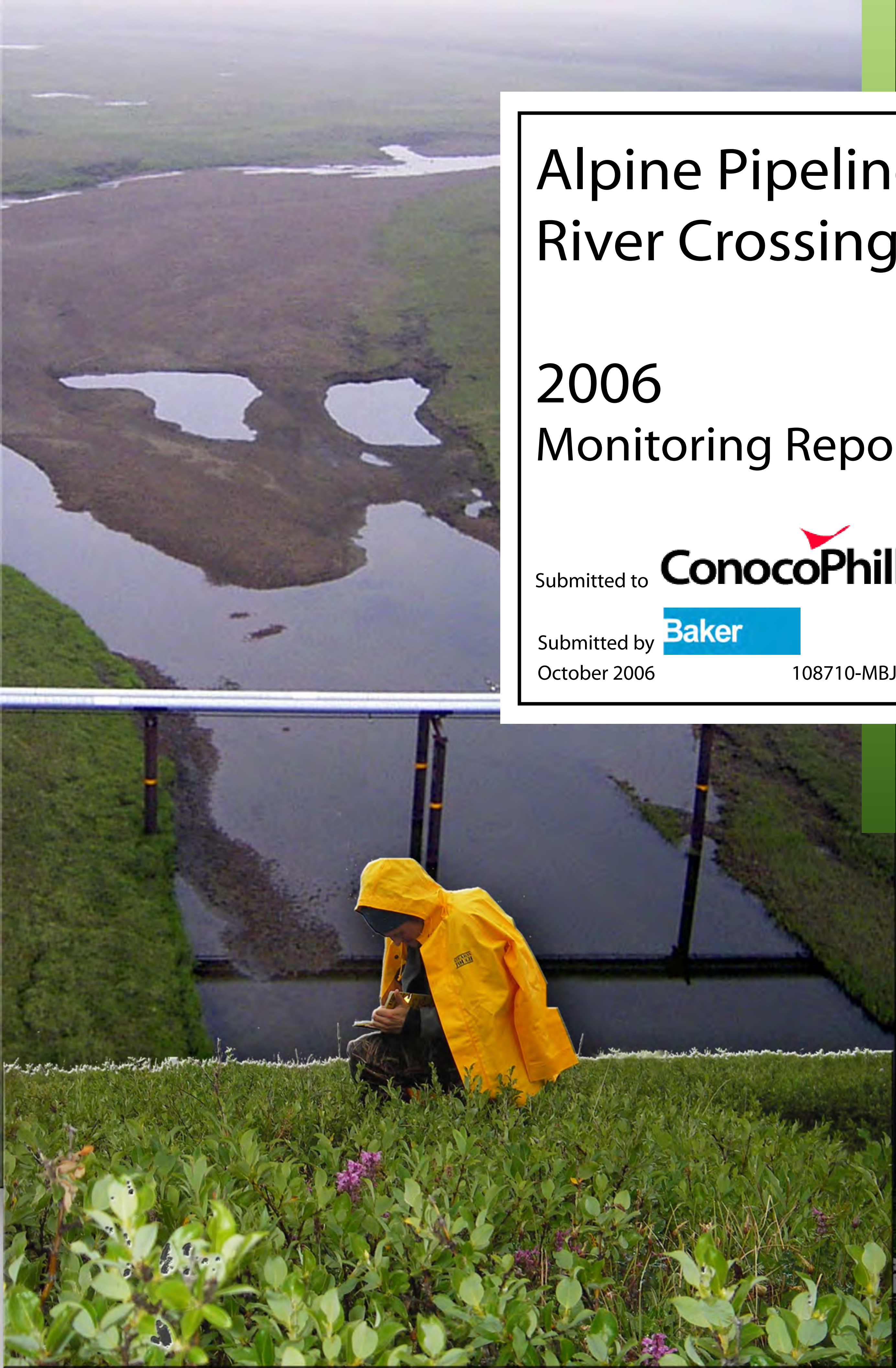
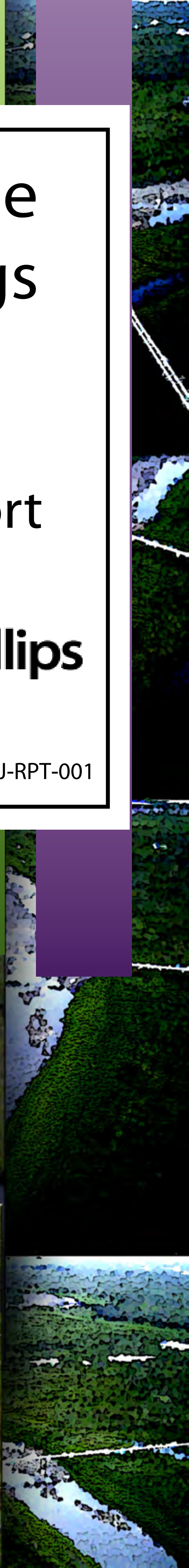




