur such as at bridges, bends in the river, headwaters and reservoirs. During spring breakup, ice jams commonly dam water along big rivers. This flooding is exacerbated by snowmelt. This type of flooding causes significant damage in Alakanuk.

Large floods in recent years on the Kenai, Susitna, Kuskokwim, and Yukon rivers were all caused by ice jams and snow melt.

Predictions are also difficult for many of the smaller rivers because of the short time span between precipitation occurrence and flooding commencement.

Rainfall-Runoff Floods: A typical rainfall event occurs in mid to late summer. The rainfall intensity, duration, distribution and geomorphic characteristics of the watershed all play a role in determining the magnitude of the flood. Runoff flooding is the most common type of flood. They usually result from weather systems that have prolonged rainfall associated with them.

Snowmelt Floods: Snowmelt floods usually occur in the spring or early summer. The depth of the snowpack, and spring weather patterns influence the magnitude of flooding. Snowmelt floods can also be caused by glacial melt.

Ice Jam Floods: Ice jams can form during fall freeze up, in midwinter when stream channels freeze forming anchor ice and during spring breakup when the existing ice cover gets broken into pieces and the pieces get stuck at bridges or other constrictions. When the ice jam fails, it releases the collected water. Ice jams have caused large floods on the Kenai, Susitna, Kuskokwim and Yukon Rivers.

Water collects upstream from a jam, flooding an area by creating a lake-like effect that has a large aereal extent. The effect is analogous to a dam. Little damage typically occurs from the current upstream of the jam but significant damage can result from flooding. The downstream effect is very different. Once the jam is breached there is usually a rapid draining of the water dammed behind the jam. Not only does the downstream stage rise substantially once the jam is breached, but there is substantial current, which can cause erosion and significant damage. Additionally, the rising water

causes the ice to float and the increased velocities move the ice further downstream. The motion of large, solid, blocks of ice are often very destructive.

Timing of events: Many floods are fairly predictable based on rainfall patterns. For coastal areas of Alaska, most of the annual precipitation is received from September through February with October being the wettest. In Interior Alaska, the wettest period is June through November with August the wettest month. This rainfall leads to flooding in late summer and fall. Spring snowmelt increases runoff, which can cause flooding. It also breaks the winter ice cover, which causes localized ice-jam floods. Glacial outburst floods occur mostly in mid-summer through late fall. Other types do not have this seasonal component.

B. Previous Occurrences for Flooding

- 1952 - Highest water level on record. Approximately 5 feet deep in the highest part of the old village.
- 1971 - All buildings flooded except for the store.
- 1972 - Approximately 2 feet of water in the highest part of the old village. 70 houses were flooded.
- 1975 - 49 houses flooded. Electrical transformers were under water.
- 1984 - 2 or 3 houses flooded, most houses surrounded.
- 1985 - High water mark 6 feet below the top of the deck on the upstream, landward side of the high school.
- 2005 (May 14) flood - flood damage caused approximately $700,000 in damage to public roads including the subdivided road in the new AVCP housing area.
- 2006 spring flood - flood damage to public roads, many homes causing approximately $750,000 in damage.

C. Geographic Location for Flooding

Following information identifies the geographic area(s) affected by each specified hazard.

The US Army Corps of Engineers has designated the Alakanuk area as a high flood hazard community. The entire community of Alakanuk is vulnerable to the effects of flooding. Conversations with residents indicate that flooding usually occurs during spring breakup and typically covers the entire community to a depth of 2 to 4 feet. High water marks were established at two locations by the USACOE based on the water level of the 1952 flood.

- The downstream shore side of the support piling of John Hanson's house (northwest corner).
- The utility pole downstream and inland approximately 100 yards southwest of John Hanson's house.

The estimated zero damage elevation is approximately 3 feet below the established high water mark at John Hanson's house. The recommended building elevation is 1 foot above the established high water level. Alakanuk passed an ordinance in 1993 that requires all future buildings to be constructed above the 1952 high water marks.

D. Hazard Extent for Flooding

Following information describes the magnitude and severity of each specified hazard.

Flooding is a natural event and damages can occur when humans interfere with the natural process. Items that can cause problems include altering the waterway and developing watersheds. An additional hazard that does not directly alter the water path is development. Building inappropriately within the floodplain can cause hazardous affects. Most of Alaska's communities and transportation facilities are located along large rivers and are subject to flooding. This flooding threatens life, safety and health; causes extensive property loss; and results in damage in excess of three-quarters of a million dollars annually.

Conversations with residents indicate that flooding usually occurs during spring breakup and typically covers the entire community to a depth of 2 to 4 feet.

E. Hazard Summary for Flooding

Following provides information on the probability of future events. In addition, the data provides an overall summary of the Jurisdiction's vulnerability and impact of each hazard.

Alakanuk is in an area rated as a high flood hazard by the USACOE, Floodplain Management Branch. By definition, this means that at least once every 5 years the entire village will be flooded. All residents, structures, and critical facilities in Alakanuk are vulnerable to flood impacts.

Impacts to the community are considered critical with the potential for injuries or illnesses resulting in permanent disability, complete shutdown of critical facilities for at least two weeks and more than 25% of property being severely damaged. In addition to the water damage, the spring floods carry large pieces of river ice than can cause significant structural damage to buildings. Many riverfront homeowners place log barriers between their houses and the river to protect them from floating ice.

Data Limitations

The vulnerability estimates provided herein use the best data currently available, and the methodologies applied result in an approximation of risk. These estimates may be used to understand relative risk from hazards and potential losses. However, uncertainties are inherent in any loss estimation methodology, arising in part from incomplete scientific knowledge concerning hazards and their effects on the built environment, as well as approximations and simplifications that are necessary for a comprehensive analysis.

F. Vulnerability Analysis for Flooding

This section serves to identify each hazard confronting the community and its vulnerabilities to that hazard.

a. Population

Approximately **100**% of the community's population is vulnerable.

b. Critical Facilities

(1) Approximately **100**% of the community's critical facilities are vulnerable.

(2) The specific critical facilities vulnerable are:

The entire community of Alakanuk including all critical facilities is vulnerable to flood impacts.

c. Non-Critical Facilities

(1) Approximately **100**% of the community's non-critical facilities is vulnerable.

(2) The specific non-critical facilities vulnerable are:

The entire community of Alakanuk including all non-critical facilities is vulnerable to flood impacts.

G. Hazard Economic Loss Estimation for Flooding

This section describes the potential economic losses due to each hazard confronting the community.

a. Economic Loss

The economic loss resulting from this hazard is approximately **$83,543,060**.

b. Structure Loss

The loss from damage to structures from this hazard is approximately **$47,744,624**.

c. Following is the methodology for estimating losses

A conservative exposure-level analysis was conducted to assess the risks of the flooding hazard. This analysis is a simplified assessment of the potential effects of the hazard on values at risk, without consideration of probability or level of damage.

Replacement values, or insurance coverage, were developed for critical and residential facilities. These values were obtained from HAZUS-MH and the Alakanuk planning team. For each residential structure and critical facility located within the flood hazard area, exposure was calculated by assuming the worst-case scenario (that is, the asset would be completely destroyed and would have to be replaced). Finally, the aggregate exposure, in terms of replacement value or insurance coverage, for each category of structure or facility was calculated. A similar analysis was used to evaluate the proportion of the population at risk. However, the analysis simply represents the number of people at risk; no estimate of the number of potential injuries or deaths was prepared.

H. Hazard Human Loss Estimation for Flooding

As discussed above, human loss estimates (death and injuries) were not completed as part of this assessment, however the analysis does identify the number and percentage of the population at risk in Alakanuk.

a. Total Affected

The estimated total number of people affected by this hazard is approximately **678**.

b. Percentage of Population

The estimated total percentage of the community's population at risk associated with this hazard is approximately **100%**.

I. Vulnerability to Future Assets/Infrastructure for Flooding

Future assets and infrastructure are vulnerable to flood impacts. The community passed an ordinance that requires all future buildings to be constructed above the 1952 high water mark.

4.2.4 Severe Winter Storm

A. Hazard Definition for Severe Winter Storm

Severe winter storms in western Alaska include heavy snows, ice storms, extreme cold, and high winds.

Heavy Snow generally means:

- Snowfall accumulating to 4 inches or more in depth in 12 hours or less
- Snowfall accumulating to 6 inches or more in depth in 24 hours or less

Snow Squalls are periods of moderate to heavy snowfall, intense, but of limited duration, accompanied by strong, gusty surface winds and possibly lightning.

A **Snow Shower** is a short duration of moderate snowfall.

Snow Flurries are an intermittent light snowfall of short duration with no measurable accumulation.

Drifting Snow is an uneven distribution of snowfall and snow depth caused by strong surface winds. Drifting snow may occur during or after a snowfall.

A **Blizzard** means that the following conditions are expected to prevail for a period of 3 hours or longer:

- Sustained wind or frequent gusts to 35 miles per hour or greater
- Considerable falling and/or blowing snow reducing visibility to less than 1/4 mile

Freezing Rain or **Drizzle** occurs when rain or drizzle freezes on surfaces such as the ground, trees, power lines, motor vehicles, streets, highways, etc. generally more than 12 inches of accumulation in less than 24 hours, can immobilize a community by bringing transportation to a halt.

The term **Ice Storm** is used to describe occasions when damaging accumulations of ice are expected during freezing rain situations. Ice storms result from the accumulation of freezing rain, which is rain that becomes supercooled and freezes upon impact with cold surfaces. Freezing rain most commonly occurs in a narrow band within a winter storm that is also producing heavy amounts of snow and sleet in other locations.

The definition of **Extreme Cold** varies according to the normal climate of a region. In areas unaccustomed to winter weather, near freezing temperatures are considered "extreme cold." In Alaska, extreme cold usually involves temperatures between -20 to –50 degrees Fahrenheit. Excessive cold may accompany winter storms, be left in their wake, or can occur without storm activity.

Blowing Snow is wind-driven snow that reduces surface visibility. Blowing snow can be falling snow or snow that already has accumulated but is picked up and blown by strong winds.

B. Previous Occurrences for Severe Winter Storm

Western Alaska communities experience severe winter storm conditions annually.

C. Geographic Location for Severe Winter Storm

Following information identifies the geographic area(s) affected by each specified hazard.

The entire Alakanuk area is equally vulnerable to the effects of severe winter storm conditions.

D. Hazard Extent for Severe Winter Storm

Following information describes the magnitude and severity of each specified hazard.

Heavy snow, generally more than 12 inches of accumulation in less than 24 hours, can immobilize a community by bringing transportation to a halt. Until the snow can be removed, airports and major roadways are impacted, even closed completely, stopping the flow of supplies and disrupting emergency and medical services. Accumulations of snow can cause roofs to collapse and knock down trees and power lines. Heavy snow can also damage light aircraft and sink small boats. A quick thaw after a heavy snow can cause substantial flooding. The cost of snow removal, repairing damages, and the loss of business can have severe economic impacts on cities and towns. Injuries and deaths related to heavy snow usually occur as a result of vehicle accidents. Casualties also occur due to overexertion while shoveling snow and hypothermia caused by overexposure to the cold weather.

Extreme cold can bring transportation to a halt across Alaska for days or sometimes weeks at a time. Aircraft may be grounded due to extreme cold and ice fog conditions, cutting off access as well as the flow of supplies to villages. Long cold spells can cause rivers to freeze, disrupting shipping and increases the likelihood of ice jams and associated flooding. Extreme cold also interferes with a community's infrastructure.

It causes fuel to congeal in storage tanks and supply lines, stopping electric generation. Without electricity, heaters do not work, causing water and sewer pipes to freeze or

rupture. If extreme cold conditions are combined with low or no snow cover, the ground's frost depth can increase disturbing buried pipes. The greatest danger from extreme cold is its effect on people. Prolonged exposure to the cold can cause frostbite or hypothermia and become life-threatening. Infants and elderly people are most susceptible. The risk of hypothermia due to exposure greatly increases during episodes of extreme cold, and carbon monoxide poisoning is possible as people use supplemental heating devices.

Ice Storms can be the most devastating of winter weather phenomena and are often the cause of automobile accidents, power outages and personal injury. Ice storms result from the accumulation of freezing rain, which is rain that becomes supercooled and freezes upon impact with cold surfaces.

E. Hazard Summary for Severe Winter Storm

Following provides information on the probability of future events. In addition, the data provides an overall summary of the Jurisdiction's vulnerability and impact of each hazard.

Severe winter storms occur annually along the western coast of Alaska and are likely to occur in Alakanuk. The entire community, including all residents and critical facilities are vulnerable to the impacts of a severe winter storm event. Impacts to the community are considered negligible with the potential for little or no injuries, less that 10% of property damaged, minor quality of life lost, and shutdown of critical facilities and services for 24 hours or less.

