

Appendix F. Kivalina Relocation Planning Project Site Investigation Log and Trip Reports

Documents Included:

- **August 2005 – O. Francis Trip Report (8-23-05)**
- **August 2005 – Daily Reports (8/23 – 8/27)**
- **Imnakuk Bluffs**
 - Site Investigation Log**
 - Water Supply Options Report**
 - Landfill Siting Considerations Report**
- **Kiniktuuraq**
 - Site Investigation Log**
 - Water Supply Options Report**
 - Landfill Siting Considerations Report**
- **Simiq**
 - Site Investigation Log**
 - Water Supply Options Report**
 - Landfill Siting Considerations Report**
- **Tatchim Isua**
 - Site Investigation Log**
 - Water Supply Options Report**
 - Landfill Siting Considerations Report**
- **December 2005 – Kivalina Trip Report**



TRYCK NYMAN HAYES, INC.

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September 17, 2004

RE: KIVALINA TRIP REPORT

By: Oceana Francis-Chythlook, Tryck Nyman Hayes, Inc.

Date: August 23-28, 2004

Accompanied by:

August 23-24, 2004

Andrea Elconin, Project Manager, Corps of Engineers, AK District, Anchorage, AK
Larry Scudder, Corps of Engineers, AK District, Anchorage, AK
John Isaacs, Senior Planner, URS Corporation, Anchorage, AK
Jill Missal, Planner, URS Corporation, Anchorage, AK

August 23-25, 2004

Frank Wuttig, Geotechnical Engineer, Shannon & Wilson, Fairbanks, AK

August 23-28, 2004

Bob Wright, P.E., Senior Project Engineer, Tryck Nyman Hayes, Inc., Anchorage, AK

Contacts:

Kivalina City Council, Kivalina, AK
Kivalina IRA Council, Kivalina, AK
Kivalina Relocation Planning Committee, Kivalina, AK
Northwest Arctic Slope Borough, Kotzebue, AK
Joe Swan, Kivalina boat operator, Kivalina, AK
Christy Miller, Director of the Flood Insurance Program for the State of Alaska
Robert 'Rori' Marston, Fellow to Senator Ted Stevens, Washington D.C.

Purpose of visit:

- ✓ Present Kivalina community with updates of the relocation effort of Kivalina.
- ✓ Investigate site conditions of Imnakuk Bluff and Simiq.
- ✓ Take photos of exterior walls, foundation framing, interior hallways, heating system clearances, and electrical boxes for all commercial and public buildings. Gather construction/agency funding dates of commercial and public buildings.

Accomplishments and Findings:

- Attended Kivalina IRA/City/KRPC joint special meeting. Discuss Kivalina relocation status. (See Kivalina_Council_Meeting_8-23-04.doc).
- Attended Kivalina relocation public meeting. Informed Kivalina residents of the purpose of the site visit, described the steps associated with this portion of the study, and answered questions regarding the status of the project. (See Kivalina_Public_Meeting_8-23-04.doc).
- By helicopter, made aerial site visits to the six alternative sites that included (in order): Simiq, Imnakuk Bluff, Tachim Isua, Kiniktuuraq, Igrugaivik, and Kuugruaq. Filmed these sites on a camcorder, which will be made available on DVD.
- By helicopter, made grounded site visits to (in order): Simiq, Tachim Isua, and Kiniktuuraq. Filmed these sites on a camcorder, which will be made available on DVD. Observations of each site are listed as follows:
 - Simiq
 - Tundra, marshy, wet (visual inspection).
 - 56-70 foot elevation (DGPS readings from Bob and Frank).
 - Soils made up of silts (visual inspection).
 - 3.5 foot active layer (top of bluff) (measured by Frank).
 - 1.5 foot active layer (lower end of bluff) (measured by Frank).
 - Located miles away from Kivalina lagoon (visual inspection).
 - No accessible river nearby (visual inspection).
 - Highly vegetated (visual inspection).
 - No visible gravel.
 - Permafrost

➤ Tachim Isua

- 78-100 foot elevation (DGPS readings from Bob and Frank).
- Highest ground in surrounding vicinity (visual inspection).
- Higher regions consist of dry gravel mix with silt (visual inspection).
- Lower regions consist of vegetation (visual inspection).
- Located a couple miles from Kivalina lagoon (visual inspection).
- No accessible river nearby (visual inspection).
- Lower regions (i.e. off edge of bluff) surrounded by marshy tundra (visual inspection).
- No permafrost encountered at 1.5 ft (measured by Frank).
- Prairie dog holes encountered.

➤ Kiniktuuraq

- Tundra, marshy, wet (visual inspection). Worse than Simiq site.
- No visible gravel.
- Heard calls from waterfowl. Possible nesting grounds?
- Sea gulls flying in vicinity area.

- By outboard boat, made grounded site visit to Imnakuk Bluff. Observations of the site include:

➤ Imnakuk Bluff

- Water depth was shallow near shore. Boat got stuck 75 yards away from shore at a water depth of <2 feet.
- Boat landed 1-2 miles from site to the closest possible location offshore. We had to walk into the site.
- High erosion on bluffs and weathered limestone were exposed (visual inspection).
- Joe Swan discussed history of Kivalina. Old Kivalina was located further north near spit. Old Kivalina relocated in 1800's to its current location. Sod houses were formerly there. A frame made of whale bone still remains.
- Geological markers found.
- Out of floodplain area (visual inspection).
- A channel showed evidence of flooding from 20 feet below top of bluff (visual inspection).
- Tundra, marshy, wet (visual inspection).

- Took photos of exterior walls, foundation framing, interior hallways, heating system clearances, and electrical boxes for all commercial and public buildings. Gave construction/agency funding dates spreadsheet of Kivalina commercial and public buildings to Myra Henry, Kivalina mayor, to be filled in at a later date.
- Noted all new buildings and building expansions on map. Took measurements of new buildings and performed swing-ties to link new buildings to old buildings.
- Performed water quality tests using home test kits from a raw water sample of the Wulik River. Tests showed presence of iron and bacteria. Results included:
 - Bacteria – positive
 - Lead – negative
 - Chlorine – 0ppm
 - Copper – 0ppm
 - Nitrates – 0ppm
 - Nitrites – 0ppm
 - Total Hardness – 0ppm
 - pH – 4 to 5
 - Alkalinity – 0ppm
 - Iron – 0.3 to 1ppm
 - Pesticide – negative
- Met Patrick Hughes, AVEC. Contacts he mentioned at AVEC include Randy Valle, Joe Earsey, and Mark Brian, overall facilities manager.
- Toured Kivalina by foot. Identified facilities and landmarks. Visited landfill.

Follow-up

- Update Kivalina building identification aerial map showing new building names and locations.
- Download video onto DVD.
- Retrieve 2003 Sanitary Survey report which includes a water quality study. (Contacted Contact Arlene Thomas, ASCG, and Rose Barr, NANA, ph. 265-4180).
- Obtain Kivalina electrical distribution maps. (Contacted Mark Teitzel, AVEC). Send a copy to Greg Aughe at Coffman.

- Gather information about construction/agency funding dates of teacher housing. (Contacted Kathy Christy and Roger Helmer, Northwest Arctic Borough School District (NWABSD), ph. 868-3498)
- Contact Myra Henry, Kivalina Mayor, on status of information for construction/agency funding dates of commercial and public buildings handed off during sit visit to Kivalina.