Alpine Pipeline River Crossings

2006 Monitoring Report

Submitted to ConocoPhillips

Submitted by Baker

October 2006

108710-MBJ-RPT-001

Alpine Pipeline River Crossings

2006 Monitoring Report

Submitted to

ConocoPhillips

Submitted by

Baker

Michael Baker Jr. Inc.
1400 W. Benson Blvd., Suite 200
Anchorage, AK 99503

October 2006
108710-MBJ-RPT-001

Table of Contents

List of Figures

List of Tables

Appendices

1.0 Introduction

The Alpine Pipeline System (pipelines) was constructed during the winter of 1998/1999, and crosses three major rivers between the Alpine Development CD-1 and the Kuparuk Pipeline located at Central Processing Facility 2 (CPF-2) as identified in Figure 1. These crossings are the horizontal directional drilled (HDD) crossing of the East Channel of the Colville River, and the aboveground crossings of the Kachemach River and the Miluveach River.

In 2001, Michael Baker Jr. Inc. (Baker) conducted post spring breakup monitoring of the HDD crossing (Baker 2002). In 2003, 2004, and 2005, Baker conducted post spring breakup monitoring of the HDD, Kachemach River, and the Miluveach River crossings (Baker 2003, 2004, and 2005).

The 2006 field observations and surveying data were compared with the pipeline design criteria and prior years' data to evaluate the stability of the pipeline system at these crossings, as well as the potential impacts on the rivers.

ConocoPhillips
Alaska, Inc.

DATE:	9/14/06	PROJECT:	108710 ALPINE PIPELINE
DRAWN:	WAP	FILE:	FIGURE 1
CHECKED:	MTA	SCALE:	1" = 10,000'

Baker

Michael Baker Jr., Inc.
A Unit of Michael Baker Corporation
1400 West Benson Blvd, Suite 200
Anchorage, Alaska 99503
Phone: (907) 273-1600
Fax: (907) 273-1699

2006 POST BREAKUP
PIPELINE MONITORING
SITES

FIGURE 1

2.0 Objective

The post spring breakup monitoring was conducted to document the condition of the pipelines at the three major river crossing sites and compare the observed condition to the design criteria. Of particular concern was the state of the pipeline itself at these crossings, as well as the pipeline's impact on the hydrologic features it crosses.

The data collected included the following:

- Photographs at each crossing location.
- Condition of Vertical Support Member(s) (VSM): tilting, settling, jacking, or scouring as follows:
  - During construction, the single VSM, identified as 1714A and 1715B, at the Kachemach River were abandoned in place and not connected to the pipeline system. The two abandoned VSM are now identified as 1714A and 1715C. One double VSM support, identified as 1715A and 1715B, replaced the two abandoned VSM.
  - During construction, the single VSM 2047 and 2048 at the Miluveach River were cut below grade and replaced with two double VSM supports.
- Measurement of depth and width of scour around VSM in the river channels.
- Measurement of localized scouring near river crossings.
- Top and bottom elevations of river banks for evaluation of bank erosion.
- Evaluation of bank erosion at the HDD crossing, 50 feet upstream and downstream from the NPS 14 crude oil pipeline.
- Topographic survey from the Colville River to the HDD East Pad to document bank and ground stability.

The following physical conditions were specifically evaluated during the site inspections:

- The presence or absence of erosion at the HDD gravel pads.
- Settlement and jacking of the HDD building foundations.
- Obstructions, ice dams, new river channels, or changes in flow in the channels.
- Signs of flooding that threatened a facility or pipeline.
- Water that could not be diverted and was concentrated longitudinally on or along the pipeline centerline, or gullying that threatened the below grade pipeline at the HDD crossing.
- Soil pressure ridges that developed parallel to the pipe axis and exceeded one foot in height and 60 feet in length.
- Ponding that extended over the pipe axis deeper than one foot and more than 100 feet long.
- Cracks within ten feet of the pipeline centerlines at least ten feet long with vertical displacement exceeding six inches, or wider than two inches parallel to the pipe axis and longer than 60 feet.
- Depressions occurring longitudinally over pipe axis deeper than one foot and more than 100 feet long.
- Pipeline leaks.