Data Limitations

The vulnerability estimates provided herein use the best data currently available, and the methodologies applied result in an approximation of risk. These estimates may be used to understand relative risk from hazards and potential losses. However, uncertainties are inherent in any loss estimation methodology, arising in part from incomplete scientific knowledge concerning hazards and their effects on the built environment, as well as approximations and simplifications that are necessary for a comprehensive analysis.

F. Vulnerability Analysis for Severe Winter Storm

This section serves to identify each hazard confronting the community and its vulnerabilities to that hazard.

a. Population

Approximately **100**% of the community's population is vulnerable.

b. Critical Facilities

(1) Approximately **100**% of the community's critical facilities are vulnerable.

(2) The specific critical facilities vulnerable are:

All residents, structures, and critical facilities in Alakanuk are at risk from the impacts of a severe winter storm.

c. Non-Critical Facilities

(1) Approximately **100**% of the community's non-critical facilities are vulnerable.

(2) The specific non-critical facilities vulnerable are:

All residents, structures, and non-critical facilities in Alakanuk are at risk from the impacts of a severe winter storm.

G. Hazard Economic Loss Estimation for Severe Winter Storm

This section describes the potential economic losses due to each hazard confronting the community.

a. Economic Loss

The economic loss resulting from this hazard is approximately **$83,543,060**.

b. Structure Loss

The loss from damage to structures from this hazard is approximately **$47,744,624**.

c. Following is the methodology for estimating losses

A conservative exposure-level analysis was conducted to assess the risks of severe winter storm hazard. This analysis is a simplified assessment of the potential effects of the hazard on values at risk, without consideration of probability or level of damage.

Replacement values, or insurance coverage, were developed for critical and residential facilities. These values were obtained from HAZUS-MH and the Alakanuk planning team. For each residential structure and critical

facility located within the severe winter storm hazard area, exposure was calculated by assuming the worst-case scenario (that is, the asset would be completely destroyed and would have to be replaced). Finally, the aggregate exposure, in terms of replacement value or insurance coverage, for each category of structure or facility was calculated. A similar analysis was used to evaluate the proportion of the population at risk. However, the analysis simply represents the number of people at risk; no estimate of the number of potential injuries or deaths was prepared.

H. Hazard Human Loss Estimation for Severe Winter Storm

As discussed above, human loss estimates (death and injuries) were not completed as part of this assessment, however the analysis does identify the number and percentage of the population at risk in Alakanuk.

a. Total Affected

The estimated total number of people affected by this hazard is approximately **678**.

b. Percentage of Population

The estimated total percentage of the community's population at risk associated with this hazard is approximately **100%**.

I. Vulnerability to Future Assets/Infrastructure for Severe Winter Storm

All future residents, structures, and Critical Facilities in Alakanuk are at risk from the impacts of a severe winter storm.

4.2.5 Tsunami

Tsunamis are ocean waves that are generally triggered by vertical motion of the sea floor during major earthquakes. Near ocean or undersea/river landslides or volcanic eruptions can also generate tsunamis. They can be generated locally or a great distance from where they landfall. Warning time can be limited when the tsunami is triggered close to the impacted coastline.

Due to the coastal shelf area along the western Bering Sea, most of the western and northwestern coastline of Alaska, including Alakanuk, is protected from the effects of a tsunami event.

Tsunami events have not been officially documented in Alakanuk, however during the hazard screening process, community elders reported that tsunami events had occurred

in the past. These events that may have tsunami-like characteristics such as an ice burst jam may have been interpreted as a tsunami at the time of the event. Due to lack of historical data, for the purposes of this hazard mitigation plan, it has been determined that tsunamis do not present a significant risk to Alakanuk. As such, a risk assessment has not been completed for this hazard.

4.2.6 Wildfires

A. Hazard Definition for Wildfires

Fires can be divided into the following categories:

Structure fires - originate in and burn a building, shelter or other structure. Prescribed fires - ignited under predetermined conditions to meet specific objectives, to mitigate risks to people and their communities, and/or to restore and maintain healthy, diverse ecological systems.

Wildland fire - any non-structure fire, other than prescribed fire, that occurs in the wildland.

Wildland Fire Use - a wildland fire functioning in its natural ecological role and fulfilling land management objectives.

Wildland-Urban Interface Fires - fires that burn within the line, area, or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels. The potential exists in areas of wildland-urban interface for extremely dangerous and complex fire burning conditions which pose a tremendous threat to public and firefighter safety.

B. Previous Occurrences for Wildfires

Previous wildland fires have not been documented in Alakanuk, however have occurred in the surrounding vicinity.

Table 8 identifies the Fire Year, Fire Name/ID, and number of acres burned (The Alaska Fire Service, 2006).

Table 8. Wildland fires in the Alakanuk Area

Fire Year	Fire Name/Number	Acres Burned
1957	9	277,805
1959	91	15,290
1962	32	1,300
1962	29	1,700
1962	35	2,304
1962	30	2,000
1971	7693	1,500
1971	7680	15,000
1972	7750	1,299
1972	7776	9,281
1972	7686	11,712
1973	7825	9,180
1973	7718	914
1974	7788	2,700
1984	a390	6,268
1987	b047	3,518
1991	b239	1,770
1991	b242	10,181
1992	a439	308
1993	b221	335
1993	b205	282
1994	a204	569
1997	b610	324
1997	b399	106
1997	b609	257
1997	b615	412
2000	a383	12,891
2002	a257	624
2002	a301	100
2004	526	332
2004	459	283
2005	562	82,123

In Alaska, the natural fire regime is characterized by a return interval of 50 to 200 years, depending on the vegetation type, topography and location. The role of wildland fire as an essential ecological process and natural change agent has been incorporated into the fire management planning process and the full range of fire management activities is exercised in Alaska to help achieve ecosystem sustainability, including its interrelated ecological, economic, and social consequences on firefighter and public safety and welfare, natural and cultural resources threatened, and the other values to be protected dictate the appropriate management response to the fire.

C. Geographic Location for Wildfires

Following information identifies the geographic area(s) affected by each specified hazard.

Over the past 50 years 35 significant fire events have occurred within 50 miles of Alakanuk (see Figure 4. Historic Wildland Fires near Alakanuk, Alaska).

D. Hazard Extent for Wildfires

Following information describes the magnitude and severity of each specified hazard.

Fuel, weather, and topography influence wildland fire behavior. Wildland fire behavior can be erratic and extreme causing firewhirls and firestorms that can endanger the lives of the firefighters trying to suppress the blaze.

Fuel determines how much energy the fire releases, how quickly the fire spreads and how much effort is needed to contain the fire. Weather is the most variable factor. Temperature and humidity also affect fire behavior. High temperatures and low humidity encourage fire activity while low temperatures and high humidity help retard fire behavior. Wind affects the speed and direction of a fire. Topography directs the movement of air, which can also affect fire behavior. When the terrain funnels air, like what happens in a canyon, it can lead to faster spreading. Fire can also travel up slope quicker than it goes down.

An uncontrolled fire in a rural Alaska community can spread quickly and destroy everything in it's path. Many communities in rural Alaska have literally burned away leaving the residents to move to an existing community and start over, or to relocate to another location.

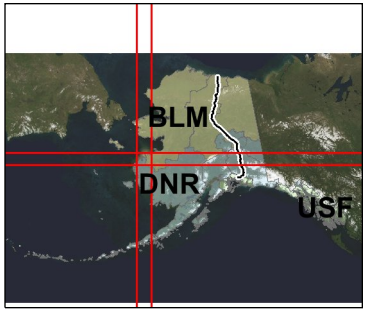
E. Hazard Summary for Wildfires

Following provides information on the probability of future events. In addition, the data provides an overall summary of the Alakanuk's vulnerability and impact from wildfires.

Given the history of wildland fires in the Alakanuk area, the probability of future fires is high.

The Alaska Fire Service

Figure 4. Historic wildland fires near Alakanuk, Alaska



Legend

Towns
- Municipality
- Home Rule City
- Other Towns

River Areas (Regional)

Rivers (Regional)
- Stream
- Braided Stream
- Intermittent Stream
- Canal
- Dam

Large Fire Perimeters Since 1950
- 1950-1959
- 1960-1969
- 1970-1979
- 1980-1989
- 1990-1999
- 2000 and after
- Unknown

Last Years Fire Origins

2006 All Fires
- Active Fire
- Out Fire

Last Years Fire Perimeters

2006 Fire Perimeters
- Active Fire
- Out Fire

N

Scale: 1:744,034

This map is a user generated static output from an Internet mapping site and is for general reference. Data layers that appear on this map are obtained from many sources. Some of this data is unique to AFS. This map is not to be used for navigation.

Notes: Alaska Fire Service Fire and Lightning Information (http://afsmaps.blm.gov/imf/imf.jsp?site=firehouse)

Map Created:
Oct 13, 2006 1:32:54 PM
Alaska Fire Service Web Site

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While conditions in Alakanuk are generally wet, the possibility of a dry season combined with high winds could lead to a catastrophic wildland fire event. Impacts to the community are considered catastrophic with the potential for multiple deaths, complete shutdown of facilities for 30 or more days, and more than 50% of property severely damaged. Alakanuk is considered a Level I Isolated village with no organized fire department or brigade, depending on Rural Basic Firefighter training within the volunteer fire department. The community has limited air and marine access to a larger hub community and would be required to rely on it's own resources for a significant period of time in the event of a wildland fire event.

The entire community, including all of it's residents and critical facilities are vulnerable to the effects of a wildland fire.

Data Limitations

The vulnerability estimates provided herein use the best data currently available, and the methodologies applied result in an approximation of risk. These estimates may be used to understand relative risk from hazards and potential losses. However, uncertainties are inherent in any loss estimation methodology, arising in part from incomplete scientific knowledge concerning hazards and their effects on the built environment, as well as approximations and simplifications that are necessary for a comprehensive analysis.

F. Vulnerability Analysis for Wildfires

This section serves to identify each hazard confronting the community and its vulnerabilities to that hazard.

a. Population

Approximately **100**% of the community's population is vulnerable.

b. Critical Facilities

(1) Approximately **100**% of the community's critical facilities is vulnerable.

(2) The specific critical facilities vulnerable are:

All of the residents, structures and critical facilities in Alakanuk are equally at risk to a wildland fire event.

c. Non-Critical Facilities

(1) Approximately **100**% of the community's non-critical facilities is vulnerable.

(2) The specific non-critical facilities vulnerable are:

All of the residents, structures and non-critical facilities in Alakanuk are equally at risk to a wildland fire event.

G. Hazard Economic Loss Estimation for Wildfires

This section describes the potential economic losses due to each hazard confronting the community.

a. Economic Loss

The economic loss resulting from this hazard is approximately **$83,543,060**.

b. Structure Loss

The loss from damage to structures from this hazard is approximately **$47,744,624**.

c. Following is the methodology for estimating losses

A conservative exposure-level analysis was conducted to assess the risks of a wildland fire hazard. This analysis is a simplified assessment of the potential effects of the hazard on values at risk, without consideration of probability or level of damage.

Replacement values, or insurance coverage, were developed for critical and residential facilities. These values were obtained from HAZUS-MH and the Alakanuk planning team. For each residential structure and critical facility located within the wildland fire hazard area, exposure was calculated by assuming the worst-case scenario (that is, the asset would be completely destroyed and would have to be replaced). Finally, the aggregate exposure, in terms of replacement value or insurance coverage, for each category of structure or facility was calculated. A similar analysis was used to evaluate the proportion of the population at risk. However, the analysis simply represents the number of people at risk; no estimate of the number of potential injuries or deaths was prepared.

H. Hazard Human Loss Estimation for Wildfires

As discussed above, human loss estimates (death and injuries) were not completed as part of this assessment, however the analysis does identify the number and percentage of the population at risk in Alakanuk.

a. Total Affected

The estimated total number of people affected by this hazard is approximately **678**.

b. Percentage of Population

The estimated total percentage of the community's population at risk associated with this hazard is approximately **100%**.

I. Vulnerability to Future Assets/Infrastructure for Wildfires

All of the future residents, structures and critical and non-critical facilities in Alakanuk are equally at risk to a wildland fire event.

4.3 Asset Inventory

4.3.1 Processes and Sources for Identifying Assets

The planning team identified both residential structures and critical facilities in the community using the 1998 Land Use and Erosion Plan as well as current population and value information. Each residential structure was identified by the household name, the number of occupants, value of the structure, and whether the structure was located within the 30-year Erosion Hazard Area. Critical facilities were identified by name, value of the facility, and whether the facility was located within the 30-year Erosion Hazard Area.