Cc: Tryck Nyman Hayes, Inc., Anchorage, AK (electronically)
Corps of Engineers, AK District, Anchorage, AK

Enclosures: Kivalina_Council_Meeting_8-23-04.doc
Kivalina_Public_Meeting_8-23-04.doc

24 August 2004

WO: 03003.007

Kivalina Relocation Planning Project

Daily Report for 23 August, 2004

1330± Arrive Kivalina via Caravan with Frank Wuttig, Shannon & Wilson, Oceana Francis-Chythlook, TNH, Jill Missal & Jon Isaacs, URS.

Unload plane and transport gear to school. Oceana and I walk to school to look over village.

Principal, Gerald Pickner, explains that an archeological team came through to study the area prior to a new wastewater system being designed by ANTHC. We have not heard a word about this from anyone...

1400± Stop by City Office to say hello to Colleen Swan (nee Koenig).

1530± Attend meeting of KRPC, City and others at City Offices. Ross Schaeffer, NAB Borough Mayor & Walter Porter, NAB Planning Director in attendance. See agenda.

Existing PAS (Planning Assistance to States) will expire September 30: renewing later than that date will not be a problem.

1545± Enoch asks about the need for an EIS, Andrea E. indicates there will be one needed. Denali Commission may handle,

1606± Lots of discussion about Executive Committee, made up of Corps, Borough, IRA and KRPC. Also, a Relocation Coordinator is discussed, as a single point of contact. It looks like the thought process here is to speed up the process and make transfer of information easier.

Enoch explains that we are 8 years into a 5 year study. The frustration level of the community is high.

Andrea explains that current study budget is \$1.5 million over next 2 years. An addition of \$0.5 million may be able to be added

Andrew Koenig, Joe Swan and David Swan vent their frustrations that the process is taking so long. All indicate that it appears that we are now going backwards.

Andrew states that he thinks the state and Cominco are in cahoots in trying to keep Kivalina from moving to Kiniktuuraq because the village would then be too close to the port expansion.

I ask about the water quality study conducted in 2003 by ASCG. Am told that Arleen Thomas of ASCG in Anchorage is the person to contact.

1738± End meeting.

1915± Community meeting begins. About 40-50 people in attendance. Enoch opens meeting by introducing the Corps. Andrea introduces the study team.

Andrea explains where we are and where we are going, acknowledges that it appears we have gone backwards, but that the work we are doing is needed to bring all sites to parity in terms of information needed to make a decision on which site is best.

There is a lot of questioning about where we are going. Colleen explains that we have been studying Kiniktuuraq for 5 years, how can we collect adequate information on all the other sites to get to where we are with Kiniktuuraq information. She also explains that the community asked for a study prior to the selection process, but none was performed.

Enoch explains his opinion that money will be no problem in getting a move made. He explains that since Ted Stevens is coming out to the village with his Appropriations Committee, it is a foregone conclusion that he will provide funding for the move, regardless of the cost.

Again, Andrew Koenig and David Swan vent frustrations regarding the time it is taking to get the move made.

2100± We explain that this Phase of the study is not a step backwards. That we will be taking all sites to a 10% level, with an equality of information, so an informed decision can be made in determining which site should be selected.

2230± End meeting. The meeting has been videotaped by Oceana.

2250± Team debriefs on stairway outside classroom we are sleeping in. General consensus is that it was a very good meeting. It is a good thing that people can vent and show frustrations with the progress of the project. It appears some misconceptions are affecting how people view this phase of the job. Some explanation has, hopefully, placed our investigation of alternate sites in a better light, and the community understands that this is not a step backward.

End Report

24 August 2004

WO: 03003.007

Kivalina Relocation Planning Project

Daily Report for 24 August, 2004

0600± Team is up and getting ready.

0700± Write report for 8/23.

0900± Call Anchorage, talk with Mike Wolski re: ANTHC proposed new WT collection, treatment & disposal system for school, clinic and washeteria. We have not been informed by ANTHC this project was in the wings. Mike will check with folks at ANTHC and get back to us.

8/25- Principal brings in copy of grant request for WT system funding. Proposed construction date is summer 2005.

1010± Part of the team (Oceana, Frank, Bob, Larry, Jon, Jill) walks to runway to wait for helo from Evergreen, Nome. Chopper scheduled to arrive 1030.

1115± Return to school, call Evergreen Aviation to check on helo. Talk with Joy Journey. She indicates that chopper got off late and was held up at Kotz for fuel. Should be here now.

1145± Chopper lands. It is a 4 passenger Messerschmidt BO105 (N730TS).

1200± Sigfried (pilot) gives passenger briefing. Entry/exit procedures, safety.

1210± Take off at Kivalina. Fly to Simiq, fly a couple loops around the site. Oceana and I film site.

1227± Land at Simiq. (For detailed information about site requirements, see Landfill and Water Resource reports)

Pt 002 Landing site at Simiq.

1242± Walk to SW edge at top bluff, take 2 pics to show willow cover at W (leeward) side. Lake to W of site. The Simiq site is covered predominantly with tussocks and tundra. Walking is difficult; area between tussocks is wet.

Ground cover consists of low grasses, blueberries, cranberries and crow berries. No trees are present, only low, scrub willows.

Pt 003 SW edge top bluff.

1255± Note some shallow drainage swales to W over W bluff, depth about 2 ft, width 20 ft.

Pt 004 W edge top of bluff.

- 1300± Walk to N end of high part of site. Take pan shots of E side: slope= 30% covered with willows.
- Pt 005 NE edge top bluff
- 1305± Walk to N end of table. Note that drainage swales get deeper toward E side: set 15 ft deep, 40+ wide. Take photos of what look like game trails in grass at toe. Note sparrows on the site.
- The site generally drains to the E; high in the middle, sloping to the edges all around. The longer slope to E.
- Excavation of soil at bank of pond slightly S of chopper landing point is saturated silt; running.
- Pt 007 E edge top of bluff.
- 1315± Pt 008 About 400 yards W of toe of slope. Very gradual slope to toe from here. The ground runs from tussocks and tundra to wetter areas at the toe.
- 1323± Pt 009 400-600 yards N of S to of slope.
- 1353± Pt 010 Chopper landing point.
- 1357± End Simiq site investigation, readying to leave to go to Tatchim Isua (TI).
- 1406± Running up helo, take off and head to TI site. We fly N, to Kivalina R. by the Imnakuk Bluff site. The river is low. Looks shallow and wide. Larry Scudder needs to get back to Kivalina to catch plane back to Anchorage. Pilot will drop Oceana, Frank & Bob at TI, take Larry to Kivalina and return.
- 1407± Take off from Simiq.
- 1417± and at TI.
- 1420± Pt 011 TI landing site.
- Site is fairly flat, sloping from N to S gently (3-5%) to bluff at S edge. Bluff is about 1:1. Note ground squirrel burrows and a number of Caribou kills scattered around the site.
- We have landed on a surface showing coarse gravel exposed and very sparse, low ground cover. Some grasses, willows at edges and along the NW side.
- 1429± Walk to edge of bluff at W. Bluff dives down quickly to toe.
- Pt 012 Top bluff, W edge. Show lots of exposed gravel. Take set of photos full 360 deg.
- 1444± Pt 014 W edge, top of bluff.

The TI site is a high, dry, solid site. Estimate area of gravel around 50 ac. Gravel showing on surface is at S end. At N and E, it has a distinct edge where the transition from gravel to wetter tundra can be easily seen.