3.0 Methods

Throughout the 2006 spring breakup, observations and photographs of the three crossings were collected. On July 20, 2006, Baker personnel Michael Alexander, P.E., and Alex Gibson inspected and took measurements at the three Alpine pipeline river crossings. On the day of the post breakup inspection, the sites were clear of ice and snow allowing full access to the channels and pipelines. At the Colville River HDD crossing, the inspections extended from the point of pipeline casing entry to the riverbanks, while at the Kachemach and the Miluveach Rivers, the inspections extended within the banks of the channel. The inspections extended upstream and downstream several hundred feet of the three crossing sites. In addition to visual observations, both aerial and ground photographs were taken at each of the sites and are provided in **Appendix A**. The observations and measurements were then compared to design criteria established at each river crossing.

3.1 Bank Erosion

In August 2006, Kuukpik/LCMF, LLC (LCMF) surveyed the stream topography and riverbanks at each crossing and incorporated the data into bank migration plans and a tabulation of historical migration since 2001 for each bank, available in **Appendices B through E**. The baseline stationing along each bank was established as a means of comparing the annual results and were based on arbitrary initial points, each beginning at 100 feet.

The survey data for the Colville River was compared to scour control points previously established to assure the pipeline system would be protected. Based on a 30-year design life, these scour control points were located on each side of the HDD crossing with the HDD West top of bank setback allowing for 105 feet of bank erosion and the HDD East top of bank setback allowing for 115 feet of bank erosion (Baker 1997).

The survey data for the VSM within the floodplain of the Kachemach and Miluveach River crossings were also compared to the 30-year design life criteria, which accommodated bank migration of 25 feet (either side) at the Kachemach River and 35 feet (either side) at the Miluveach River (Baker 1999).

3.2 VSM Tilt, Settlement, and Jacking

LCMF surveyed the top of steel (TOS) elevation for various pipeline supports and developed tabulations of historical TOS elevations for each support, available in **Appendices B through E**. Tilt of various VSM adjacent to the HDD, Miluveach River, and Kachemach River crossings was measured using a 4-foot carpenter's level and tape measure. Tilt was measured perpendicular to the NPS 14 oil pipeline (north/south) and parallel to the pipeline (east/west). Tilt of each VSM was documented by measuring the horizontal distance from plumb in feet per vertical foot (feet/foot). The VSM axis was considered plumb if the tilt was measured to be less than or equal to 0.00125 feet/foot (1/64 inch/foot). If tilt was measurable, the direction of tilt was also recorded (N, S, E, or W). Conversions between Feet/Foot measurements presented in this report and Inch/Foot units are provided in Table 3-1**.**

Table 3-1 VSM Tilt Unit Conversion

Feet/Foot	Inch/Foot
< 0.00125	< 1/64
0.00250	1/32
0.00500	1/16
0.00750	3/32
0.01000	1/8
0.01250	5/32

The 1999 Alpine VSM installation specification states that "the plumb of each VSM shall vary no more than +/- 0.5% (1/16 inch per 12 inches) in any direction" (ARCO 1999). The 2004 CPAI North Slope VSM specification states that "the slope of any support beam in the direction parallel to the pipeline centerline shall not exceed 1/2 inch (0.042 feet) in ten feet (0.004 feet/foot or 1/16 inch per foot)" (CPAI 2004). Based on these VSM specifications and for comparison purposes, the plumb (tilt) tolerance was accepted to be 0.005 feet/foot (1/16 inch/foot).

3.3 VSM Scour

Scour at each in-stream VSM at the Miluveach and Kachemach Rivers were measured using a steel tape measure. Scour depths were determined by comparing the water depth directly upstream and downstream of each pile to the water depth adjacent to each location. In addition, LCMF surveyed the elevation of scour at each pier in order to compare to design scour limits.

Based on the Mechanical Analysis of Aboveground Pipeline & Aboveground River Crossings (Baker 1999), the VSM within the floodplain of the Kachemach and Miluveach River crossings were designed to withstand local (pier) scour and general main channel scour during a 200-year flood as summarized in Table 3-2.

Table 3-2 VSM Design Scour Limits

River	Minimum Scour Hole Elevations (feet – BPMSL)	
	Floodplain	Main Channel
Kachemach	9.5	6.9
Miluveach	36.7	35.1

4.0 Results

4.1 HDD West Bank

Baker personnel evaluated the west bank of the Colville River HDD crossing by visual inspection and review of ground and aerial photography **(Photo A-1 through Photo A-5, Appendix A).** The 2006 Colville River breakup floodwaters reached portions of the top of the sand bluff causing minor erosion along the HDD West Bank and deposition of sand along the toe of the bank **(Photo A-4, Appendix A).** However, floodwaters did not reach the gravel pads, and no sign of erosion was identified at these locations.