Data Limitations

At this time the values of the airport, fire station, fuel storage tanks, landfill, sewage lagoon, and United Utilities Telephone Critical Facilities are unknown. When this information becomes available it will be incorporated as part of the update to this plan.

4.3.2 Critical Facilities List

A critical facility is defined as a facility in either the public or private sector that provides essential products and services to the general public, such as preserving the quality of life in the community and fulfilling important public safety, emergency response, and disaster recovery functions. The critical facilities identified in Alakanuk include the following:

Table 9. Alakanuk Critical Facilities

Facility Name	Facility Type	Latitude	Longitude
Airport - 18/36	Airport	62.68089	-164.65754
Church - Alakanuk Catholic Church	Church	62.68746	-164.66708

Table 9. Alakanuk Critical Facilities

Facility Name	Facility Type	Latitude	Longitude
Church - Alakanuk Catholic Church Rectory	Church		
Church - Assembly of God Church	Church	62.69608	-164.677
Church - Assembly of God Parsonage	Church		
AVEC Connex Parts Storage	Community Storage Shed		
Corporation Garage	Community Storage Shed		
GRB (sp) Building	Community Storage Shed		
Warehouse 1	Community Storage Shed		
Warehouse 2	Community Storage Shed		
Warehouse 3	Community Storage Shed		
Fire Hall	Fire Station	62.68836	-164.66478
Fuel Storage 1	Fuel Storage Tanks (>500gal)	62.68474	-164.64995
Fuel Storage 2	Fuel Storage Tanks (>500gal)	62.687	-164.62006
Fuel Storage 3	Fuel Storage Tanks (>500gal)	62.69353	-164.67464
Fuel Storage 4	Fuel Storage Tanks (>500gal)		
LYSD Generator/Warehouse Building	Generator		
Health Clinic	Hospital/Clinic/ER	62.68372	-164.65307
Landfill Class III Municipal	Landfill/Incinerator	62.68284	-164.64346
Armory 1	National Guard	62.684	-164.65526
Armory 2	National Guard		
April Aistrone Trailer	Offices		
City Office	Offices	62.68787	-164.66524
John Strongheart Trailer	Offices		
Native Corp Office	Offices	62.6876	-164.62022
Tribal Building	Offices		
Police Dept	Police Station	62.68799	-164.66574
Post Office	Post Office	62.69106	-164.67008
AVEC Connex 1	Power Generation Facility	62.68559	-164.66265
AVEC Connex 2	Power Generation Facility		
AVEC Power Plant	Power Generation Facility	62.68579	-164.66285
Generator Room 4	Power Generation Facility		
Headstart School	School	62.68433	-164.65287
LYSD Grade School	School	62.68421	-164.6516
LYSD High School	School	62.68429	-164.65063
LYSD Ramone Classroom	School	62.68404	-164.65224
City Shop	Service/Maintenance Shop	62.68809	-164.66551
LYSD - Shop	Service/Maintenance Shop		
LYSD Mechanical Building	Service/Maintenance Shop		
LYSD Truck Garage	Service/Maintenance Shop		
Public Shop	Service/Maintenance Shop		
Sewage Lagoon	Sewage Lagoon	62.6847	-164.65104
Alakanuk City Lodge	Store		
Alakanuk Deli	Store		
Annex Store	Store		
Jorgenson Warehouse	Store		
Jorgensons Store	Store	62.69161	-164.67121
Native Corp Store	Store	62.68752	-164.61969
LYSD Teachers Quarters	Teachers Quarters	62.68451	-164.65183

Table 9. Alakanuk Critical Facilities			
Facility Name	**Facility Type**	**Latitude**	**Longitude**
LYSD Trailer 1	Teachers Quarters		
LYSD Trailer 2	Teachers Quarters		
LYSD Trailer 3	Teachers Quarters		
LYSD Trailer 4	Teachers Quarters		
LYSD Trailer 5	Teachers Quarters		
LYSD Trailer 6	Teachers Quarters		
LYSD Trailer 7	Teachers Quarters		
LYSD Trailer 8	Teachers Quarters		
LYSD Triplex Housing	Teachers Quarters	62.68473	-164.64903
United Utilities Telephone	Telephone	62.68548	-164.64868
Washeteria/Sauna	Washeteria	62.6847	-164.65104
Water Sewer Plant	Waste Water Treatment Facility		

4.3.3 Non-Critical Facilities:

Population and residential structures data were collected by the planning team during preparation of this plan. The total number of residential buildings located in Alakanuk is 138, with a median value of $72,000. The following list identifies each residential household and the population of the household for year 2006. Figure 3 shows the location of each household.

Table 10. Alakanuk Non-Critical Facilities			
Household Name	**# of Occupants**	**Household Name**	**# of Occupants**
Ms. Alice Hanson	7	Mr. and Mrs. Mathew Augline	12
Ms. Angela Smith	1	Mr. and Mrs. Charlie Sage	7
Mr. Charles Smith	2	Mrs Sophie Joseph	2
Ms. Theresa Cook	3	Mrs. Paul Tony	5
Mrs Martin James	8	Camille Omalley	1
Mr. Anthony Shelton	1	andres and Besa Bob	7
Mr. Marvin Paul (Rent)	3	Mrs. Charles Patrick	6
Mr. Ernest Hanson	3	Elmer Patrick	1
Mr. Allen Hanson	8	Ronald Stanislaus	1
Ms. Theresa Augustine	2	Mr. and Mrs. Willie Joseph	8
Mr. and Mrs. Martin Harry	7	Mr. and Mrs. Placicle Joseph	7
Mr. and Mrs. Aaron Kameroff	8	Mr. and Mrs. Marcel Isidorn	6
Mr. and Mrs. Jacob Murphy	4	Mr. and Mrs. Patrick Phillip	6
Mr. Regis Augline	4	Mr. and Mrs. Joe Joseph Sr.	3
Mr. and Mrs. Edward Post	7	Ms. Mary Williams	2
Mr. and Mrs. Curtis Augline	4	Ms Theresa Damian	2
Mr. David Stern	4	Mr. and Mrs. Ronnie Joseph	6
Mr. Mark Damien	1	Mrs. Bernard Stanislaus	5
Mr. Paul Ayanerak Jr.	4	Mr. Ronald Chikigak	2
Mr. and Mrs. Brian Williams	3	Mr. Steve Duncan	3
Mr. and Mrs. Paul Kassock	4	Mr. and Mrs. Joe Buster	5

Table 10. Alakanuk Non-Critical Facilities

Household Name	# of Occupants	Household Name	# of Occupants
Mr. and Mrs. Dale Alstrom	4	Mr. and Mrs. Max Agayar	9
Mr. and Mrs. Peter Black	6	Mary Jo Charlie	5
Mr. Austin Kakutak	1	Issac Chikigak	6
Mr. John Aloysius	1	Mr. and Mrs. Raymond Joseph	6
Mr. and Mrs. Morris Stanislaus	3	Mr. and Mrs. Thomas Chikigak	6
Mr. and Mrs. Patrick and Rena Black	4	Mr. Boniface Chikigak	1
Mr. and Mrs. Paul Ayunvak	7	Mr. and Mrs. Leon Joseph	6
Mr. and Mrs. John L. Chikigak	4	Mr. Joe Joseph Jr.	1
Mr. and Mrs. Josephine George	5	Mrs. Rose Rene	5
Mr. and Mrs. David Joe	7	Mr. and Mrs. Louie Chikigak	8
Mr. Christopher James	2	Mrs. Laura Patrick	8
Mr. Paul Stanislaus	0	Mr. and Mrs. James Isidore	4
Mr. Mike James	1	Unoccupied (Louis Chikigak)	0
Ms. Theresa Edmund	2	Mr. Richard Agayar	1
Ms. Justina Leopold	1	Mrs. Margaret Stanislaus	10
Mr. and Mrs. Ray Oney	4	Mr. and Mrs. Joe Agayar	2
Mr. Morris Patrick & Ms. Tracy Phillip	3	Mr. and Mrs. Jason Joe	6
Mr. and Mrs. Dennis Sheldon	5	Mrs. Barbara Joe	7
Mrs. Theresa George	2	Mr. and Mrs. Noah Tyson	4
Mr. Martin Augline	1	Mr. Louie Shelton	3
Mr. and Mrs. John Ayunerak	4	Mr. Joe Phillip	7
Mr. Joseph Ayunerak	2	Mr. and Mrs. Edward Phillip	4
Mr. James Ayernerak	5	Mr. Moses James	2
Mr. Fred Augustine	2	Ms. Martha Phillip	2
Mr. Gabriel Buster	2	Ms. Agnes Damie	2
VCP Unoccupied	0	Mr. and Mrs. Ben Phillip	8
Mrs. Sarah Buster	6	Mr. and Mrs. Clyde Edmund	5
Mr. and Mrs. Robert Stanislaus	4	Ms. Sophie Stanislaus and Mr. Albert Agathluk	6
Mr. and Mrs. John D. Ayunerak	6	Mr. David Augline	2
Mrs. Angela Afcan	3	Unoccupied	0
Mr. Zacheus Paul	5	Mr. and Mrs. Jonathan Damien	6
Mr. and Mrs. Joseph James	7	Mr. and Mrs. Cyprian Augline	8
Mr. and Mrs. John Kameroff	2	Mr. and Mrs James Leopold	5
Mrs. Sophie James	3	Ms. Agnes Xavier	5
Mr. Henry Phillip	3	Mr. Allen Edmund	5
VCP Unoccupied	0	Mr. Melvin Joseph	5
VCP Unoccupied	0	Ms. Martha Joseph	4
VCP Unoccupied	0	Mr. and Mrs. Vernon Chikigak	5
VCP Unoccupied	0	Mr. and Mrs. Paul James	7
Mrs. James Cook	7	Mr. and Mrs. Camille Augline	5
Mrs. Isidore James	7	Mr. and Mrs. John Kameroff Jr.	10
Mrs. Paul Phillip Jr.	8	Mr. and Mrs. Kevin Joseph	4
VCP Unoccupied	0	Mr. Joe Regis	1
VCP Unoccupied	0	Mr. and Mrs. Steven Kokrine	6
Ms. Christine Phillip	2	Mr. and Mrs. Mark Wilson	8
Mrs. Arthur Chikigak	5	Ms. Nellie Edmund	3
Mr. and Mrs. Greg Ayunerak Sr.	5	Mr. Joe Mathews	2
		(SP) Nie Stribling/ Sharlene Smith	3

4.3.4 Critical Facility Replacement Costs

The following table provides an estimated replacement value for residential and critical facilities in Alakanuk. Structure values were obtained during the asset data inventory during the summer and fall of 2006. Using HAZUS-MH, the estimated contents values were calculated after each structure was classified by occupancy class.

Table 11. Alakanuk Loss Estimates by Occupancy Class

Type of Structure (Occupancy Class)	# in Hazard Area	Estimated Value of Structure	Estimated Value of Contents	
			HAZUS Contents Value (%) by Occupancy Class	# in Hazard Area
Residential	**138**	$ 13,223,000.00	50%	$ 6,611,500.00
Commercial	**8**	$ 1,570,000.00	150%	$ 2,355,000.00
Industrial	**5**	$ 1,102,000.00	150%	$ 1,653,000.00
Religious/Non-Profit	**4**	$ 740,000.00	100%	$ 740,000.00
Government	**12**	$ 2,950,000.00	150%	$ 4,425,000.00
Education**	**18**	$ 14,144,624.00	150%	$ 21,216,936.00
Utilities	**5**	$ 14,015,000.00	NA	
Total	**190**	**$ 47,744,624.00**		**$ 37,001,436.00**

Notes: 1 - Estimated Value of Contents does not include values for Utilities category (not available in HAZUS-MH)

Finally, the functional value is calculated by adding the structure value to the contents value. Displace values were calculated where data was available, and represent the daily displacement value of a critical facility.