Walking off the gravel transitions to the tundra within 50 ft.

The site is bordered on the N to W by a large drainage, and on the E to SE by a smaller swale. Both flow down to the low marsh fronting the SE side of the bluff. A good size lake is located a couple hundred yards W of the bluff toe.

- 1449± Pt 015 Point at end of gravel surface. I have walked to the S end of the site, where the gravel tapers to a real point, maybe 10-15 ft wide. Take two sets of pan photos to show finger end of gravel and S drainage about 200 yards to S.
- 1455± Take photo of gravel in silt matrix with pocket rod for scale. Dry gravel runs out to E of finger. Begin tussocks 50 ft E of Pt 015
- 1500± Tracking outside limits of gravel deposit.
- Pt 016 E edge of gravel.
- 1515± Photo 102 View N from Pt 21 showing beginning of tussocks to N.
- 1522± Take pan shots W to E looking N showing drainage boundary.
- 1530± Take photo 113 looking E from Pt 025 showing gravel bluff.
- 1537± Pt 027 Top W edge of TI bluff.
- 1609± Pt 028 Toe at W edge of gravel. Frank has dug hole in tussocks 2-3 ft deep to ice.
- Traverse around N edge shows boundary between gravel and tundra becomes somewhat less distinct. Traveling around to the W side, bluff begins within a short distance to S. Gravel evident in bluff face. Swamp starts right at toe of bluff.
- 1617± Frank is traversing a line across the site to create a cross-section, along a line N30E. Digging holes to check for gravel along the traverse. Pits show a thin silt cover over ice at about 3 ft.
- 1636± End geologic investigation, return to helo.
- 1645± Load up chopper, readying to fly, take off to Kiniktuuraq.
- Circle Kiniktuuraq site a couple of times to video and orient.
- 1657± We land at Kiniktuuraq.
- 1704± Pt 030 Landing site at Kiniktuuraq.

This is a very wet, boggy site. Walking is difficult, and site is noticeably wetter than Simiq. More lakes, water between the tussocks, more sedge.

Sig must leave around 1800, so we do not have a lot of time on site. Walk to west to access beach. Very swampy. Note a couple of cold storage dens along the N edge of the site marked by a triangle of poles maybe 20 ft tall.

Walk to beach from landing site. Note that walking is difficult; harder to select a route as the site has low swampy drainage swales from a number of ponds.

Ground near the beach w/in about 200 yards is eroded and cut by deep channels. See photos 138-144. Sides of the channels are splitting off parallel to the channel and falling in. See photo 144, right side of channel.

Pt 031 At top of beach, Kiniktuuraq site.

1726± Acres of trash cover area near beach. On return to Kivilina, we talk to Russell Adams, who explains that the Kiniktuuraq site used to be a dump site. This raises the question of whether or not there will be a permitting requirement to clean up the site or if covering with gravel will be allowed.

It isn't possible to see far, nor to discern areas for airport, solid waste or sewage disposal.

1746± Pack up helo and take off. Circle site, video, fly around Kuugaruk & Igrugaivik sites to video, fly back to Kivalina, end helo tour of sites.

1755± Land Kivalina.

End Report

25 August 2004

WO: 03003.007

Kivalina Relocation Planning Project

Daily Report for 25 August, 2004

0600± Team is up and getting ready.

0700± This is the first day of school. Principal has scheduled an assembly; both parents and kids are here.

0900± Trouble getting a boat lined up. Principal says maybe Caleb Wesley will be able to take us, but he's not home when we call.

1000± David Swan comes by, knows we are looking for someone to take us out. He says he'll check and get back to us. Time is wasting. Frank must be on 1500 plane out, and I want him to be along on this trip to Imnakuk Bluff site.

1030± David returns with Joe Swan. He wants to know where we want to go, and advises that getting to the bluff site is difficult. Can't get there by boat as the river is too shallow. He will take us as far as he can, and we can walk from wherever he can land.

We agree to meet at Joe's house, by lagoon at 1100±.

1105± We are ready to leave on boat. Bob Wright, Oceana Francis-Chythlook and Frank Wuttig with Joe Swan.

1130± We have made it up the river to a point about ½ mi E of the E end of the Imnakuk Bluffs site. We beach bow of boat, but decide to try to get closer. A few hundred yards downstream, we get stuck in shallow section of river.

1145± We work loose and head back to last point we beached boat, tie up and get our kit to walk up bluff and to Imnakuk Bluffs site.

Pt 033 Landing point of boat

1204± Pt 034 directly above intersection of limestone bedrock and gravel interface in bluff at river.

We continue W along top of bluff to locate site.

1215± Find first of 3 survey markers. This one an AI BLM Cadastral Survey marker on a rod sticking 3 ft out of the ground. Frank speculates that it could either have been pulled out or frost jacked out. It is marking the location of an aerial photo panel. We can see remnants of the marker. We will check RLS number when back in Anchorage to find out if an aerial topo map for this area exists.

1220± Find second survey marker, smaller private AI cap, take photo.

1230± Reach E side of stream shown on USGS map. This is a gully maybe 30-40 ft deep with a stream flowing into the Kivalina R. There is a second BLM Cadastral Survey marker and a metal aerial survey disk. Take photos of mon, GPS shot at mon and first 360 deg photo pans (see 8/25 photos, 170-178, start at S, looking toward village in distance).

Pt 035 top of BLM Cadastral Survey marker

We are on the E end of the site at this point. Land to about 50 ft from the top of the Kivalina R bluff and same inland of stream bluff is not too bad to walk on. Muskeg, tussocks minimum, some solid outcroppings of gravel. As we progress inland from these points, either N of river or W/E of top stream bluffs, the ground becomes more and more muskeg, larger tussocks and definite signs of polygonal ice wedging.

This site seems to be drier than Simiq; much drier than Kiniktuuraq site. Site slopes gently at 3±% from N to S. Drainage stream channel is a major feature and cuts through this part of the site, making crossing difficult except on foot.

Stream channel could act as bioswale for wastewater discharge, but treatment would have to be high; higher than lagoon effluent. It is not possible to see enough of site to determine if a suitable solid waste site or airport site is available. Soils determine much of this, and soils on top of bluffs grade to plastic silts quickly; therefore availability of suitable cover is unknown.

1305± We reach W extents of investigation, maybe 500 yards to W of stream channel bluff. Time crunch to get Frank back for his plane limits time on site.

White Caribou skull in photo frames 204 & 206, 8/25 show limits of investigation. Frank digs a hole here, brown, wet, plastic silt with a 6" layer of surficial organics (see photo 205 on 8/25). No gravel is noted, ice at 2.8 ft.

Take 360 pan shots at this hole, frames 194 through 203, 8/25.

There are no trees on the site, and only scrub willows along the stream. Across the river on the sand bars the willow is thicker and taller.

1330± Musk Oxen on other side of Kivalina R.

Note that there has been a constant wind from NE, of about 10mph, all the time we have been on the site.

1344± Frank finished second hole closer to the Kivalina R bluff and starts back for the boat. Oceana and Joe have gone on ahead.

1415± Leave site in boat. Oceana collects 1/2L sample of river water for testing back at the school.

1444± Arrive Kivalina. We walk to school from Joe Swan's house, after I pay him \$200 for boat trip; Frank is ready to leave, we help him with bags and he heads for plane already landed at runway.

1804± Start bacteria test of Kivalina R water sample.

There is little to no taste to the water and no odor.