4.1.1 Bank Erosion

Between April 2002 and August 2006, LCMF measured a maximum erosion of 18.8 feet and a maximum average rate of 4.3 feet/year along the top of bank at a single location 120 feet north of the NPS 14 oil pipeline centerline along the bluff. The average rate of erosion along the 440-foot top of bank was measured to be 0.8 feet/year. A summary of the LCMF surveying results for the HDD West Bank crossing is presented in **Appendix B**. The measured average annual rate of west bank erosion is less than the observed long-term historical average rate of 1.2 feet/year, and less than the estimated maximum erosion rate used for design of 2.3 feet/year (Baker 1997).

The 2006 LCMF survey data was compared to the 1997 scour control point at the NPS 14 oil pipeline centerline along the bluff. Based on this comparison, the west top of bank at the pipeline centerline has migrated approximately 9.0 feet in 9 years, or 1.0 foot/year. As of 2006, the observed bank erosion equals approximately 9% of the design setback, which represents an observed erosion rate that is less than was estimated in 1997. The west bank erosion has not yet reached the 50% design setback; however, if either bank "migrates 50% of the design setback, erosion rates or possible mitigation measures will be evaluated" (Baker 1999).

4.1.2 VSM Tilt

Based on the July 20, 2006 observations and measurements, the VSM directly adjacent to the HDD West pad and crossing were found to be generally plumb and adequately supporting the pipeline. Of the six VSM measured for tilt, the maximum tilt was measured to be 0.005 feet/foot (1/16 inch/foot), within the project tolerances of less than or equal to 0.005 feet/foot (1/16 inch/foot). A summary of the HDD West Bank VSM tilt survey results are presented in Table 4-1.

Table 4-1 HDD West VSM Tilt Measurement Results

VSM Number	Tilt Measurement Orientation (ft/ft)	
	North/South	East/West
783	< 0.00125	< 0.00125
784A	0.00250 S	0.00205 W
784B	< 0.00125	0.00500 W
788	< 0.00125	< 0.00125
789A	0.00500 N	0.00250 W
789B	0.00250 S	0.00250 E

LCMF has conducted a pile cap elevation survey annually since 2005 and based on the result of their surveys, the pile caps have generally experienced less than 0.1 feet of movement vertically. A summary of the LCMF surveying results for the HDD West Bank crossing is presented in **Appendix B**.

4.1.3 Summary

The HDD West Bank crossing has not experienced significant erosion or scour in the 5 years of annual observations and measurements. The observed erosion of the west bank represents approximately 9% of the 105-foot design setback while the pipeline crossing has operated for approximately 30% of the original design life of the crossing. Based on the visual inspections, measurements, and survey results, there appeared to be no tilting, settling, or jacking of the VSM or HDD building foundations. The HDD West Bank gravel pad is free from erosion and the pipelines appeared to be in good, stable condition with no leaks.

4.2 HDD East Bank

Baker personnel evaluated the east bank of the Colville River HDD crossing by visual inspection and review of ground and aerial photography **(Photo A-6 through Photo A-11, Appendix A).** The 2006 Colville River breakup floodwaters were observed above the top of the tundra bluff and there were minor signs of erosion along the east bank of the HDD crossing as a result of the flooding and natural erosion of the bank**.** While flood waters did reach the gravel pads, no sign of erosion was identified at these locations.

4.2.1 Bank Erosion

Slumping and erosion of the bank was observed at the HDD East Bank site, as well as upstream and downstream from the pipeline crossing, suggesting that the pipelines are not affecting the erosion rate of the bank. In addition to monitoring the bank bluff migration, subsidence monitoring has been conducted at the polygon trough cross sections since 2001. The cumulative subsidence at each of the eight cross sections is generally less than one foot.

Between October 2001 and August 2006, LCMF measured a maximum erosion of 26.8 feet and a maximum average rate of 5.4 feet/year along the top of bank at a single location 50 feet south of the NPS 14 oil pipeline centerline along the bluff. The average rate of erosion along the 335-foot top of bank was measured to be 2.3 feet/year. A summary of the LCMF surveying results for the HDD East Bank crossing is presented in **Appendix C**. The measured average annual rate of east bank erosion is greater than the observed long-term historical average rate of 1.5 feet/year, but less than the estimated maximum erosion rate used for design of 2.5 feet/year (Baker 1997).

The 2006 LCMF survey data was compared to the 1997 scour control point at the NPS 14 oil pipeline centerline along the bluff. Based on this comparison, the east top of bank at the oil pipeline centerline has migrated approximately 8.0 feet in 9 years, or 0.9 feet/year. As of 2006, the observed bank erosion equals approximately 7% of the design setback which represents an observed erosion rate that is less than was estimated in 1997. The east bank erosion has not yet reached the 50% design setback; however, if the bank "migrates 50% of the design setback, erosion rates or possible mitigation measures will be evaluated" (Baker 1999).