Table 12. Alakanuk Critical Facility Loss Estimates

Name	Functional	Displace	Structure	Content	Other
Airport					
Airport - 18/36	$0	$0	$0	$0	$0
Church					
Church - Alakanuk Catholic Church	$600,000	$0	$300,000	$300,000	$0
Church - Alakanuk Catholic Church Rectory	$120,000	$0	$120,000	$120,000	$0
Church - Assembly of God Church	$400,000	$0	$200,000	$200,000	$0
Church - Assembly of God Parsonage	$360,000	$0	$180,000	$180,000	$0
Community Storage Shed					
AVEC Connex Parts Storage	$5,000	$0	$5,000	$0	$0
Corporation Garage	$175,000	$0	$70,000	$105,000	$0
GRB (sp) Building	$200,000	$0	$80,000	$120,000	$0
Warehouse 1	$250,000	$0	$100,000	$150,000	$0
Warehouse 2	$250,000	$0	$100,000	$150,000	$0
Warehouse 3	$250,000	$0	$100,000	$150,000	$0
Fire Station					
Fire Hall	$0	$0	$0	$0	$0
Fuel Storage Tanks (>500gal)					
Fuel Storage 1	$0	$0	$0	$0	$0

Table 12. Alakanuk Critical Facility Loss Estimates

Name	Functional	Displace	Structure	Content	Other
Fuel Storage 2	$0	$0	$0	$0	$0
Fuel Storage 3	$0	$0	$0	$0	$0
Fuel Storage 4	$0	$0	$0	$0	$0
Generator					
LYSD Generator/Warehouse Building	$1,968,750	$0	$787,500	$1,181,250	$0
Hospital/Clinic/ER					
Health Clinic	$500,000	$0	$200,000	$300,000	$0
Landfill/Incinerator					
Landfill Class III Municipal	$0	$0	$0	$0	$0
National Guard					
Armory 1	$2,750,000	$0	$1,100,000	$1,650,000	$0
Armory 2	$1,750,000	$0	$700,000	$1,050,000	$0
Offices					
April Aistrone Trailer	$75,000	$0	$30,000	$45,000	$0
City Office	$200,000	$0	$80,000	$120,000	$0
John Strongheart Trailer	$75,000	$0	$30,000	$45,000	$0
Native Corp Office	$250,000	$0	$100,000	$150,000	$0
Tribal Building	$875,000	$0	$350,000	$525,000	$0
Police Station					
Police Dept	$300,000	$0	$120,000	$180,000	$0
Post Office					
Post Office	$212,500	$0	$85,000	$127,500	$0
Power Generation Facility					
AVEC Connex 1	$5,000	$0	$5,000	$0	$0
AVEC Connex 2	$5,000	$0	$5,000	$0	$0
AVEC Power Plant	$1,000,000	$0	$1,000,000	$0	$0
Generator Room 4	$2,000	$0	$2,000	$0	$0
School					
Headstart School	$500,000	$0	$200,000	$300,000	$0
LYSD Grade School	$6,750,000	$0	$2,700,000	$4,050,000	$0
LYSD High School	$17,352,750	$0	$6,941,100	$10,411,650	$0
LYSD Ramone Classroom	$778,060	$0	$311,224	$466,836	$0
Service/Maintenance Shop					
City Shop	$125,000	$0	$50,000	$75,000	$0
LYSD - Shop	$262,500	$0	$105,000	$157,500	$0
LYSD Mechanical Building	$280,000	$0	$112,000	$168,000	$0
LYSD Truck Garage	$913,500	$0	$365,400	$548,100	$0
Public Shop	$37,500	$0	$15,000	$22,500	$0
Sewage Lagoon					
Sewage Lagoon	$0	$0	$0	$0	$0
Store					
Alakanuk City Lodge	$137,500	$100	$55,000	$82,500	$0
Alakanuk Deli	$87,500	$150	$35,000	$52,500	$0
Annex Store	$625,000	$1,000	$250,000	$375,000	$0
Jorgenson Warehouse	$300,000	$0	$120,000	$180,000	$0
Jorgensons Store	$1,500,000	$3,000	$600,000	$900,000	$0
Native Corp Store	$1,125,000	$2,000	$450,000	$675,000	$0
Teachers Quarters					

Table 12. Alakanuk Critical Facility Loss Estimates

Name	Functional	Displace	Structure	Content	Other
LYSD Teachers Quarters	$684,000	$0	$153,600	$230,400	$0
LYSD Trailer 1	$524,000	$0	$209,600	$314,400	$0
LYSD Trailer 2	$524,000	$0	$209,600	$314,400	$0
LYSD Trailer 3	$524,000	$0	$209,600	$314,400	$0
LYSD Trailer 4	$556,000	$0	$222,400	$333,600	$0
LYSD Trailer 5	$556,000	$0	$222,400	$333,600	$0
LYSD Trailer 6	$556,000	$222,400	$333,600	$0	$0
LYSD Trailer 7	$556,000	$0	$222,400	$333,600	$0
LYSD Trailer 8	$556,000	$0	$222,400	$333,600	$0
LYSD Triplex Housing	$1,820,000	$0	$728,000	$1,092,000	$0
Telephone					
United Utilities Telephone	$0	$0	$0	$0	$0
Washeteria					
Washeteria/Sauna	$800,000	$0	$800,000	$0	$0
Waste Water Treatment Facility					
Water Sewer Plant	$13,000,000	$0	$13,000,000	$0	$0
Totals	$64,008,560	$228,650	$34,692,824	$28,913,336	$0

Table 13. Vulnerability Assessment – Population, Residential Structures, and Critical Facilities

		Residential Structures				Critical Facilities				Total		
Hazard	Population	Number	Structure Value	Contents Value	Total Value	Number	Structure Value	Contents Value	Value	Structure Value	Contents Value	Value
Earthquake	678	138	$ 13,223,000.00	$ 6,611,500.00	$ 19,834,500.00	61	$ 34,521,624.00	$ 29,186,936.00	$ 63,708,560.00	$ 47,744,624.00	$ 35,798,436.00	$ 83,543,060.00
Erosion	58	14	$ 760,000.00	$ 1,520,000.00	$ 2,280,000.00	1	$ 120,000.00	$ 180,000.00	$ 300,000.00	$ 880,000.00	$ 1,700,000.00	$ 2,580,000.00
Flooding	678	138	$ 13,223,000.00	$ 6,611,500.00	$ 19,834,500.00	61	$ 34,521,624.00	$ 29,186,936.00	$ 63,708,560.00	$ 47,744,624.00	$ 35,798,436.00	$ 83,543,060.00
Severe Winter Storm	678	138	$ 13,223,000.00	$ 6,611,500.00	$ 19,834,500.00	61	$ 34,521,624.00	$ 29,186,936.00	$ 63,708,560.00	$ 47,744,624.00	$ 35,798,436.00	$ 83,543,060.00
Wildfire	678	138	$ 13,223,000.00	$ 6,611,500.00	$ 19,834,500.00	61	$ 34,521,624.00	$ 29,186,936.00	$ 63,708,560.00	$ 47,744,624.00	$ 35,798,436.00	$ 83,543,060.00

4.3.5 Future Development

A. Analysis of Community Development Trends

Ownership of lands in the project area is generally divided between private individuals or businesses, the Calista Native Corporation, and government entities. Figure 1 shows land status by property number as derived through research conducted at the Bureau of Land Management (BLM). Private or public property transfers subsequent to the original transfer from the federal government may not necessarily be recorded with the BLM, and would not have been discovered in our research.

B. Growth Areas

Alakanuk is situated along the banks of Alakanuk Pass, from its confluence with the Yukon River and westward approximately 2.5 miles. The majority of the housing units and commercial and industrial properties are located on the southern bank of the Pass, although several residential houses, a store, and the closed cannery are located on the northern bank. Most of the developed areas are north of Anderson Road.

Assuming the average growth trend over the past twenty years continues, the population of Alakanuk should continue to grow at a modest rate of approximately 3% annually. According to the 2006 asset data inventory by the Alakanuk planning team, there were 138 residential housing units. Several homes have been moved or are in danger of being destroyed because of

erosion problems caused by Alakanuk Pass. The Department of Housing and Urban Development constructed 21 new housing units on the south side of Anderson Road during the summer of 1993.

The area surrounding Alakanuk is designated as the Yukon Delta National Wildlife refuge, and is primarily wetlands. There are no adequate sources of construction borrow materials nearby, and any new road construction would probably require importing borrow material from upriver at a significant expense. Many of the areas along the existing roads are not currently developed. Because of the expense of constructing new roads, it is expected that any new housing development would be placed along existing roads.

Section 5 Mitigation Strategy

5.1 Mitigation Goals, Objectives, and Projects

Based on the hazards, and the assets at risk from those hazards, goals, objectives, and projects were developed as the foundation of the mitigation strategy. Mitigation goals are defined as general guidelines that explain what a community wants to achieve in terms of hazard and loss prevention. Goal statements are typically long-range, policy-oriented statements representing community-wide visions. The planning team developed 10 goals and associated objectives to reduce or avoid long-term vulnerabilities to the identified hazards.

Table 14. Alakanuk Mitigation Goals, Objectives, and Projects

Goal Number	Goal	Objective
1	Reduce possibility of damage and losses from erosion	Identify buildings that are at risk of impact from erosion
		Work with agencies, Native corporations, and organizations to identify new and emerging riverbank protection methods and grants (or other type of funding mechanism) that are available for these strategies
2	Promote erosion prevention education	Research information regarding riverbank erosion problems, prevention, and mitigation
3	Reduce the possibility of damage and losses from flooding	Adopt and enforce floodplain management ordinances
		Identify and assess repetitively flooded properties
		Enhance warning and response activities to increase warning time for the community
4	Promote recognition of wildland fire and preparation for impacts from wildland fire	Identify impacts that can result from excessive wildland fire smoke and the ways to guard yourself against those impacts
5	Reduce possibility of damage and losses from wildland fires	Identify methods of alerting the community if wildfire threat develops
		Develop an evacuation plan for the community
		Maintain Project Code Red Equipment
		Promote FireWise building design, siting, and materials for construction
		Support training for volunteers on the on fire department
		Identify funding sources for training
6	Reduce vulnerability of structures to earthquake damage	Encourage use of earthquake resistant materials and construction practices
		Ensure that all future development meets all requirements for seismic protection
7	Promote public education regarding earthquake hazards	Educate community about what do to in the event of an earthquake
		Educate community about ways to mitigate damages (structural {buildings/fuel tanks} & non structural {book cases & filing cabinets})
8	Promote public access to severe weather emergency advisory information	Provide access to a current weather watch and advisory information
		Investigate emergency broadcast capabilities in western Alaska
		Investigate opportunities to participate in National Warning System to receive weather warning information from the National Weather Service
		Obtain more accurate flood warning information
9	Promote public education regarding severe winter storm hazards	Participate in winter weather awareness week and flood awareness week
		Conduct community alert tests for NOAA warning tones
10	Reduce vulnerability of structures to severe winter storm damage	Encourage use of weather resistant materials and construction practices

In addition to developing goals, the planning team created a list of potential mitigation actions. Mitigation actions are activities, measures, or projects that help achieve the goals and objectives of a mitigation plan. Mitigation actions are usually grouped into six broad categories: prevention, property protection, public education and awareness, natural resource protection, emergency services and structural projects.

The planning team reviewed their local capabilities and risk assessment as a basis for developing potential mitigation actions.

The following identifies Alakanuk's hazard mitigation goals, objectives, and related potential actions. The planning team has identified a range of cost-effective, environmentally sound, and technically feasible mitigation actions to achieve each goal.