1919± Cl, Cu, Ni, Na all undetectable with PUR brand water quality test kit.

1921± Tot Hardness, Alkalinity, no detection. pH= 4-5, iron 0.3 to 1ppm, no reaction for pesticides.

End Report

26 August 2004

WO: 03003.007

Kivalina Relocation Planning Project

Daily Report for 26 August, 2004

0600± Team is up and getting ready.

0700± Transfer GPS points from GPS to Excel spreadsheet. Note that we have retained less than half the points collected. Important safety lesson here: be familiar with equipment before taking it into the field, and check the storage of points after each entry.

0930± Today we have our building inspection walk thru scheduled. The difficulty will be in obtaining access to all buildings we want to look in. For detailed information on the walk thru, see the architect/mechanical/electrical matrix. Walk to City/IRA office to talk with Colleen and get info on who has keys to buildings we need to inspect & photo.

Colleen gives us names of folks to contact and we start our investigation at the IRA/City office.

1048± Finished with City/IRA, PO, Clinic.

1100± Working S through village, complete investigation of exterior Washeteria.

1155± Complete exterior of existing Friends Church and inside Washeteria plus water treatment plant.

1210± Shoot photos of all four sides store and elect box

1215± Lunch at school.

1312± Back to store to complete interior.

1430± Complete outside of teacher housing and store storage units.

1530± Media card is full; return to school to download & charge batteries. We will return to complete interiors of teacher housing when teachers are home.

Talk with Principal Pickner about address for McQueen School:

11 McQueen School
Kivalina, AK 99750
Attn: Gerald Pickner

1700± Complete interior of Episcopal Church and head N to look at Friends Church and Episcopal Church cabins.

1800± Visit teacher trailers and photo all but Principal's No 114.

1930± Complete interiors of teacher housing.

2000± Return to school and begin labeling photos.

2200± Complete labels of 150 photos, end day.

End of Report

27 August 2004

WO: 03003.007

Kivalina Relocation Planning Project

Daily Report for 27 August, 2004

- 0600± Team is up and getting ready.
- 0630± Resume labeling Thursday photos, plan schedule to clean up remaining tasks on list. We still have to swing-tie locations of new buildings and additions, obtain photos of city buildings, as well as get photos in Teacher House 114.
- 0900± Complete labeling task. Currently have 258 photos, anticipate another 50 or so.
- 0930± Getting ready to head out, need to copy NWAB Kivalina School inventory.
- 1030± Rori Marston from Senator Ted Stevens office and Christy Miller from AK Div of Community Advocacy, Planner and Flood Insurance Program Coordinator arrive at school with David Swan. We exchange cards and discuss the current relocation project. Christy explains some of the realities of funding projects in this area.
- Rori asks to be copied on the material we submit so Sen. Stevens's office can be aware of what is going on.
- Christy asks for copies of 2001, 2003 and 2004 (in progress) reports. She explains there will be a meeting at the end of AFN, Friday, Oct 29 about village relocation; Corps, much legislative interest present. They can telecom anyone who wishes to be involved.
- 1115± We are out late. Head to teacher housing to swing-tie location of Teacher House 149. After, we swing-tie locate the raw water intake, new Friends Church and addition to existing Episcopal Church.
- 1210± Lunch
- 1310± Walk to City offices to see about getting keys to Boys and Girl Club, Bingo Hall (Community Center) and Old Clinic Bldg. Keys are tough to find. We discuss contacts for community buildings with city clerk. Gain access to Community Center (Bingo Hall) and take photos.

- 1421± Take photos of City residence and make arrangements with Donald Baldwin to see interior after he gets off work at 1500.
- 1500± We get handfull of keys for community buildings and have to try all in padlocks on doors. Gain access to interiors and shoot pics of heaters, breaker boxes and exits. Return to old jail to get breaker box pic with Andrew Koenig.
- 1630± Get interior shots of Teacher House 114.
- 1700± Back to school, download pictures and label to complete building inventory, write report.

End of Report

September 5, 2004

Kivalina Relocation Planning Project
Water Supply Options & Site Visit
WO: 03003.007

Imnakuk Bluffs Site

The following as a response to questions posed by the URS raw water design team for the above noted project, to be answered during the 8/23-28/04 site visit by TNH.

The questions below were provided to the site visit team by fax on 8/24/04.

1 Provide photographs of streams and lakes close to the site.
See the photos taken at each site visited. All photos are dated and labeled. Direction the photograph is looking and approximate position it was taken from is indicated.

2. Estimate size of bodies of water, streams, lakes, ponds.
There is only one available body of water near the Imnakuk Bluffs site; the Kivalina River. The site abuts the river on its south side. There is a possibility that a well could be drilled to access the aquifer that feeds the river, but a test well program would have to be developed to see if a well with sufficient yield could be developed to service the new village year round.

The Kivalina River is shallow, and most likely does not stay open all year. While accessing the site in a small boat, we ran aground about ½ mile upstream of the site and had to beach and walk to access the site.

The river is an estimated 600 ft wide, 4 ft deep and has an estimated surface rate of flow of 5 ft/sec, providing an estimated flow volume of 12,000 CFS. To determine if the river could be developed as a raw water source, a study program will have to be developed to test water quantity, quality and whether or not the river has a thaw bulb that will serve as a year round water source.

A home water quality test kit (Pur-Test) was taken to the village with the field team. A sample of water was taken during the site visit and rough tests run at the school to determine a number of parameters. The results are recorded in the Imnakuk Bluffs Site Investigation Log. Most tests showed no result, but the pH was noted as between 4-5, and a low level of bacteria was detected. The water has no odor, no taste and shows very low visual turbidity.

3. If instrumentation available, take field measurements of pH, salinity, conductivity, temperature, DO and turbidity.

Due to the proximity and types of available bodies of water, no sampling was possible. It was judged from observation that none of the ponds/streams reachable would be able to be developed for year round water supply. No water samples were taken.

4. If sampling bottle available, bring back sampled for lab testing.
No samples were taken.

Because of the very difficult terrain, it was not possible to hike very far from the helicopter landing area to more closely investigate any bodies of water. Review of an aerial photograph or a USGS map will probably yield as much information as the team was able to collect at the site, under the conditions present.

September 5, 2004

Kivalina Relocation Planning Project
Landfill Siting Considerations & Site Visit
WO: 03003.007

Imnakuk Bluffs Site

The following as a response to questions posed by the URS Solid Waste design team for the above noted project, to be answered during the 8/23-28/04 site visit by TNH.

The questions below were provided to the site visit team by fax on 8/24/04.

Investigation of a viable site for a solid waste site for the new village was not possible by foot. Due to the restrictions on flying time for the helicopter, and the time needed at each site visited to investigate soils, topo, water source, etc, any potential solid waste site located away from the subject site could only be assessed visually.

Hundreds of photographs have been taken and labeled to assist in visualizing what the site looks like, as well as the surrounding area. Consult the photographs to get a feel for the site.

- 1 Are there any ponds/lakes or running creeks/streams (potential for surface water to enter the solid waste site, or is run-off a potential problem?)

No. The Imnakuk Bluffs site is situated about 50 ft above the Kivalina River. The site slopes to the bluff at a shallow angle. No drainages were noted on the site, except for a major drainage bounding the E end of it.

The site appears to contain gravelly soils along the top of the bluff that grade quickly to wet, plastic silts underlain by permafrost at less than 36".