4.2.2 VSM Tilt

Based on the July 20, 2006 observations and measurements, the VSM directly adjacent to the HDD East pad and crossing were found to be generally plumb and adequately supporting the pipelines. Of the five VSM measured for tilt, the maximum tilt was measured to be 0.0025 feet/foot (1/32 inch/foot), within the project tolerances of less than or equal to 0.005 feet/foot (1/16 inch/foot). A summary of the HDD East Bank VSM tilt survey results is presented in Table 4-2**.**

Table 4-2 HDD East VSM Tilt Measurement Results

VSM Number	Tilt Measurement Orientation (ft/ft)	
	North/South	East/West
883	< 0.00125	< 0.00125
884	< 0.00125	< 0.00125
885	0.00250 S	0.00250 W
889	< 0.00125	< 0.00125
890	< 0.00125	< 0.00125

The most significant observation during the 2006 spring breakup, with respect to flooding impacts to the pipeline river crossings, was minor contact between a pan of river ice and the southwestern most thermosyphon at the HDD East crossing **(Photo A-6 and Photo A-7, Appendix A).** Because of this observation, the tilt of the thermosyphon was measured and found to be tilting 0.0225 feet/foot (1/4 inch/foot) towards the northeast. Baseline data for this thermosyphon is not available for comparison; however, considering that the impact from the ice pan was from the southwest, it can be assumed that the tilt in this thermosyphon was caused by the 2006 flooding. The current orientation of this and the remaining thermosyphon are within operational tolerances and do not impact the performance of these systems (Arctic Foundations 2006). For this reason, there appears to be no adverse impacts to the Alpine Pipeline System at the HDD East Bank due to the 2006 spring breakup flooding.

4.2.3 Summary

The HDD East Bank crossing has experienced erosion during the 5 years of annual observations and measurements as was anticipated. The observed erosion of the east bank represents approximately 7% of the 115-foot design setback while the pipeline crossing has operated for approximately 30% of the original design life of the crossing. Based on the visual inspections, measurements, and survey results, there appeared to be no tilting, settling, or jacking of the VSM. The HDD East Bank gravel pad is free from erosion and the pipelines appeared to be in good, stable condition with no leaks.

4.3 Kachemach River Crossing

The Kachemach River crossing was evaluated by visual inspection and review of ground and aerial photography **(Photo A-12 through Photo A-16, Appendix A).** At the time of the inspection, flow was observed within the gravel channel bottom at a depth of generally less than one foot. Based on observed debris drift lines, flow from the 2006 breakup was confined to the main channel and did not appear to have reached the overbank regions adjacent to the river crossing.

4.3.1 Bank Erosion

Between October 2002 and August 2006, LCMF measured a maximum single point erosion of 17.5 feet on the east bank and 15.6 feet on the west bank. This corresponds to a maximum average erosion rate of 4.4 feet/year at the east bank and 3.9 feet/year at the west bank. The average rate of erosion along the 420-foot top of east bank was measured to be 0.5 feet/year. The average rate of erosion along the 440-foot top of west bank was measured to be 0.8 feet/year. A summary of the LCMF surveying results for the Kachemach River crossing is presented in **Appendix D**.

Based on the July 20, 2006 observations and measurements, the average observed east and west bank migration is approximately 8% and 13%, respectively, of the 25-foot design migration allowance based on 30-year service. The pipelines appear to be having no impact on the migration or erosion of the banks at the crossing location. The observed erosion along the Kachemach River banks can primarily be attributed to the ice road impacts during the 2004 spring breakup flow (Baker, 2004).

4.3.2 VSM Tilt

Based on the July 20, 2006 observations and measurements, the VSM directly adjacent to the Kachemach River crossing were found to be generally plumb and adequately supporting the pipelines. Of the six VSM measured for tilt, the maximum tilt was measured to be 0.0075 feet/foot (3/32 inch/foot) for the operational VSM and 0.0125 feet/foot (5/32 inch/foot) for the abandoned VSM. As such, the tilt of each operational VSM was within the project tolerances of less than or equal to 0.005 feet/foot (1/16 inch/foot) with the exception of VSM 1716. The tilt of VSM 1716 exceeds project tolerances by 0.0025 feet/foot. However, this difference is generally within the accuracy of methods used in this investigation and for this reason the tilt of VSM 1716 is considered acceptable. A summary of the Kachemach River tilt survey results is presented in Table 4-3**.**

Table 4-3 Kachemach River VSM Tilt Measurement Results

VSM Number	Tilt Measurement Orientation (ft/ft)	
	North/South	East/West
1713	Not within Channel	
1714	0.00500 N	< 0.00125
Abandoned (1714A)	0.00250 S	0.01000 E
1715A	< 0.00125	< 0.00125
1715B	< 0.00125	0.00250 W
Abandoned (1715C)	< 0.00125	0.01250 E
1716	0.00750 S	0.00250 E
1717	Not within Channel	

LCMF has conducted a pile cap elevation survey annually since 2004 and based on the result of their survey, the pile caps have generally experienced less than 0.1 feet of movement vertically. A summary of the LCMF surveying results for the Kachemach River crossing can be found in **Appendix D**.