Table 15. Potential Mitigation Actions

Hazard	Goal	Objective	Action/Project	Potential Funding Source	Duration (long/short)	Rank	Potential Participants
Erosion	Reduce possibility of damage and losses from erosion	Identify buildings that are at risk of impact from erosion	1 - Update Erosion hazard mapping	PDM, HMGP Grants Program	Short-term		City Council
			2 - Relocate buildings that are at risk of being affected by erosion	PDM, HMGP, Department of Homeland Security Preparedness Technical Assistance Program	Short-term		
		Work with agencies, Native corporations, and organizations to identify new and emerging riverbank protection methods and grants (or other type of funding mechanism) that are available for these strategies	3 - Apply for grants/funds to implement riverbank protection methods	PDM and HMGP grants	Long-term		City Council, Alakanuk Native Corporation, Village of Alakanuk
	Promote erosion prevention education	Research information regarding riverbank erosion problems, prevention, and mitigation	4 - Hold a series of community meetings to provide information to residents	PDM, Lindbergh Grants Program	Short-term		City Council, Alakanuk Native Corporation, Village of Alakanuk
			5 - Provide information on riverbank erosion and ways to halt and prevent it in a format that can be distributed to all residents	PDM, Lindbergh Grants Program	Short-term		City Council, LYSD

Table 15. Potential Mitigation Actions

Flooding	Reduce the possibility of damage and losses from flooding	Adopt and enforce floodplain management ordinances	1 - Join the National Flood Insurance Program, which regulates development in floodplains and provides federally-backed insurance to individuals who live in communities that have joined the program	None needed	Short-term		City Council
		Identify and assess repetitively flooded properties	3 - Relocate, acquire, elevate, or otherwise flood-proof identified properties	PDM, HMGP, FMA, Lindbergh Grants Program	Short-term		City Council
			2 - Relocate, acquire, elevate, or otherwise flood-proof critical facilities	PDM, HMGP, FMA, Lindbergh Grants Program	Short-term		
			4 - Complete a detailed inventory of community structures and infrastructure, including all critical facilities that are susceptible to flooding in GIS	PDM, HMGP Grants Program	Short-term		
		Enhance warning and response activities to increase warning time for the community	5 - Install new streamflow and rainfall measuring gauges	PDM, HMGP Grants Program	Short-term		City Council, State of Alaska, USGS

Table 15. Potential Mitigation Actions

Hazard	Goal	Objective	Action/Project	Potential Funding Source	Duration (long/short)	Rank	Potential Participants
Flooding (continued)	See above	See above	6 - Develop "real-time" internet access and interagency cooperation to speed flood warning times	PDM, HMGP Grants Program	Long-term		See above
Wildfire	Promote recognition of wildland fire and preparation for impacts from wildland fire	Identify impacts that can result from excessive wildland fire smoke and the ways to guard yourself against those impacts	1 - Provide information in a format that can be distributed to residents	PDM, Lindbergh Grants Program, HMGP, AFG Program's Fire Prevention and Safety Grant	Short-term		LYSD
	Reduce possibility of damage and losses from wildland fires	Identify methods of alerting the community if wildfire threat develops	2 - Schedule and perform "fire drills" at least twice per year	PDM, Lindbergh Grants Program, HMGP, AFG Program's Fire Prevention and Safety Grant	Long-term		City Council, Alakanuk Native Corporation, Village of Alakanuk, State Fire Marshall
		Develop an evacuation plan for the community			Long-term		
		Maintain Project Code Red Equipment			Long-term		
		Promote FireWise building design, siting, and materials for construction	3 - Develop a workshop for builders	PDM, Lindbergh Grants Program, HMGP, AFG Program's Fire Prevention and Safety Grant	Long-term		City Council
			4 - Retrofit structures with FireWise building design materials	PDM, Lindbergh Grants Program, HMGP, AFG Program's Fire Prevention and Safety Grant	Long-term		

Table 15. Potential Mitigation Actions

Hazard	Goal	Objective	Action/Project	Potential Funding Source	Duration (long/short)	Rank	Potential Participants
Wildfire (continued)	See above	Support training for volunteers on the on fire department	5 - Send at least two volunteer fire department members to the Code Red equipment training, rural basic firefighter certification, or basic incident command system knowledge	PDM, Lindbergh Grants Program, HMGP, AFG Program's Fire Prevention and Safety Grant	Long-term		Alakanuk Native Corporation, Village of Alakanuk, State Fire Marshall
		Identify funding sources for training			Short-term		
Earthquake	Reduce vulnerability of structures to earthquake damage	Encourage use of earthquake resistant materials and construction practices	1 - Implement Uniform International and State Building Codes	PDM, Lindbergh Grants Program	Short-term		City Council
		Ensure that all future development meets all requirements for seismic protection	2 - Inspect or have certified all new construction	PDM, Lindbergh Grants Program	Long-term		City Council
	Promote public education regarding earthquake hazards	Educate community about what do to in the event of an earthquake	3 - Train earthquake safety and hold drills at schools	PDM, Lindbergh Grants Program	Short-term		City Council, LYSD

Table 15. Potential Mitigation Actions

Hazard	Goal	Objective	Action/Project	Potential Funding Source	Duration (long/short)	Rank	Potential Participants
Earthquake (continued)	See above	Educate community about ways to mitigate damages (structural {buildings/fuel tanks} & non structural {book cases & filing cabinets})	4 - Hold workshop to identify household mitigation measures	PDM, Lindbergh Grants Program	Short-term		City Council
Severe Winter Storm	Promote public access to severe weather emergency advisory information	Provide access to a current weather watch and advisory information	1 - Purchase NOAA radios and develop web portal (NWS, FEMA, The Weather Channel)	PDM, Lindbergh Grants Program	Short-term		City Council, Alakanuk Native Corporation, Village of Alakanuk
		Investigate emergency broadcast capabilities in western Alaska	2 - Contact NOAA and request NWS station installation in Alakanuk (or similar western Alaska community to provide coverage between Bethel and Nome)	PDM, Lindbergh Grants Program	Long-term		City Council, Alakanuk Native Corporation, Village of Alakanuk
		Investigate opportunities to participate in National Warning System to receive weather warning information from the National Weather Service	3 - Send at least two volunteers to NWS storm spotter training	PDM, Lindbergh Grants Program	Short-term		City Council
		Obtain more accurate flood warning information	4 - Install new streamflow and rainfall measuring gauges	HMGP, PDM Grants	Long-term		City Council
	Promote public education regarding severe winter storm hazards	Participate in winter weather awareness week and flood awareness week	5 - Develop workshop at school and have students display mitigation projects	PDM, Lindbergh Grants Program	Short-term		City Council, LYSD
		Conduct community alert tests for NOAA warning tones	6 - Contact NOAA, City Police and Fire Departments, and Volunteer Fire Department and to coordinate test	PDM, Lindbergh Grants Program	Short-term		City Council, Alakanuk Native Corporation, Village of Alakanuk, NOAA
	Reduce vulnerability of structures to severe winter storm damage	Encourage use of weather resistant materials and construction practices	7 - Implement Uniform International and State Building Codes	PDM, Lindbergh Grants Program	Short-term		City Council

5.2 Evaluation and Prioritization of Mitigation Actions

The planning team evaluated and ranked each of the mitigation actions to determine which actions would best help the community of Alakanuk fulfill its mitigation goals, thereby reducing or avoiding long-term vulnerabilities to the identified hazards. To complete this task, the planning team members reviewed the Capability Assessment and applied simplified Social, Technical, Administrative, Political, Legal, Economic and Environmental (STAPLE+E) evaluation criteria (shown below) to consider the opportunities and constraints of implementing a particular mitigation action. A detailed cost benefit analysis has not been completed for those projects selected for implementation by the City. However, cost-benefit was discussed during prioritization in a public forum for all mitigation actions and is summarized in Table 18 for those mitigation actions considered the highest priority by the community.

Table 16. Evaluation Criteria for Mitigation Actions

Evaluation Category	Discussion "It is important to consider…"	Considerations
Social	The public support for the overall mitigation strategy and specific mitigation actions.	Community acceptance Adversely affects segment of population
Technical	If the mitigation action is technically feasible and if it is the whole or partial solution.	Technical feasibility Long-term solutions Secondary impacts
Administrative	If the City of Alakanuk has the personnel and administrative capabilities necessary to implement the action or whether outside help will be necessary.	Staffing Funding allocation Maintenance / operations
Political	What the community feels about issues related to the environment, economic development, safety and emergency management.	Political support Local champion Public support
Legal	Whether the City of Alakanuk has the legal authority to implement the action, or whether they must pass new laws and regulations.	Local authority Federal authority Potential legal challenge
Economic	If the action can be funded with current or future internal and external sources of funding, if the costs seem reasonable for the size of the project, and if enough information is available to complete a FEMA Benefit-Cost Analysis (See Attachment B).	Benefit of action Cost of action Contributes to other economic goals Outside funding required FEMA Benefit-Cost Analysis
Environmental	The impact on the environment because of public desire for sustainable and environmentally healthy communities.	Effect on land/water Effect on Endangered Species Effect on culturally sensitive areas Consistent with community environmental goals Consistent with Local & Federal laws

The results of this evaluation and ranking process of a "positive" or "neutral" ranking are shown below.

Table 17. Mitigation Action Ranking Scores

Goals		Number	Rank	Action/Project
1	Reduce possibility of damage and losses from erosion	1.1	N	1 - Update Erosion hazard mapping
		1.2	P	2 - Relocate buildings that are at risk of being affected by erosion
		1.3	P	3 - Apply for grants/funds to implement riverbank protection methods
2	Promote erosion prevention education	2.4	N	4 - Hold a series of community meetings to provide information to residents
		2.5	N	5 - Provide information on riverbank erosion and ways to halt and prevent it in a format that can be distributed to all residents
3	Reduce the possibility of damage and losses from flooding	3.1	N	1 - Join the National Flood Insurance Program, which regulates development in floodplains and provides federally-backed insurance to individuals who live in communities that have joined the program
		3.3	P	3 - Relocate, acquire, elevate, or otherwise flood-proof identified properties
		3.2	P	2 - Relocate, acquire, elevate, or otherwise flood-proof critical facilities
		3.4	N	4 - Complete a detailed inventory of community structures and infrastructure, including all critical facilities that are susceptible to flooding in GIS
		3.5	N	5 - Install new streamflow and rainfall measuring gauges
		3.6	N	6 - Develop "real-time" internet access and interagency cooperation to speed flood warning times
4	Promote recognition of wildland fire and preparation for impacts from wildland fire	4.1	N	1 - Provide information in a format that can be distributed to residents
5	Reduce possibility of damage and losses from wildland fires	5.2	N	2 - Schedule and perform "fire drills" at least twice per year
		5.3	N	3 - Develop a workshop for builders
		5.4	N	4 - Retrofit structures with FireWise building design materials
		5.5	N	5 - Send at least two volunteer fire department members to the Code Red equipment training, rural basic firefighter certification, or basic incident command system knowledge
6	Reduce vulnerability of structures to earthquake damage	6.1	N	1 - Implement Uniform International and State Building Codes
		6.2	N	2 - Inspect or have certified all new construction
7	Promote public education regarding earthquake hazards	7.3	N	3 - Train earthquake safety and hold drills at schools
		7.4	N	4 - Hold workshop to identify household mitigation measures
8	Promote public access to severe weather emergency advisory information	8.1	N	1 - Purchase NOAA radios and develop web portal (NWS, FEMA, The Weather Channel)
		8.2	N	2 - Contact NOAA and request NWS station installation in Alakanuk (or similar western Alaska community to provide coverage between Bethel and Nome)
		8.3	N	3 - Send at least two volunteers to NWS storm spotter training
		8.4	N	4 - Install new streamflow and rainfall measuring gauges
9	Promote public education regarding severe winter storm hazards	9.5	N	5 - Develop workshop at school and have students display mitigation projects
		9.6	N	6 - Contact NOAA, City Police and Fire Departments, and Volunteer Fire Department and to coordinate test
10	Reduce vulnerability of structures to severe winter storm damage	10.7	N	7 - Implement Uniform International and State Building Codes

5.3 Implementation Strategy and Analysis of Mitigation Projects

Once mitigation actions were ranked, members of the planning team and Alakanuk City Council reviewed the entire list, and voted on one mitigation action to be included in the mitigation action plan. The outcome of this voting process yielded 2 mitigation actions. The ranking, how each mitigation action will be implemented and administered (including which departments or agencies will be responsible for implementation), existing and potential funding sources, overall cost benefits and time frame are outlined below.

Table 18. Mitigation Action Plan

1.2	Action Item	Relocate buildings that are at risk of being affected by erosion
	Ranking	Positive
	Department / Agency	City Council
	Potential Funding Source	Department of Homeland Security Preparedness Technical Assistance Program, PDM grants
	Implementation Timeline	1-3 years
	Benefit-Costs	This mitigation action addresses high risk situations – it is imperative that at risk buildings (both residences and critical facilities) can function during and after a disaster.
1.3	Action Item	Apply for grants/funds to implement riverbank protection methods
	Ranking	Positive
	Department / Agency	City Council, Alakanuk Native Corporation, Village of Alakanuk
	Potential Funding Source	Department of Homeland Security Preparedness Technical Assistance Program, HMGP, and PDM grants
	Implementation Timeline	1–2 years
	Benefit-Costs	This mitigation action is low cost, but has the potential to prevent, curb, and mitigate future development in hazard prone areas.

5.4 Alakanuk Capability Assessment

Storm Water Management Ordinances: **No**

Stream Maintenance Ordinances: **No**

Zoning Management Ordinances: **No**

Subdivision Management Ordinances: **No**

Erosion Management Ordinances: **No**

Floodplain Management Ordinances: **No**

Fire Insurance Rating:

Floodplain Management Plan Published Date:

Floodplain Management Last Delineation Date:

Elevation Certificates Maintained: **No**

National Flood Insurance Program Community: **No**

National Flood Insurance Program Join Date:

National Flood Insurance Program Number:

National Flood Insurance Program Rating:

National Flood Insurance Program Rating Date:

Flood Insurance Claims:

Land Use Plan: **Yes**

Land Use Plan Last Update: **6/10/1998**

Community Zoned: **No**

Zoned Date:

Established Building Codes: **No**

Building Codes Last Updated:

Type of Building Codes:

Local Electric Utilities: **AVEC**

Local Water Utilities: **City of Alakanuk**

Local Sewage Treatment Utilities: **City of Alakanuk**

Local Natural Gas Utilities: **n/a**

Local Telephone Utilities: **United Utilities, Inc.**

Section 6 Plan Maintenance

6.1 Monitoring, Evaluating and Updating the Plan

Plan Last Updated On:

The Alakanuk Hazard Mitigation Plan was prepared as a collaborative effort among the planning team. To maintain momentum and build upon this hazard mitigation planning effort, the City of Alakanuk will use the planning team to monitor, evaluate and update the plan. In addition to the original members of the planning team, other interested parties can participate in this process. Allen Hansen (Planning Team Leader) will serve as the primary point of contact and will coordinate all local efforts to monitor, evaluate and revise the plan.