2. Is the site in a flood plain? How close is the nearest floodplain, and what direction does it lie?

The site is situated at an elevation approximately 50 ft above the Kivalina River. At this elevation, it is not in any floodplain. Any solid waste dump site located N of the village site would be higher than the village, and therefore less susceptible to flooding. The river itself appears to be a flood plain.

3. Describe the topography of the area.

The Imnakuk Bluffs site is on the top of a limestone cliff approximately 50 ft above the Kivalina River. The topography of the site is a gentle curving slope from the N and NE to the top of the bluff. Slopes are shallow, not exceeding 5-7% in most places.

4. Is the area a wet tundra biotic community? Does it have mat cover or tussocks? Is it interspersed with small lakes/ponds? Are there grasses, sedges, Dwarf Willow, Dwarf Alder or other tundra plants?

The site is definitely a tundra biotic community. After a traverse of between 50-100 ft inland from the shoulder of the bluff at the S side of the site, the drier, more gravelly soil rapidly turns to wet, plastic silt with ice at less than 36". The ground cover near the bluff is a low hearty plant that appears to be similar to a vine. As the land becomes more tundra-like, it is wetter, characterized by tussocks, grasses, sedge, low arctic plants such as cotton grass, crowberries, cranberries and some shrub willow.

There were no small tundra ponds noted during our site investigation. The only water course was a small stream located in the drainage bounding the E side of the site.

5. What are the thermal conditions of the site? Is permafrost present? If so, is it continuous or discontinuous? Note any large areas of thermokarsting.

Polygonal ice wedging is evident as the distance inland from the shoulder of the bluff above the Kivalina is increased. Most of these wedges are minor. Consult the geotechnical report for more information regarding the thermal conditions of the site.

Evidence of permafrost was found in shovel dug excavations at a depth of less than 36". It appears that the gravel does not show signs of permafrost.

6. Where is the cover borrow source?

If a solid waste site was to be developed above the village, the source of cover soil would most likely be the islands between the braids of the Kivalina River. This gravel source is abundant and close to the potential village site.

Permitting may be a problem as disturbance of anadromous fish habitat may occur.

7. What wildlife habitat is discernable?

Signs of Caribou and Musk Ox are prevalent on the site. Indications of small game, such as Arctic Hare and ground squirrels was noted. There appear to be various bird species, such as Ravens, and songbirds.

While at the site, a herd of about a dozen Musk Ox exited the brush at the other side of the river and walked along the river bank. A total of perhaps 20 Musk Oxen were seen.

Kivalina Relocation Project Phase III Study- Raw Water/Solid Waste Site Investigation Log

Site: Kiniktuuraq **Date:** 8/24/04 Tuesday **Time on:** 1657±
Weather Conditions
Sky: Partly Cldy, visibility to horz **Wind:** From NE @ < 10 knots **Temperature** 65°F **Time off:** 1746±

Topography
Slope%: Basically flat, **Slope direction:** Possibly to SSE
Site Relief: Very wet, many small ponds, no relief till reach beach at W.
Drainage: Very poor. This site is wetter than Simiq **Drainage Outfall:** Cannot be determined by eyeball

Access
Barge Landing: On N side off river channel or from W at Chukchi Sea **Access to Site:** Good from N&W **Distance to Site** ~1200 Feet <1/4± Miles

Water Source
Location: N edge of site **Distance from Site:** Borders N edge of site
Stream/Pond Name: Wulik river **Stream Width:** 300± **Stream Depth:** varies, ave= 4 ft Feet
Surface Flow Rate: Est 10 Ft/S **Flow Volume:** 12000 This is a rough estimate CFS

Water Quality
pH: NA **Iron:** NA **Copper:** NA **Iron Bacteria:** NA **Lead:** NA **Hardness:** NA
Nitrates: NA **Nitrites:** NA **Bacteria:** NA **Hydrogen Sulfide:** NA **Taste:** NA **Chlorine:** NA
Alkalinity: NA **Pesticide:** NA **Visual Turbidity:** NA

<p>Ground Cover</p> <p>% Trees: 0 Types: NA</p> <p>% Brush: <5 Types: Scrub willow , scrub Alder, sedge, cotton grass</p> <p>% Tundra: >95 Wind Exposure: High Blowing Snow Problems: High</p>	<p>Sewage Lagoon</p> <p>Location: To S in lower area</p> <p>Distance: 1/4 to 1 mi Potential Area: >5 ac</p> <p>Soils: NA Ice Depth: NA</p>
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Airport
Location: None noted during site visit: tough site **Direction from Site:** NA **Distance from Site:** NA

Solid Waste
Location: None noted during site visit: tough site **Direction from Site:** NA **Distance from Site:** NA
Soils: Plastic silts, very wet, shallow ice **Drainage:** Very poor. This is the wettest site yet.

Notes This site is low, very wet and has poor soild. Old dump site is an issue that may have to be dealt with during permitting

September 5, 2004

Kivalina Relocation Planning Project
Water Supply Options & Site Visit
WO: 03003.007

Kiniktuuraq Site

The following as a response to questions posed by the URS raw water design team for the above noted project, to be answered during the 8/23-28/04 site visit by TNH.

The questions below were provided to the site visit team by fax on 8/24/04.

1. Provide photographs of streams and lakes close to the site.
See the photos taken at each site visited. All photos are dated and labeled. Direction the photograph is looking and approximate position it was taken from is indicated.

2. Estimate size of bodies of water, streams, lakes, ponds.
The only potential body of water that may provide a year round source of raw water is the Wulik River, bounding the N side of the site. This river is not deep and most likely freezes over in the winter. The presence of a thaw bulb to support an infiltration gallery is not know, and further study will have to be performed to establish whether or not one exists.

In addition, siltation may be a problem during break-up. The village usually waits until the end of June for the silt in the Wulik River to settle before drawing their first volume of water to fill the community storage tanks. Any structure to collect water in the Wulik will have to be designed to consider siltation.

Because of the close proximity of the site to the Chukchi Sea, it is doubtful that water wells will work on this site.

The site is very wet, and is covered by small tundra ponds of a few hundred square feet in area. None appear large enough to provide a sustainable source of raw water.

If water cannot be drawn from the Wulik River, it is doubtful a raw water source for this site can be economically developed.

3. If instrumentation available, take field measurements of pH, salinity, conductivity, temperature, DO and turbidity.
Due to the proximity and types of available bodies of water, no sampling was possible. It was judged from observation that none of the ponds/streams reachable would be able to be developed for year round water supply. No water samples were taken.

4. If sampling bottle available, bring back sampled for lab testing.
No samples were taken.

Because of the very difficult terrain, it was not possible to hike very far from the helicopter landing area to more closely investigate any bodies of water. Review of an aerial photograph or a USGS map will probably yield as much information as the team was able to collect at the site, under the conditions present.

September 5, 2004

Kivalina Relocation Planning Project
Landfill Siting Considerations & Site Visit
WO: 03003.007

Kiniktuuraq Site

The following as a response to questions posed by the URS Solid Waste design team for the above noted project, to be answered during the 8/23-28/04 site visit by TNH.

The questions below were provided to the site visit team by fax on 8/24/04.

Investigation of a viable site for a solid waste site for the new village was not possible by foot. Due to the restrictions on flying time for the helicopter, and the time needed at each site visited to investigate soils, topo, water source, etc, any potential solid waste site located away from the subject site could only be assessed visually.

Hundreds of photographs have been taken and labeled to assist in visualizing what the site looks like, as well as the surrounding area. Consult the photographs to get a feel for the site.