4.3.3 VSM Scour

There were no signs of significant scour at the base of the Kachemach River crossing VSM. The July 20, 2006 observed scour measurements are presented in Table 4-4**.**

Table 4-4 Kachemach River Scour Measurement Results

VSM Number	Measurement Location (ft)	
	Upstream	Downstream
1713	Not within Channel	
1714	2.0	2.0
Abandoned (1714A)	0.7	0.4
1715A	0.8	0.5
1715B	1.0	0.3
Abandoned (1715C)	0.8	0.4
1716	0.5	0.5
1717	Not within Channel	

In addition to these scour measurements, LCMF established the elevation of the bottom of scour at each in stream VSM and these drawings are presented in **Appendix D**. The minimum measured elevation of scour at the Kachemach River crossing was 23.75 feet BPMSL. The minimum bed elevation at the Kachemach River pipeline crossing prior to construction was 26.8 feet based on the design drawings (Baker 1998). Therefore, the approximate maximum observed scour within the main channel is equal to 3.1 feet and is well above the 200-year design scour elevation of 6.9 feet BPMSL. Based on the Del Norte Alpine Pipeline VSM Asbuilts (Del Norte 1999) and the Mechanical Analysis of Aboveground Pipeline & Aboveground River Crossings (Baker 1999), the bottom of VSM 1715A and 1715B were installed to -13.3 feet BPMSL; therefore, observed scour of each operational VSM within the Kachemach River crossing was found to be within project design criteria.

4.3.4 Summary

Over the past 5 years of monitoring, significant erosion, scour, or VSM tilt have not been observed or measured at the Kachemach River crossing. VSM 1714A and 1715C are not attached to the pipeline and appear to be stable and free from jacking. Based on the visual inspections, measurements, and survey results, the pipelines are stable and there appears to be no significant scour, tilting, settling, or jacking of the VSM. The river banks are free from significant erosion and the pipelines appear to be in good condition with no leaks. Based on a review of historical monitoring of breakup at the Kachemach River Crossing, it is recommended that future post-spring breakup monitoring activities take place on a 5-year interval rather than annually.

4.4 Miluveach River Crossing

The Miluveach River crossing was evaluated by visual inspection and review of ground and aerial photography **(Photo A-17 through Photo A-21, Appendix A).** At the time of the inspection, flow was observed within the gravel channel bottom at a depth of generally less than one foot. Based on observed debris drift lines, flow from the 2006 breakup was confined to the main channel and did not appear to have reached the overbank regions adjacent to the river crossing.

4.4.1 Bank Erosion

Between October 2002 and August 2006, LCMF measured a maximum single point erosion of 1.1 feet on the east bank and 5.1 feet on the west bank. This corresponds to a maximum average erosion rate of 0.3 feet/year at the east bank and 1.3 feet/year at the west bank. The average rate of erosion along the 620-foot top of east bank was measured to be 0.0 feet/year. The average rate of erosion along the 610-foot top of west bank was measured to be 0.4 feet/year. A summary of the LCMF surveying results for the Miluveach River crossing is presented in **Appendix E**.

Based on the July 20, 2006 observations and measurements, the average observed east and west bank migration is approximately 0% and 5%, respectively, of the 35-foot design migration allowance based on a 30-year service life. The pipeline appears to have no impact on the migration or erosion of the banks at the crossing location.