Following the first, second, third, and fourth year of adoption, the planning team will conduct an annual review to monitor progress in implementing the plan, particularly the Mitigation Action Plan. As shown on the attached annual review form (Attachment C), the annual review will provide the basis for possible changes in the Mitigation Action Plan, by refocusing on new or more threatening hazards, adjusting to changes to or increases in resource allocations, and engaging additional support for the plan implementation. The planning team leader will initiate an annual review by questionnaire 1 month prior to the next date of consideration of adoption.

The planning team leader will collect the questionnaire and summarize the results into an annual report. This report will be distributed to all planning team members, City Council members and other interested agencies, departments and persons.

Six months prior to the fifth year of adoption, the planning team will undertake the following activities to evaluate the plan and ensure that the plan is readopted in the fifth year.

- Thoroughly analyze and update the risk of natural hazards.
- Review the previous annual reviews, including the mitigation activities progress reports.
- Provide a detailed review and revision of the Mitigation Strategy.
- Prepare a new Mitigation Action Plan with prioritized actions, responsible parties and resources.
- Prepare a new draft hazard mitigation plan and submit it to the City Council for adoption.
- Submit an updated hazard mitigation plan to DHS&EM and FEMA for approval.

Each department and agency identified as the responsible party for a mitigation project, will specifically be responsible for monitoring mitigation project implementation and closeout. If more than one department and/or agency is identified for a mitigation

project, a single department or agency will be chosen to monitor the mitigation project implementation and closeout. The status of the project implementation and closeout will be included with each annual review. In addition, each of these agencies and/or departments will be required to submit a closeout report at the conclusion of any mitigation project.

6.2 Implementation through Existing Programs

The regulatory documents that allow the City of Alakanuk to function as a community are also those that will ensure a successful outcome due to a natural hazard event. The following procedures describe how this Hazard Mitigation Plan will be implemented through existing programs.

Within two years of adoption of the Plan, the City of Alakanuk will incorporate into existing planning mechanisms any local policies recommended by the Local Hazard Mitigation Planning Team. The City of Alakanuk utilizes land use planning, development standards, building codes, and other regulatory mechanisms to control development in the community. Since the City has control over these various tools, they have the opportunity to enhance them as necessary to address hazard mitigation requirements. As a good neighbor, they will also ensure that by altering any of these standards, they do not negatively affect neighboring communities by collaborating with them regarding similar regulatory documents.

After adoption, the City Hazard Mitigation Planning team leader will coordinate with the current City Planner to ensure that they are aware of the hazards that are affected by the planning and development decisions they may make and implement. The Planning team leader will work with local staff to inform them of the Plan's hazard mitigation strategies. They will assist in identifying areas where incorporation of those strategies into new planning mechanisms is applicable. The City will conduct reviews at least every 5 years of planning documents, development guidelines, and land use policies. The Planning team leaders will use these reviews to ensure that this Plan's Mitigation Action Plan complies with any updates or amendments made to the City's regulatory documents.

6.3 Continued Public Involvement

Description of opportunities and mechanisms for on-going public involvement

Progress review on achievement of goals and implementation of activities and projects of the Mitigation Strategy will also be accomplished during the annual review process. During each annual review, the department and/or agency currently administering a mitigation project will submit a progress report to the planning team. The report will include the current status of the mitigation project, including any changes made to the project, the identification of implementation problems and appropriate strategies to overcome them, and whether or not the project has helped to achieve the appropriate

goals identified in the plan. Finally, the planning team will review each progress report, as well as other relevant local, State and Federal mitigation activities, to determine if progress has been made toward achieving each goal identified in the Mitigation Strategy. A summary of the status of all mitigation projects will be presented to all interested parties and project stakeholders identified on the project mailing list during an annual hazard mitigation plan update public meeting.

- end of Mitigation Plan -

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Attachment A

Project Mailing List

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Attachment B

FEMA Benefit-Cost Analysis Fact Sheet

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Benefit-Cost Analysis Fact Sheet

Hazard mitigation projects are specifically aimed at reducing or eliminating future damages. Although hazard mitigation projects may sometimes be implemented in conjunction with the repair of damages from a declared disaster, the focus of hazard mitigation projects is on strengthening, elevating, relocating or otherwise improving buildings, infrastructure or other facilities to enhance their ability to withstand the damaging impacts of future disasters. In some cases, hazard mitigation projects may also include training or public-education programs if such programs can be demonstrated to reduce future expected damages.

A Benefit Cost-Analysis (BCA) provides an estimate of the "benefits" and "costs" of a proposed hazard mitigation project. The benefits considered are avoided future damages and losses which are expected to accrue as a result of the mitigation project. In other words, benefits are the reduction in expected future damages and losses (i.e., the difference in expected future damages before and after the mitigation project). The costs considered are those necessary to implement the specific mitigation project under evaluation. Costs are generally well determined for specific projects for which engineering design studies have been completed. Benefits, however, must be estimated probabilistically because they depend on the improved performance of the building or facility in future hazard events, the timing and severity of which must be estimated probabilistically.

All Benefit-Costs must be:

- Credible and well documented
- Prepared in accordance with accepted BCA practices
- Cost-effective (BCR $\geq$ 1.0)

General Data Requirements:

- All data entries (other than FEMA standard or default values) MUST be documented in the application
- Data MUST be from a credible source
- Provide complete copies of reports and engineering analyses
- Detailed cost estimate
- Identify the hazard (flood, wind, seismic, etc.)
- Discuss how the proposed measure will mitigate against future damages
- Document the Project Useful Life
- Document the proposed Level of Protection
- The Very Limited Data (VLD) BCA module <u>cannot</u> be used to support cost-effectiveness (screening purposes only)
- Alternative BCA software MUST be approved in writing by FEMA HQ and the Region <u>prior</u> to submittal of the application

Damage and Benefit Data

- Well documented for each damage event
- Include estimated frequency and method of determination per damage event
- Data used in place of FEMA standard or default values MUST be documented <u>and</u> justified
- The Level of Protection MUST be documented and readily apparent

- When using the Limited Data (LD) BCA module, users cannot extrapolate data for higher frequency events for unknown lower frequency events

Building Data

- Should include FEMA Elevation Certificates for elevation projects or projects using First Floor Elevations (FFEs)
- Include data for building type (tax records or photos)
- Contents claims that exceed 30% of building replacement value (BRV) MUST be fully documented
- Method for determining BRVs MUST be documented. BRVs based on tax records MUST include the multiplier from the County Tax Assessor
- Identify the amount of damage that will result in demolition of the structure (FEMA standard is 50% of pre-damage structure value)
- Include the site location (i.e., miles inland) for the Hurricane module

Use correct occupancy data:

- *Design occupancy* for Hurricane shelter portion of Tornado module
- *Average occupancy per hour* for the Tornado shelter portion of the Tornado module
- *Average occupancy* for Seismic modules

Questions to Be Answered

- Has the level of risk been identified?
- Are all hazards identified?
- Is the BCA fully documented and accompanied by technical support data?
- Will there be residual risk after the mitigation project is implemented?

Common Shortcomings

- Incomplete documentation
- Inconsistencies between data in the application, BCA module runs, and the technical support data
- Lack of technical support data
- Lack of a detailed cost estimate
- Use of discount rate other than FEMA required amount of 7%
- Overriding FEMA default values without providing documentation and justification
- Lack of information on building type, size, number of stories and value
- Lack of documentation and credibility for first floor elevations (FFEs)
- Use of incorrect Project Useful Life (not every mitigation measure = 100 years)

Attachment C

Plan Maintenance Documents (Annual Review Form)

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Mitigation Action Progress Report

Progress Report Period:_____ to_____
(date) (date)

Project Title: _____ Project ID# _____

Responsible Agency: _____

Address: _____

City: _____

Contact Person: _____ Title: _____

Phone #(s): _____ email address: _____

List Supporting Agencies and Contacts:

_____

_____

Total Project Cost: _____

Anticipated Cost Overrun/Underrun: _____

Date of Project Approval: _____ Start date of the project: _____

Anticipated completion date: _____

Description of the Project (include a description of each phase, if applicable, and the time frame for completing each phase): _____

_____

_____

_____

Milestones	Complete	Projected Date of Completion

Plan Goal (s) Addressed:

Goal: _____

Indicator of Success: _____

_____

_____

_____

Project Status

☐ Project on schedule

☐ Project completed

☐ Project delayed*

*explain: _____

_____

☐ Project canceled

Project Cost Status

☐ Cost unchanged

☐ Cost overrun*

*explain: _____

_____

☐ Cost underrun*

*explain: _____

_____

Summary of progress on project for this report:

A. What was accomplished during this reporting period?

_____

_____

_____

B. What obstacles, problems, or delays did you encounter, if any?

_____

_____

_____

_____

C. How was each problem resolved?

_____

_____

_____

_____

Next Steps: What is/are the next step(s) to be accomplished over the next reporting period?

Other Comments:

Annual Review Questionnaire

PLAN SECTION	QUESTIONS	YES	NO	COMMENTS
PLANNING PROCESS	Are there internal or external organizations and agencies that have been invaluable to the planning process or to mitigation action project implementation that should be represented on the Steering Committee?			
	Are there procedures (e.g., meeting announcements, plan updates) that can be done more efficiently?			
	Has the Steering Committee undertaken any public outreach activities regarding the HMP or implementation of mitigation actions?			
RISK ASSESSMENT	Has a natural and/or human-caused disaster occurred in this reporting period?			
	Are there natural and/or human-caused hazards that have not been addressed in this HMP and should be?			
	Are additional maps or new hazard studies available? If so, what have they revealed?			
	Has the critical facilities list changed?			
	Have there been changes in development patterns that could influence the effects of hazards or create additional risks?			
MITIGATION STRATEGY	Are there different or additional resources (financial, technical, and human) that are now available for mitigation planning?			
	Are the goals still applicable?			
	Should new mitigation actions be added to the Action Plan?			
	Do existing mitigation actions need to be reprioritized?			
	Are the mitigation actions appropriate for available resources?			

Attachment D

Final FEMA Crosswalk

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Local Mitigation Plan Review and Approval Status

Jurisdiction: City of Alakanuk	**Title of Plan:** City of Alakanuk Hazard Mitigation Plan	**Date of Plan:** N/A
Local Point of Contact: Paul Joe	**Address:** P.O. Box 167 Alakanuk, AK 99554	
Title: Grants Administrator		
Agency: City of Alakanuk		
Phone Number: (907) 238-3313	**E-Mail:** cityauk@unicon-alaska.com	

State Reviewer: Erv Petty	**Title:** Mitigation Planner	**Date:** N/A

FEMA Reviewer: Kristen Meyers	**Title:** Mitigation Planning Manager	**Date:** August 24, 2007
Date Received in FEMA Region X	August 15, 2007	
Plan Not Approved		
Plan Approved	**X**	
Date Approved	**October 11, 2007**	

Jurisdiction:	**NFIP Status***			
	Y	**N**	**N/A**	**CRS Class**
1. City of Alakanuk			X	

*** Notes:** **Y = Participating** **N = Not Participating** **N/A = Not Mapped**

LOCAL MITIGATION PLAN REVIEW SUMMARY

The plan cannot be approved if the plan has not been formally adopted.

Each requirement includes separate elements. All elements of the requirement must be rated "Satisfactory" in order for the requirement to be fulfilled and receive a score of "Satisfactory." Elements of each requirement are listed on the following pages of the Plan Review Crosswalk. A "Needs Improvement" score on elements shaded in gray (recommended but not required) will not preclude the plan from passing. Reviewer's comments must be provided for requirements receiving a **"Needs Improvement"** score.

SCORING SYSTEM

Please check one of the following for each requirement.

N – Needs Improvement: The plan does not meet the minimum for the requirement. Reviewer's comments must be provided.
S – Satisfactory: The plan meets the minimum for the requirement. Reviewer's comments are encouraged, but not required.