- 1 Are there any ponds/lakes or running creeks/rivers (potential for surface water to enter the solid waste site, or is run-off a potential problem?)

The Kiniktuuraq site is very wet. There was no time to walk far from the helicopter landing site. All the land scanned from the air and from standing on the site appears to be at least as wet as the Kiniktuuraq village site, or wetter. The areas to the S are lower and wetter than the village site.

2. Is the site in a flood plain? How close is the nearest floodplain, and what direction does it lie?

At existing elevations, it looks like all the land for several miles around the Kiniktuuraq site is within the 500 year flood plain

3. Describe the topography of the area.

The Kiniktuuraq site and all surrounding areas for miles are low, fairly level, cut by small water courses and dotted with small tundra ponds. Walking is difficult. See photo Frames 124, 125 and 133 -138. Note no high ground is visible.

4. Is the area a wet tundra biotic community? Does it have mat cover or tussocks? Is it interspersed with small lakes/ponds? Are there grasses, sedges, Dwarf Willow, Dwarf Alder or other tundra plants?

The site is definitely a tundra biotic community. The entire site and all surrounding areas for miles are characterized by tundra. The soils are wet, plastic silt with ice at less than 36". The ground cover is predominantly tussocks, grasses, sedge, low arctic plants such as cotton grass, crowberries, cranberries and some shrub willow.

There are many small tundra ponds noted in the area during our site investigation.

5. What are the thermal conditions of the site? Is permafrost present? If so, is it continuous or discontinuous? Note any large areas of thermokarsting.

Polygonal ice wedging is evident over the entire Kiniktuuraq village site and all surrounding land for miles. Most of these wedges are minor. Consult the geotechnical report for more information regarding the thermal conditions of the site.

Evidence of permafrost was found in on the potential village site in shovel dug excavations at a depth of less than 36". All surrounding areas for miles evidenced the same type of land configuration, elevations and plant-life. No developable landfill site was noted during the fly-around conducted by the helicopter.

All the areas flown over were filmed. There is a set of videos for each site that show the land around the Kiniktuuraq site.

6. Where is the cover borrow source?

Sand and gravel can be mined from the beach and along the edges of the Wulik River. Permitting a gravel mining operation in the river may be difficult. Transporting the gravel/sand cover soil to the dump would be very difficult.

7. What wildlife habitat is discernable?

Signs of Caribou evident on the site. No signs of other wildlife were seen. There appear to be various bird species, such as Ravens, and songbirds.

Kivalina Relocation Project Phase III Study- Raw Water/Solid Waste Site Investigation Log

Site: Simiq **Date:** 8/24/04 **Tuesday** **Time on:** 1227±
Weather Conditions
Sky: Part Cldy, visibility to horz **Wind:** Light breeze, < 5 knots from NE **Temperature** 65°F **Time off:** 1407±

Topography
Slope%: Gentle < 5% **Slope direction:** Generally N-NE w/high area in middle. Slopes gelthy to all sides, bluff on N & W
Site Relief: Generally uniform, slightly rounded. No distinct relief on the site (swales, gullies, mounts, etc)
Drainage: Generally N-NE w N & W off bluff faces **Drainage Outfall:** Toe of slope. W side bluff. SE gently rolls to swamp, 3% for 800±yds

Access
Barge Landing: None at site. Neares barge landing 4 mi West at lagoon. Road needed **Access to Site:** From lagoon @ W need road **Distance to Site** 21000 Feet 4± Miles

Water Source
Location: None noted. Appears water to S **Distance from Site:** 1± miles over swamp.
Stream/Pond Name: Some small tundra ponds to NE **Stream Width:** NA **Stream Depth:** NA Feet
Surface Flow Rate: NA Ft/S **Flow Volume:** NA CFS

Water Quality
pH: NA **Iron:** NA **Copper:** NA **Iron Bacteria:** NA **Lead:** NA **Hardness:** NA
Nitrates: NA **Nitrites:** NA **Bacteria:** NA **Hydrogen Sulfide:** NA **Taste:** NA **Chlorine:** NA
Alkalinity: NA **Pesticide:** NA **Visual Turbidity:** NA

Ground Cover % Trees 0 Types: NA % Brush: 10 Types: Scrub Willow, Crowberry, Blueberry, Carnberry, Labrador Tea, Moss, sedges % Tundra 90 Wind Exposure: High Blowing Snow Problems: High	Sewage Lagoon Location: N-NE, tundra pond- also W to tundra pond Distance: <1 mi Potential Area: <2 ac Soils: UNK Ice Depth: If similar to site: 36"
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Airport
Location: None scouted. High ground to E, long to NE **Direction from Site:** East **Distance from Site:** 1 mi±

Solid Waste
Location: No good site noted **Direction from Site:** NA **Distance from Site:** NA
Soils: NA **Drainage:** NA

Notes Site is wet w/shallow plastic silt soils to ice at 36" max. Access, water, airport and solid waste will be a problem.

September 5, 2004

Kivalina Relocation Planning Project
Water Supply Options & Site Visit
WO: 03003.007

Simiq Site

The following as a response to questions posed by the URS raw water design team for the above noted project, to be answered during the 8/23-28/04 site visit by TNH.

The questions below were provided to the site visit team by fax on 8/24/04.

1. Provide photographs of streams and lakes close to the site.
See the photos taken at each site visited. All photos are dated and labeled. Direction the photograph is looking and approximate position it was taken from is indicated.
2. Estimate size of bodies of water, streams, lakes, ponds.
There are two main bodies of water near the Simiq site. One is a large pond on the W side of the site, approximately ½ mi away from the top of the bluff on the W side of the site. Ref Frame 54. Estimated size of the pond is about 1,200ft X 400 ft. The other is a smaller pond to the NE of the side, approximately 400 yards NE of the NE bluff of the site. Estimated size of this pond is approximately 600 ft X 200 ft. Neither of these ponds looks like it could be used for year round raw water supply. There are no major streams or rivers in close proximity to the site. There are fingers of small rivers that wind east from the lagoon, to the south of the site, but no information is known about their size or water quality.
3. If instrumentation available, take field measurements of pH, salinity, conductivity, temperature, DO and turbidity.
Due to the proximity and types of available bodies of water, no sampling was possible. It was judged from observation that neither of the two ponds reachable would be able to be developed for year round water supply. No water samples were taken.
4. If sampling bottle available, bring back sampled for lab testing.
No samples were taken. Because of the very difficult terrain, it was not possible to hike very far from the helicopter landing area to more closely investigate any bodies of water. Review of an aerial photograph or a USGS map will probably yield as much information as the team was able to collect at the site, under the conditions present.

September 5, 2004

Kivalina Relocation Planning Project
Landfill Siting Considerations & Site Visit
WO: 03003.007

Simiq Site

The following as a response to questions posed by the URS Solid Waste design team for the above noted project, to be answered during the 8/23-28/04 site visit by TNH.

The questions below were provided to the site visit team by fax on 8/24/04.

Investigation of a viable site for a solid waste site for the new village was not possible by foot. Due to the restrictions on flying time for the helicopter, and the time needed at each site visited to investigate soils, topo, water source, etc, any potential solid waste site located away from the subject site could only be assessed visually.

Hundreds of photographs have been taken and labeled to assist in visualizing what the site looks like, as well as the surrounding area. Consult the photographs to get a feel for the site.