4.4.2 VSM Tilt

Based on the July 20, 2006 observations and measurements, the VSM directly adjacent to the Miluveach River crossing were found to be generally plumb and adequately supporting the pipelines. Of the four VSM measured for tilt, the maximum tilt was measured to be 0.0075 feet/foot (3/32 inch/foot) and within project tolerances of less than or equal to 0.005 feet/foot (1/16 inch/foot) with the exception of VSM 2048B. The tilt of VSM 2048B exceeds project tolerances by 0.0025 feet/foot. However, this difference is generally within the accuracy of methods used in this investigation and for this reason the tilt of VSM 2048B is considered acceptable. A summary of the Miluveach River VSM tilt survey is presented in **Table 4-5.**

Table 4-5 Miluveach River VSM Tilt Measurement Results

VSM Number	Tilt Measurement Orientation (ft/ft)	
	North/South	East/West
2046	Not within Channel	
2047A	0.00250 N	< 0.00125
2047B	0.00250 S	< 0.00125
2048A	< 0.00125	< 0.00125
2048B	< 0.00125	0.00750 E
2049	Not within Channel	

LCMF has conducted a pile cap elevation survey annually since 2004 and based on the result of their survey, the pile caps have generally experienced less than 0.1 feet of movement vertically. A summary of the LCMF surveying results of the Miluveach River crossing is presented in **Appendix E**.

4.4.3 VSM Scour

There were no signs of significant scour at the base of the Miluveach River crossing VSM. The July 20, 2006 observed scour measurements are presented in **Table 4-6.**

Table 4-6 Miluveach River Scour Measurement Results

VSM Number	Measurement Location (ft)	
	Upstream	Downstream
2046	Not within Channel	
2047A	0.6	0.0
2047B	0.3	0.0
2048A	0.8	0.2
2048B	1.1	0.7
2049	Not within Channel	

In addition to these scour measurements, LCMF established the elevation of the bottom of scour at each in stream VSM and these drawings are presented in **Appendix E**. The minimum measured elevation of scour at the Miluveach River crossing was 44.25 feet BPMSL. The minimum bed elevation at the Miluveach River pipeline crossing prior to construction was 47.3 feet based on the design drawings (Baker 1998). Therefore, the approximate maximum observed scour within the main channel is equal to 3.1 feet and is well above the 200-year design scour elevation of 35.1 feet BPMSL. Based on the Del Norte Alpine Pipeline VSM Asbuilts (Del Norte 1999) and the Mechanical Analysis of Aboveground Pipeline & Aboveground River Crossings (Baker 1999), the bottoms of VSM 2047A and 2047B were installed to -14.8 feet BPMSL and the bottoms of VSM 2048A and 2048B were installed to -13.8 feet BPMSL. Therefore observed scour of each operational VSM within the Miluveach River crossing was found to be within project design criteria.

4.4.4 Summary

Over the past 5 years of monitoring, significant erosion, scour or VSM tilt have not been observed or measured at the Miluveach River crossing. VSM 2047 and 2048 are cut off below grade and appear to be stable. Based on the visual inspections and survey results, the pipelines are stable and there appears to be no significant scour, tilting, settling, or jacking of the VSM. The river banks are free from erosion and the pipelines appear to be in good condition with no leaks. Based on a review of historical monitoring of breakup at the Miluveach River crossing, it is recommended that future post-spring breakup monitoring activities take place on a 5-year interval rather than annually.

5.0 Conclusions

No significant erosion or scour occurred at the Alpine Pipeline System river crossing sites during the 2006 spring breakup, based on Baker's data collection and evaluation and LCMF surveying results. The condition of the VSM and pipelines at the sites was determined to be stable. At the east and west bank HDD crossing sites, continuing natural erosion along the banks was noted to be within design estimates and is not negatively impacting the safe operation of the pipeline.

While the erosion of the banks near the HDD crossing of the Colville River does not appear to have been affected by the construction or operation of the pipeline, continued annual monitoring at these locations is recommended. However, considering the stability of the Kachemach and Miluveach River crossings, it is recommended that future post-spring breakup monitoring activities take place on a 5-year interval rather than annually.

6.0 References

ARCO Alaska, Inc. (ARCO). 1999. Vertical Support Member and Module Pile Installation Specification. SPC-CE-AP-10001. February 1999.

Arctic Foundations. 2006. Telephone Communication between Michael Alexander, P.E. (Baker) and Edward Yarmak, P.E. July 26, 2006.

ConocoPhillips Alaska (CPAI). 2004. Vertical Support Member and Module Pile Installation Specification. SPC-CE-NS-80002. May 2004.

Del Norte Surveying Inc. (Del Norte). 1999. Alpine Pipeline VSM Asbuilt. May 20, 1999.

Michael Baker, Jr., Inc. (Baker). 2005. 2005 Alpine Pipeline River Crossing Monitoring. Prepared for ConocoPhillips Alaska. 105758-MBJ-001. October 2005.

—— 2004. 2004 Alpine Pipeline River Crossing Monitoring. Prepared for ConocoPhillips Alaska. 103654-MBJ-001. October 2004.

—— 2003. 2003 Alpine Pipeline River Crossing Monitoring. Prepared for ConocoPhillips Alaska. 101376-MBJ-001. July 2003.