Prerequisite(s) (Check Applicable Box)	STAFFORD		FMA	
	NOT MET	MET	NOT MET	MET
Adoption by the Local Governing Body: §201.6(c)(5) and §78.5(f)		X		
OR				
Multi-Jurisdictional Plan Adoption: §201.6(c)(5) and and §78.5(f) **AND**		N/A		
Multi-Jurisdictional Planning Participation: §201.6(a)(3) and and §78.5(a)		N/A		

Planning Process	N	S	N	S
Documentation of the Planning Process: §201.6(b) and §201.6(c)(1) and §78.5(a)		X		

Risk Assessment	N	S	N	S
Identifying Hazards: §201.6(c)(2)(i) and §78.5(b)		X		
Profiling Hazards: §201.6(c)(2)(i) and §78.5(b)		X		
Assessing Vulnerability: Overview: §201.6(c)(2)(ii) and §78.5(b)		X		
Assessing Vulnerability: Identifying Structures: §201.6(c)(2)(ii)(A) and §78.5(b)		N/A		
Assessing Vulnerability: Estimating Potential Losses: §201.6(c)(2)(ii)(B)		X		
Assessing Vulnerability: Analyzing Development Trends: §201.6(c)(2)(ii)(C)		X		
Multi-Jurisdictional Risk Assessment: §201.6(c)(2)(iii) and FEMA 299		N/A		

Mitigation Strategy	STAFFORD		FMA	
	N	S	N	S
Local Hazard Mitigation Goals: §201.6(c)(3)(i) and §78.5(c)		X		
Identification and Analysis of Mitigation Actions: §201.6(c)(3)(ii) and §78.5(d)		X		
Implementation of Mitigation Actions: §201.6(c)(3)(iii) and §78.5(d) and (e)		X		
Multi-Jurisdictional Mitigation Actions: §201.6(c)(3)(iv) and FEMA 299		N/A		

Plan Maintenance Process	STAFFORD		FMA	
	N	S	N	S
Monitoring, Evaluating, and Updating the Plan: §201.6(c)(4)(i) and §78.5(e)		X		
Incorporation into Existing Planning Mechanisms: §201.6(c)(4)(ii)		X		
Continued Public Involvement: §201.6(c)(4)(iii)		X		

Additional State Requirements*	STAFFORD		FMA	
	N	S	N	S
Insert State Requirement		N/A		
Insert State Requirement		N/A		
Insert State Requirement		N/A		

LOCAL MITIGATION PLAN APPROVAL STATUS	STAFFORD	FMA
PLAN NOT APPROVED		
PLAN APPROVED	X	

*States that have additional requirements can add them in the appropriate sections of the *Multi-Hazard Mitigation Planning Guidance* or create a new section and modify this Plan Review Crosswalk to record the score for those requirements.

See Reviewer's Comments

PREREQUISITE(S)

Adoption by the Local Governing Body

- **Multihazard Requirement §201.6(c)(5):** *[The local hazard mitigation plan **shall** include] documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval of the plan (e.g., City Council, County Commissioner, Tribal Council).*
- **FMA Requirement §78.5(f):** *Documentation of formal plan adoption by the legal entity submitting the plan (e.g., Governor, Mayor, County Executive).*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE			
			STAFFORD		FMA	
			NOT MET	MET	NOT MET	MET
A. Has the local governing body adopted the plan?	Page 13, Adoption by local Governing Body.	Plan adopted by Alakanuk City Council via Resolution 07-3 on October 9, 2007.		X		
B. Is supporting documentation, such as a resolution, included?		Yes		X		
		SUMMARY SCORE		X		

Multi-Jurisdictional Plan Adoption

- **Multihazard Requirement §201.6(c)(5):** *For multi-jurisdictional plans, each jurisdiction requesting approval of the plan **must** document that it has been formally adopted.*
- **FMA Requirement §78.5(f):** *Documentation of formal plan adoption by the legal entity submitting the plan (e.g., Governor, Mayor, County Executive).*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE			
			STAFFORD		FMA	
			NOT MET	MET	NOT MET	MET
A. Does the plan indicate the specific jurisdictions represented in the plan?		N/A				
B. For each jurisdiction, has the local governing body adopted the plan?		N/A				
C. Is supporting documentation, such as a resolution, included for each participating jurisdiction?		N/A				
		SUMMARY SCORE				

Multi-Jurisdictional Planning Participation

- **Multihazard Requirement §201.6(a)(3):** *Multi-jurisdictional plans (e.g., watershed plans) may be accepted, as appropriate, as long as each jurisdiction has participated in the process … Statewide plans will not be accepted as multi-jurisdictional plans.*
- **FMA Requirement §78.5(a):** *Description of the planning process and public involvement. Public involvement **may** include workshops, public meetings, or public hearings.*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE			
			STAFFORD		FMA	
			NOT MET	MET	NOT MET	MET
A. Does the plan describe **how** each jurisdiction participated in the plan's development?		N/A				
		SUMMARY SCORE				

PLANNING PROCESS:

Documentation of the Planning Process

- **Multihazard Requirement §201.6(b):** *An open public involvement process is essential to the development of an effective plan. In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process **shall** include:*
  (1) An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval;
  (2) An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia and other private and non-profit interests to be involved in the planning process; and
  (3) Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.
- **Multihazard Requirement §201.6(c)(1):** *[The plan **shall** document] the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.*
- **FMA Requirement §78.5(a):** *Description of the planning process and public involvement. Public involvement **may** include workshops, public meetings, or public hearings.*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE			
			STAFFORD		FMA	
			N	S	N	S
A. Does the plan provide a narrative description of the process followed to prepare the plan?	§1.1- pg 3	The Planning Team developed a five step planning process. This plan represents a collaborative effort between the Alakanuk Planning Team, Alaska DHS&EM, and URS, the team's planning consultant.		X		

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE STAFFORD N	SCORE STAFFORD S	SCORE FMA N	SCORE FMA S
B. Does the plan indicate who was involved in the planning process? (For example, who led the development at the staff level and were there any external contributors such as contractors? Who participated on the plan committee, provided information, reviewed drafts, etc.?)	§1.1- pg 3	Table 1, Planning Team Information		X		
C. Does the plan indicate how the public was involved? (Was the public provided an opportunity to comment on the plan during the drafting stage and prior to the plan approval?)	§1.3 – pg 4 §1.5 – pg 5 App. A	Public meeting on May 9, 2006. involved in hazard identification and screening process		X		
D. Was there an opportunity for neighboring communities, agencies, businesses, academia, nonprofits, and other interested parties to be involved in the planning process?	§1.4 – pg 5 App. A	Included interested parties on invitee list for public meeting. List in App. A		X		
E. Does the planning process describe the review and incorporation, if appropriate, of existing plans, studies, reports, and technical information?	§1.6 – pg 11-12	Lists plans and studies. Uses included throughout document.		X		
		SUMMARY SCORE		X		

RISK ASSESSMENT: *§201.6(c)(2): The plan shall include a risk assessment that provides the factual basis for activities proposed in the strategy to reduce losses from identified hazards. Local risk assessments must provide sufficient information to enable the jurisdiction to identify and prioritize appropriate mitigation actions to reduce losses from identified hazards.*

Identifying Hazards

- **Multihazard Requirement §201.6(c)(2)(i):** *[The risk assessment **shall** include a] description of the type … of all natural hazards that can affect the jurisdiction.*
- **FMA Requirement §78.5(b):** *Description of the existing flood hazard and identification of the flood risk, including estimates of the number and type of structures at risk, repetitive loss properties, and the extent of flood depth and damage potential.*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE STAFFORD N	SCORE STAFFORD S	SCORE FMA N	SCORE FMA S
A. Does the plan include **a description** of the types of **all natural hazards** that affect the jurisdiction? If the hazard identification omits (without explanation) any hazards commonly recognized as threats to the jurisdiction, this part of the plan cannot receive a Satisfactory score. Consult with the State Hazard Mitigation Officer to identify applicable hazards that may occur in the planning area.	§4.2 – 23-56	Six natural hazards were identified – earthquake, erosion, flooding, severe winter storm, tsunami, and wildfires.		X		
		SUMMARY SCORE		X		

Profiling Hazards

- **Multihazard Requirement §201.6(c)(2)(i):** *[The risk assessment **shall** include a] description of the … location and extent of all natural hazards that can affect the jurisdiction. The plan **shall** include information on previous occurrences of hazard events and on the probability of future hazard events.*
- **FMA Requirement §78.5(b):** ***Description of the existing flood hazard and identification of the flood risk**, …..,* ***and the extent of flood depth*** *and damage potential.*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE STAFFORD N	SCORE STAFFORD S	SCORE FMA N	SCORE FMA S
A. Does the risk assessment identify the **location** (i.e., geographic area affected) of each natural hazard addressed in the plan?	§4.2	Each hazard within the "Hazard Profile" 4.2, includes a narrative geographic location for each hazard. For example, page 28, Geographic Location for Erosion, has a narrative description and map, Figure 2, page 29.		X		
B. Does the risk assessment identify the **extent** (i.e., magnitude or severity) of each hazard addressed in the plan?	§4.2	See above comment. "Hazard Extent" is described within each hazard section.		X		
C. Does the plan provide information on **previous occurrences** of each hazard addressed in the plan?	§4.2	See above comment. "Previous Occurrences" are described within each hazard section.		X		
D. Does the plan include the **probability of future events** (i.e., chance of occurrence) for each hazard addressed in the plan?	§4.1 – pg 21-22	Listed in Table 7, defined in Table 4		X		
		SUMMARY SCORE		X		

Assessing Vulnerability: Overview

- **Multihazard Requirement §201.6(c)(2)(ii):** *[The risk assessment **shall** include a] description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description **shall** include an overall summary of each hazard and its impact on the community.*
- **FMA Requirement §78.5(b):** ***Description of the existing flood hazard and identification of the flood risk**, …., **and the extent of flood depth and damage potential.***

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE STAFFORD N	SCORE STAFFORD S	SCORE FMA N	SCORE FMA S
A. Does the plan include an **overall summary** description of the jurisdiction's **vulnerability** to each hazard?	§4.2	A summary of vulnerability is described for each hazard in the Hazard Profile, 4.2. For example, see page 32, A. Vulnerability Analysis for Erosion. **Recommendation:** the "economic loss percentages" identified should be explained further.		X		
B. Does the plan address the **impact** of each hazard on the jurisdiction?	§4.2 – pg 25, 32, 41, 46, 54	Impacts listed in Hazard Summary of each hazard profile.		X		
		SUMMARY SCORE		X		

Assessing Vulnerability: Identifying Structures

- **Multihazard Requirement §201.6(c)(2)(ii)(A):** *The plan **should** describe vulnerability in terms of the types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard area … .*
- **FMA Requirement §78.5(b):** *Description of the existing flood hazard and identification of the flood risk, including **estimates of the number and type of structures at risk, repetitive loss properties**,….*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE STAFFORD N	SCORE STAFFORD S	SCORE FMA N	SCORE FMA S
A. Does the plan describe vulnerability in terms of the **types and numbers** of **existing** buildings **(including repetitive loss structures)**, infrastructure, and critical facilities located in the identified hazard areas?	§4.3.3	Identifies numbers and types if buildings and infrastructure in the entire planning area.		X		
B. Does the plan describe vulnerability in terms of the **types and numbers** of **future** buildings, infrastructure, and critical facilities located in the identified hazard areas?		N/A	X			
		SUMMARY SCORE	X			

Assessing Vulnerability: Estimating Potential Losses

- **Multihazard Requirement §201.6(c)(2)(ii)(B):** *[The plan **should** describe vulnerability in terms of an] estimate of the potential dollar losses to vulnerable structures identified in paragraph (c)(2)(i)(A) of this section and a description of the methodology used to prepare the estimate … .*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE STAFFORD N	SCORE STAFFORD S	SCORE FMA N	SCORE FMA S
A. Does the plan estimate **potential dollar losses** to vulnerable structures?	§4.3.4, §4.2 -	Tables 11, 12 and 13 estimate the potential dollar losses for critical facilities and residential structures located within the planning area. Table 13 identifies overall populations and structures vulnerable for each hazard. Also discussed in each hazard profile		X		
B. Does the plan describe the **methodology** used to prepare the estimate?	§4.2	Discussed in each hazard profile		X		
		SUMMARY SCORE		X		