- 1 Are there any ponds/lakes or running creeks/rivers (potential for surface water to enter the solid waste site, or is run-off a potential problem?)

There was one small tundra pond, not over 2500 sf at the S portion of the village site. The site has a few drainage swales that are shallow and appear to carry run-off from the surface of the site off to the W and NE.

A site for a solid waste dump as not located during the site visit. Since the potential village site does not contain gravel, a gravel source would be some distance away from any potential dump site.

There is not a location for a solid waste dump site within 2 miles of the potential village site at Simiq. The village site is a high point is a swamp. The land surrounding the site is lower by as much as 50 ft. Any dump site would have to be located to the east of the Simiq site as shown in photo Frames 39, 40.

2. Is the site in a flood plain? How close is the nearest floodplain, and what direction does it lie?

The village site is situated at an elevation approximately 30-50 ft above the lower swampy ground surrounding it. At this elevation, it is not in any floodplain. Any solid waste dump site located NE or E of the village site would be at least as high as the village, and therefore not susceptible to flooding. All the land around the site is low enough to be affected by flood waters of the 100 & 500 year floods.

3. Describe the topography of the area.

A dump site for the Simiq village site could be situated in low rolling hills that have little relief and do not appear to have features such as water course, hills, knolls or depressions.

4. Is the area a wet tundra biotic community? Does it have mat cover or tussocks? Is it interspersed with small lakes/ponds? Are there grasses, sedges, Dwarf Willow, Dwarf Alder or other tundra plants?

The site is definitely a tundra biotic community. The sites to the E and NE are characterized by tundra and show tussocks, grasses, sedge, low arctic plants such as cotton grass, crowberries, cranberries, blueberries, Labrador Tea and some shrub willow.

It is expected that some tundra ponds will be located on the low hills to the E.

5. What are the thermal conditions of the site? Is permafrost present? If so, is it continuous or discontinuous? Note any large areas of thermokarsting.

Polygonal ice wedging is evident over most of the area that can be seen from the Simiq site. Consult the geotechnical report for more information regarding the thermal conditions of the site.

Evidence of permafrost was found in shovel dug excavations at a depth of less than 36" on the Simiq site, and the soils of the hills to the E is expected to be similar.

6. Where is the cover borrow source?

No nearby gravel source is present. To develop the Simiq village site, a road would have to be built over the approximately 4 miles of swamp between the E shore of the lagoon and the village site. To reach potential dump sites to the E, additional road of 1 or more miles would have to be constructed.

7. What wildlife habitat is discernable?

Signs of Caribou evident on the site, as well as fox and bear scat. Indications of small game, such as Arctic Hare and ground squirrels was noted. There appear to be various bird species, such as Ravens, and songbirds. This same type of fauna is expected at the potential dump sites to the E.

Kivalina Relocation Project Phase III Study- Raw Water/Solid Waste Site Investigation Log

Site: **Tatchim Isua** Date: **8/24/04 Tuesday** Time on: **1417±**

Weather Conditions

Sky: **Partly Cloudy, visibility to horizon on Sea** Wind: **From NE** Temperature **65°F** Time off: **1647±**

Topography

Slope%: **Basically flat,<3%** Slope direction: **to SW from NE**

Site Relief: **Site is very gently curved across NW-SE direction. Drainage channel limits site on both W & E sides**

Drainage: **Site drains to SW and to W and E from ctr** Drainage Outfall: **Can outfall drainage in channels on W & E sides**

Access

Barge Landing: **Best landing appears to be on Chuckchi Sea due W of site. Lagoon too shallow for barge** Access to Site: **W from Sea** Distance to Site: **<2 mi** Feet **<10000** Miles

Water Source

Location: **Drainage channels on W & E sides or wells** Distance from Site: **<1/2 mi**

Stream/Pond Name: **NA** Stream Width: **NA** Stream Depth: **NA** Feet

Surface Flow Rate: **NA** Ft/S Flow Volume: **NA** CFS

Water Quality

pH: **NA** Iron: **NA** Copper: **NA** Iron Bacteria: **NA** Lead: **NA** Hardness: **NA**

Nitrates: **NA** Nitrites: **NA** Bacteria: **NA** Hydrogen Sulfide: **NA** Taste: **NA** Chlorine: **NA**

Alkalinity: **NA** Pesticide: **NA** Visual Turbidity: **NA**

Ground Cover

% Trees: **0** Types: **NA**

%Brush: **1** Types: **Scrub willow and Alder**

%Tundra: **99** Wind Exposure: **High** Blowing Snow Problems: **High**

Sewage Lagoon

Location: **To tundra Pond W or Pkg plant to surface disch**

Distance: **<1 mi** Potential Area: **>10 ac**

Soils: **UNK** Ice Depth: **UNK**

Airport

Location: **Maybe to SE, nothing to W, S or E** Direction from Site: **SE** Distance from Site: **UNK**

Solid Waste

Location: **Area to SW look potential** Direction from Site: **SW** Distance from Site: **1/1 to 2 mi**

Soils: **UNK. From cover, appear silty and wet** Drainage: **Poor**

Notes: **Soil on the site is excellent; gravel. Locating an airport will be tough. Any SW dump sited to SW will need fill soil**

September 5, 2004

Kivalina Relocation Planning Project
Water Supply Options & Site Visit
WO: 03003.007

Tatchim Isua Site

The following as a response to questions posed by the URS raw water design team for the above noted project, to be answered during the 8/23-28/04 site visit by TNH.

The questions below were provided to the site visit team by fax on 8/24/04.

1 Provide photographs of streams and lakes close to the site.
See the photos taken at each site visited. All photos are dated and labeled. Direction the photograph is looking and approximate position it was taken from is indicated.

2. Estimate size of bodies of water, streams, lakes, ponds.
This site has no major fresh bodies of water near it. To the W & SW there are some tundra ponds, as seen in frames 78, 80. There is a particularly large pond shown in the distance in Frame 80, approximately a mile or so from the W bluff of the site. The quantity and quality of water in these ponds is unknown. The proximity of the far pond to the lagoon raises the question of salinity. None of the ponds in the lowlands to the W of the site appear to be viable year round sources of raw water.

The site is bounded on the NW and Se by drainages flowing toward the lowlands to the W of the site. The drainage on the SE side of the site, seen in Frames 94, 95 is the smaller of the two. It appears there is a small stream flowing in this drainage. Size, quantity and quality of this water is unknown. From the topography and discernable size of the feature, not much water is available from this creek. It is highly doubtful that this creek flows year round.

The drainage bounding the NW side of the site, as seen in Frames 105-107 is larger, and contains a creek that appears to have a more useful volume of water. Even though it is bigger, this stream most likely does not flow all year, and would not be a source of raw water in the winter.

It appears this site may be a candidate for a test well drilling program. Since there is a drainage on each side of the site, the groundwater table maybe situated such that it can be tapped and will provide water for the new village year round.

3. If instrumentation available, take field measurements of pH, salinity, conductivity, temperature, DO and turbidity.

Due to the proximity and types of available bodies of water, no sampling was possible. It was judged from observation that none of the ponds/streams reachable would be able to be developed for year round water supply. No water samples were taken.

4. If sampling bottle available, bring back sampled for lab testing.
No samples were taken.

Because of the very difficult terrain, it was not possible to hike very far from the helicopter landing area to more closely investigate any bodies of water. Review of an aerial photograph or a USGS map will probably yield as much information as the team was able to collect at the site, under the conditions present.