Assessing Vulnerability: Analyzing Development Trends

- **Multihazard Requirement §201.6(c)(2)(ii)(C):** *[The plan **should** describe vulnerability in terms of] providing a general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions.*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE STAFFORD N	SCORE STAFFORD S	SCORE FMA N	SCORE FMA S
A. Does the plan describe land uses and development trends?	§4.3.5	Figure 2 and Figure 3 identify current land use and current land ownership. Considering the size of the planning area and remote location to construction materials, the city is projected to grow at a rate of 3% annually. Any new housing development is expected to be located along existing roads as needed.		X		
		SUMMARY SCORE		X		

Multi-Jurisdictional Risk Assessment

- **Multihazard Requirement §201.6(c)(2)(iii):** *For multi-jurisdictional plans, the risk assessment **must** assess each jurisdiction's risks where they vary from the risks facing the entire planning area.*
- **FMA FEMA 299 Guidance:** *The Plan should be coordinated with, and ideally developed in cooperation with, all of the local jurisdictions within the geographical area.*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE STAFFORD N	SCORE STAFFORD S	SCORE FMA N	SCORE FMA S
A. Does the plan include a risk assessment for each participating jurisdiction as needed to reflect unique or varied risks?		N/A				
		SUMMARY SCORE				

MITIGATION STRATEGY: *§201.6(c)(3): The plan shall include a mitigation strategy that provides the jurisdiction's blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs and resources, and its ability to expand on and improve these existing tools.*

Local Hazard Mitigation Goals

- **Multihazard Requirement §201.6(c)(3)(i):** *[The hazard mitigation strategy **shall** include a] description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.*
- **FMA Requirement §78.5(c):** *The applicant's floodplain management goals for the area covered by the plan.*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE STAFFORD N	SCORE STAFFORD S	SCORE FMA N	SCORE FMA S
A Does the plan include a description of mitigation **goals** to reduce or avoid long-term vulnerabilities to the identified hazards? (**GOALS** are long-term; represent what the community wants to achieve, such as "eliminate flood damage"; and are based on the risk assessment findings.)	§5.1 – pg 66	Table 14: Alakanuk Mitigation Goals, Objectives, and Projects		X		
		SUMMARY SCORE		X		

Identification and Analysis of Mitigation Actions

- **Multihazard Requirement §201.6(c)(3)(ii):** *[The mitigation strategy **shall** include a] section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure.*
- **FMA Requirement §78.5(d):** *Identification and evaluation of cost-effective and technically feasible mitigation actions considered.*

Element	Location in the Plan (section or	Reviewer's Comments	SCORE STAFFORD	SCORE FMA

	annex and page #)		N	S	N	S
A. Does the plan identify and analyze a **comprehensive range** of specific mitigation actions and projects for each hazard?	§5.1 – pg 67-69	Table 15: Potential Mitigation Actions Actions have been identified in relation to the goals and objectives of the plan.		X		
B Do the identified actions and projects address reducing the effects of hazards on **new** buildings and infrastructure?	§5.1 – pg 67-69	Table 15: Potential Mitigation Actions For example, join NFIP, institute IBC and inspect new construction		X		
C. Do the identified actions and projects address reducing the effects of hazards on **existing** buildings and infrastructure?	§5.1 – pg 67-69	Table 15: Potential Mitigation Actions For example, join the National Flood Insurance Program (NFIP)		X		
		SUMMARY SCORE		X		

Implementation of Mitigation Actions

- **Multihazard Requirement: §201.6(c)(3)(iii):** *[The mitigation strategy section **shall** include] an action plan describing how the actions identified in section (c)(3)(ii) will be prioritized, implemented, and administered by the local jurisdiction. Prioritization **shall** include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.*
- **FMA Requirement §78.5(d):** *Identification and evaluation of cost-effective and technically feasible mitigation actions considered; and*
- **FMA Requirement §78.5(e):** *Presentation of the strategy for reducing flood risks and continued compliance with the NFIP, and procedures for ensuring implementation, reviewing progress, and recommending revisions to the plan.*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE STAFFORD N	SCORE STAFFORD S	SCORE FMA N	SCORE FMA S
A. Does the mitigation strategy include how the actions are **prioritized**? (For example, is there a discussion of the process and criteria used?)	§5.2	Table 16, Evaluation Criteria for Mitigation Actions**.** The STAPLEE evaluation will be used to prioritize mitigation actions. Page 71, Table 18 Mitigation Action Plan. Two mitigation actions are identified as a priority from the main list located in table 15.		X		
B. Does the mitigation strategy address how the actions will be **implemented and administered**? (For example, does it identify the responsible department, existing and potential resources, and timeframe?)	§5.1 and §5.2	Table 15 lists possible funding sources for each action Page 71, Table 18, Mitigation Action Plan. "Potential funding source" for the two prioritized actions are identified. Table 18, page 71 Mitigation Action Plan identifies the City Council as lead agency/department.		X		
B.1. Does the mitigation strategy address continued compliance with the NFIP?	§5.1 – pg 98	Lists joining NFIP as possible mitigation action (N/A)	X			

C. Does the prioritization process include an emphasis on the use of a **cost-benefit review** (see page 3-36 of *Multi-Hazard Mitigation Planning Guidance*) to maximize benefits?	§5.2	Attachment B, FEMA Benefit-Cost Analysis Fact Sheet has been provided. Costs and benefits as part of process was discussed as part of the action item prioritization.		X		
C.1. Does the mitigation strategy emphasize cost-effective and technically feasible mitigation actions?		N/A	X			
			SUMMARY SCORE	X		

Multi-Jurisdictional Mitigation Actions

- **Multihazard Requirement §201.6(c)(3)(iv):** *For multi-jurisdictional plans, there **must** be identifiable action items specific to the jurisdiction requesting FEMA approval or credit of the plan.*
- **FMA FEMA 299 Guidance:** *The Plan should be coordinated with, and ideally developed in cooperation with, all of the local jurisdictions within the geographical area.*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE STAFFORD N	SCORE STAFFORD S	SCORE FMA N	SCORE FMA S
A Does the plan include at least one identifiable **action item** for each jurisdiction requesting FEMA approval of the plan?		N/A				
		SUMMARY SCORE				

PLAN MAINTENANCE PROCESS

Monitoring, Evaluating, and Updating the Plan

- **Multihazard Requirement §201.6(c)(4)(i):** [*The plan maintenance process **shall** include a] section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.*
- **FMA Requirement §78.5(e):** *Presentation of the strategy for reducing flood risks and continued compliance with the NFIP, and procedures for ensuring implementation, reviewing progress, and recommending revisions to the plan.*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE STAFFORD N	SCORE STAFFORD S	SCORE FMA N	SCORE FMA S
A. Does the plan describe the method and schedule for **monitoring** the plan? (For example, does it identify the party responsible for monitoring and include a schedule for reports, site visits, phone calls, and meetings?)	§6 – pg 77	The Planning Team, specifically the Planning Team Leader, will continue to monitor and update the plan. The Planning Team leader will initiate an annual review to monitor the plans progress		X		
B. Does the plan describe the method and schedule for **evaluating** the plan? (For example, does it identify the party responsible for evaluating the plan and include the criteria used to evaluate the plan?)	§6.1 – pg 77-78	Prior to the five year update review the plan will be evaluated, including the risk assessment, mitigation strategy, mitigation activities, and annual reports.		X		
C. Does the plan describe the method and schedule for **updating** the plan within the five-year cycle?	§6.1 – pg 77-78	The plan will be submitted to the State and FEMA for their five year plan update. Planning Team will undertake the update.		X		
		SUMMARY SCORE		X		

Incorporation into Existing Planning Mechanisms

- **Multihazard Requirement §201.6(c)(4)(ii):** *[The plan **shall** include a] process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvement plans, when appropriate.*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE STAFFORD N	SCORE STAFFORD S	SCORE FMA N	SCORE FMA S
A. Does the plan identify other local planning mechanisms available for incorporating the requirements of the mitigation plan?	§5.4 – pg 74-75	Capability Assessment lists common planning methods and indicates whether or not they available to community.		X		
B. Does the plan include a process by which the local government will incorporate the requirements in other plans, when appropriate?	§6.2 – pg 78	Within 2 years of adoption, community will incorporate HM Plan into other planning mechanisms. HM Planning Team Leader will coordinate with the City Planner.		X		
		SUMMARY SCORE		X		

Continued Public Involvement

- **Multihazard Requirement §201.6(c)(4)(iii):** *[The plan maintenance process **shall** include a] discussion on how the community will continue public participation in the plan maintenance process.*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE STAFFORD N	SCORE STAFFORD S	SCORE FMA N	SCORE FMA S
A. Does the plan explain how **continued public participation** will be obtained? (For example, will there be public notices, an on-going mitigation plan committee, or annual review meetings with stakeholders?)	§6.3 – pg 78-79	An annual update and review process will include a summary of changes to all the stakeholders on the mailing list prior to submittal to the city council and the public meetings. **Recommendation**: Identify further how the general public will be involved in the planning process. Will flyer or press releases be distributed; will the plan be available for review and comment?		X		
		SUMMARY SCORE		X		

– END REVIEW CHECKLIST –

Attachment E

Adoption Resolution and FEMA Final Approval Letter

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City of Alakanuk Hazard Mitigation Plan
Adoption Resolution
(Resolution No. 07-3)

Whereas the City of Alakanuk, Alaska has experienced repetitive disasters that have damaged commercial, residential and public properties, displaced citizens and businesses, and presented general public health and safety concerns; and

Whereas the community has prepared a *Hazard Mitigation Plan* that outlines the community's options to reduce overall damage and impact from natural hazards; and

Whereas the *Hazard Mitigation Plan* has been reviewed by community residents, business owners, and federal, state and local agencies, and has been revised to reflect their concerns;

Now, therefore, be it resolved that:

1. The *Hazard Mitigation Plan* is hereby adopted as an official plan of the City of Alakanuk.
2. A hazard mitigation planning group is hereby established as a permanent community advisory body. The Hazard Mitigation Planning Team Leader shall designate its members, subject to the approval of the City of Alakanuk. They shall serve one-year terms. The group's duties shall be as designated in the *Hazard Mitigation Plan*.
3. The Hazard Mitigation Planning Team Leader is charged with supervising the implementation of the Plan's recommendations within the funding limitations as provided by the City of Alakanuk or other sources.
4. The Hazard Mitigation Planning Team Leader shall give priority attention to the following action items recommended by the *Hazard Mitigation Plan*:

   a. **Relocate buildings that are at risk of being affected by erosion.**
   b. **Apply for grants/funds to implement riverbank protection methods.**
   c. **Relocate, acquire, elevate, or otherwise flood-proof identified properties.**
   d. **Relocate, acquire, elevate, or otherwise flood-proof critical facilities.**

5. The Hazard Mitigation Planning Team Leader shall convene the hazard mitigation planning group quarterly. The planning group shall monitor implementation of the plan and shall submit a written progress report to the City of Alakanuk in accordance with the following format:
   a. A review of the original plan.
   b. A review of any disasters or emergencies that occurred during the previous calendar year.
   c. A review of the actions taken, including what was accomplished during the previous year.
   d. A discussion of any implementation problems.
   e. Recommendations for new projects or revised action items. Such recommendations shall be subject to approval by the City of Alakanuk.

Passed on this date 10-9-07.

Signature of the Mayor of the City of Alakanuk [signature]

U.S. Department of Homeland Security
Region X
130 228th Street, SW
Bothell, WA 98021-9796

FEMA

October 19, 2007

Mayor Shelby Edmond
City of Alakanuk
P.O. Box 167
Alakanuk, Alaska 99554

Dear Mayor Edmond:

The U.S. Department of Homeland Security's Federal Emergency Management Agency (FEMA) has approved the ***City of Alakanuk Hazard Mitigation Plan*** as a local plan as outlined in 44 CFR Part 201. With approval of this plan, the City of Alakanuk is now eligible to apply for the Robert T. Stafford Disaster Relief and Emergency Assistance Act's hazard mitigation project grants through October 19, 2012.

The plan's approval provides eligibility to apply for hazard mitigation project grants through your State. Grant applications will be evaluated individually according to the specific eligibility and other requirements of the particular hazard mitigation grant program. For example, a mitigation project identified in the approved plan may or may not meet the eligibility requirements for Hazard Mitigation Grant Program funding.

Over the next five years, we encourage your community to follow the plan's schedule for monitoring and updating the plan, and to develop further mitigation actions. The plan must be reviewed, revised as appropriate, and resubmitted for approval within five years in order to continue project grant eligibility.

If you have questions regarding your plan's approval or FEMA's mitigation grant programs, please contact our state counterpart, Alaska Division of Homeland Security and Emergency Management, who coordinates and administers these efforts for local entities.

Sincerely,

Mark Carey

Mark Carey, Director
Mitigation Division

cc: Mark Roberts, Alaska Division of Homeland Security and Emergency Management

Enclosure

KM:bb