September 5, 2004

Kivalina Relocation Planning Project
Landfill Siting Considerations & Site Visit
WO: 03003.007

Tatchim Isua Site

The following as a response to questions posed by the URS Solid Waste design team for the above noted project, to be answered during the 8/23-28/04 site visit by TNH.

The questions below were provided to the site visit team by fax on 8/24/04.

Investigation of a viable site for a solid waste site for the new village was not possible by foot. Due to the restrictions on flying time for the helicopter, and the time needed at each site visited to investigate soils, topo, water source, etc, any potential solid waste site located away from the subject site could only be assessed visually.

Hundreds of photographs have been taken and labeled to assist in visualizing what the site looks like, as well as the surrounding area. Consult the photographs to get a feel for the site.

- 1 Are there any ponds/lakes or running creeks/rivers (potential for surface water to enter the solid waste site, or is run-off a potential problem?)

Not on the village site itself. Location of a solid waste dump site is difficult without the ability to cover large amounts of terrain and stop to dig and investigate potential sites.

There appear to be developable dump sites NE and NW of the site, as well as SE across the small drainage discussed in the Site Investigation log. The team did not have enough time to get to these sites in the flight window allowed by the helicopter. They can be seen in the photographs in Frames 83, 84, 85 & 93-86 for the NE and SE areas, and Frames 106-108 & 110 for the NW areas.

2. Is the site in a flood plain? How close is the nearest floodplain, and what direction does it lie?

The Tatchim Isua site is well above the flood plain, being about elevation 75. All the potential solid waste dump sites are also at least as high as the potential village site.

The nearest flood plain is at the foot of the W bluff, as can be seen in photo Frames 79-81 and 114-116. Tundra ponds and swampy lands characterize the area from the toe of the bluff to the lagoon.

3. Describe the topography of the area.

The Tatchim Isua site is on the top of a bluff about 1-2 miles from the NE shore of the lagoon. The topography of the site is a gentle curving slope from the N and NE to the top of the bluff. Slopes are shallow, not exceeding 5% in most places. The site is not complicated by any topographic features such as swales, knobs, hills, etc.

4. Is the area a wet tundra biotic community? Does it have mat cover or tussocks? Is it interspersed with small lakes/ponds? Are there grasses, sedges, Dwarf Willow, Dwarf Alder or other tundra plants?

The area surrounding the site is definitely a tundra biotic community. Once inland, off the gravel making up the site for about 500-600 ft, the soil rapidly turns to wet, plastic silt with ice at less than 36". The ground cover over the heart of the site and area of perhaps 20-40 ac is a low hearty plant that appears to be similar to a vine. As the land becomes more tundra-line, inland from the bluff about 600 ft, it is wetter, characterized by tussocks, grasses, sedge, low arctic plants such as cotton grass, crowberries, cranberries and some shrub willow.

There were no small tundra ponds noted during our site investigation. The only water course was a small stream located in the drainage bounding the E side of the site.

The areas for potential dump sites appear to be characterized by arctic flora. These gently rolling hills would be able to support a dump site, but shallow ice and lack of fill would most likely make them nonviable.

See the geotechnical report for more information on the geology and soil characteristics of the village site and the tundra outside the investigated area.

5. What are the thermal conditions of the site? Is permafrost present? If so, is it continuous or discontinuous? Note any large areas of thermokarsting.
On the site itself, signs of permafrost are non existent. As a traverse is made away from the site, early polygonal ice wedging can be seen. It was noted in shovel holes dug within 100 ft of the edge of the gravel area of the site, that ice was encountered within 36". Consult the geotechnical report for more information regarding the thermal conditions of the site.
6. Where is the cover borrow source?
The nearest potential borrow source for cover gravel is at the Chukchi Sea. Some gravel could be mined from the areas of the Kivalina River braids and barged to the dump site or trucked in winter, but no near-by gravel was found.
7. What wildlife habitat is discernable?
Signs of Caribou are prevalent on the site. We saw at least 5 sets of bones of animals that had been harvested on the site. Indications of small game, such as Arctic Hare and ground squirrels was noted. Ground squirrel holes were seen in the face of the bluff. There appear to be various bird species, such as Ravens, Ptarmigan and songbirds.



December 19, 2005

RE: KIVALINA TRIP REPORT

Date: December 12-13, 2005

Attendees:

Andrea Elconin, Alaska Corps of Engineers
Larry Scudder, Alaska Corps of Engineers
Mike Wolski, Senior Civil Engineer, Tryck Nyman Hayes, Inc., Anchorage, AK
Jon Isaacs, Senior Planner, URS Corporation, Anchorage, AK
Laura Young, Technical Services Manager, URS Corporation, Anchorage, AK

Purpose of Visit:

- Present the Kivalina Relocation Planning Committee (KRPC), the Kivalina IRA Council, and the Kivalina City Council with the results and recommendations of the draft Relocation Report prior to the public meeting.
- Present the community of Kivalina with the results and recommendations of the draft Relocation Report.

Northwest Arctic Borough Informal Meeting

- Andrea Elconin, Larry Scudder, Mike Wolski, Jon Isaacs, and Laura Young stopped by the Borough offices and talked with Mayor Schaeffer and Walter Porter before heading out to Kivalina. General findings from the draft Relocation Report, potential future next steps, and evacuation road were discussed.

Special Joint Meeting Summary

- ACOE/THN/URS Attendees presented the KRPC, the IRA Council, and the City Council with the results of the draft report.
- Jon Isaacs indicated that all of the sites were not perfect and generally that all sites that were good for subsistence uses were not easy or cost effective to construct, and that those sites that were less costly and easier to construct would not be easy to access or good for subsistence uses.
- Jon Isaacs asked if there were any sites that the study had overlooked thus far. (No new sites were identified.)
- Jon Isaacs indicated that coastal sites would be hard to get support by the organizations providing funding.
- Community expressed frustration that their preferred site was the lowest ranked.



Public Meeting Summary

- Andrea Elconin opened the meeting by giving project background through where they were at now and introduced Jon Isaacs.
- Jon Isaacs presented the results of the draft Relocation Report.
- Community requested information on where the existing airport runway material had come from.
- ACOE indicated that the material had not come from the lagoon and gravel was not available in the lagoon for future building.
- The ACOE had assumed that Kiniktuuraq site had good gravel (but it turned out not so).
- Community requested information on potential Red Dog gravel sources.
- Community stated that some Red Dog sources may be contaminated.
- Community stated that the State of Alaska should be consulted on whether Kivalina could use Red Dog gravel pits (+/- 6 pits).
- Community stated that they need their own heavy equipment to build roads.
- Community stated that they have their own qualified labor and operators.
- Community stated that they could build an ice road so they could work year round.
- Community stated that the lead agency needs to be identified and coordination needs to start.
- Community asked about a salvage/relocation assessment being completed.
- Community asked how they could start the inventory/evaluation process for each individual facility.

Presentation to Kivalina Middle and High School Students

- Jon Isaacs, Mike Wolski, and Laura Young gave a presentation to a large group of middle and high school students on the results of the draft Relocation Report. They focused their discussion on the pros/cons of each site.

Follow-up

- Revise report to remove ratings matrix
- Provide cost and quantities information to build road from Kivalina to each proposed site
- Obtain copy of NWAB/ASCG Evacuation Road Report
- Obtain copies of ADOT&PF wind and site selection studies for Kiniktuuraq
- Confirm that Tatchim Isua could accommodate crosswind runway