—— 2002. HDD Transition Zones Civil Surveillance Trip Report – 2001. Prepared for Phillips Alaska Inc. 25114-217-MBJ-001. January 2002.

—— 1999. Mechanical Analysis of Aboveground Pipeline & Aboveground River Crossings. Prepared for ARCO Alaska Inc. 23100-MBJ-RP-001. May, 1999.

—— 1998. Alpine Development Overland Pipeline PI-03 to PI-40 Plan and Profile Drawings. November 1998.

—— 1997. Alpine Development. Colville River Crossing Design Report. Prepared for ARCO Alaska. Rev. 4 2003. Prepared for Arco Alaska Inc. 23100-MBJ-RP-003. June 1997.

Appendix A Photos

Photo A-1 HDD West, June 2, 2006. Bluff and thermosyphons at HDD West bank 2 days after peak stage, looking north.

Photo A-2 HDD West, July 20, 2006. Bluff, thermosyphons and pad at HDD West, looking south.

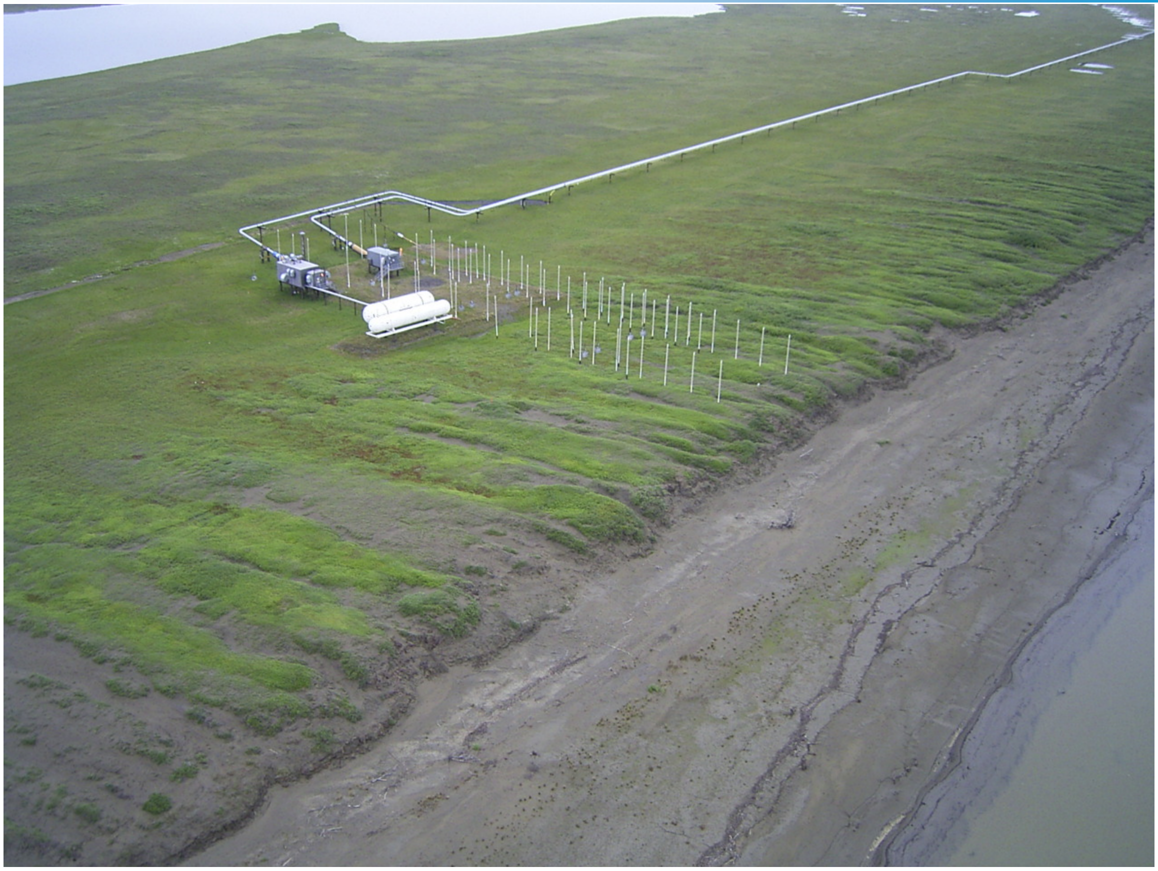


Photo A-3 HDD West, July 20, 2006. Bluff, thermosyphons, pad and pipeline at HDD West, looking north.

Photo A-4 HDD West, July 20, 2006. Bluff and thermosyphon at HDD West, looking north.

Photo A-5 HDD West, July 20, 2006. Bluff, thermosyphons, and pads at HDD West, looking west.

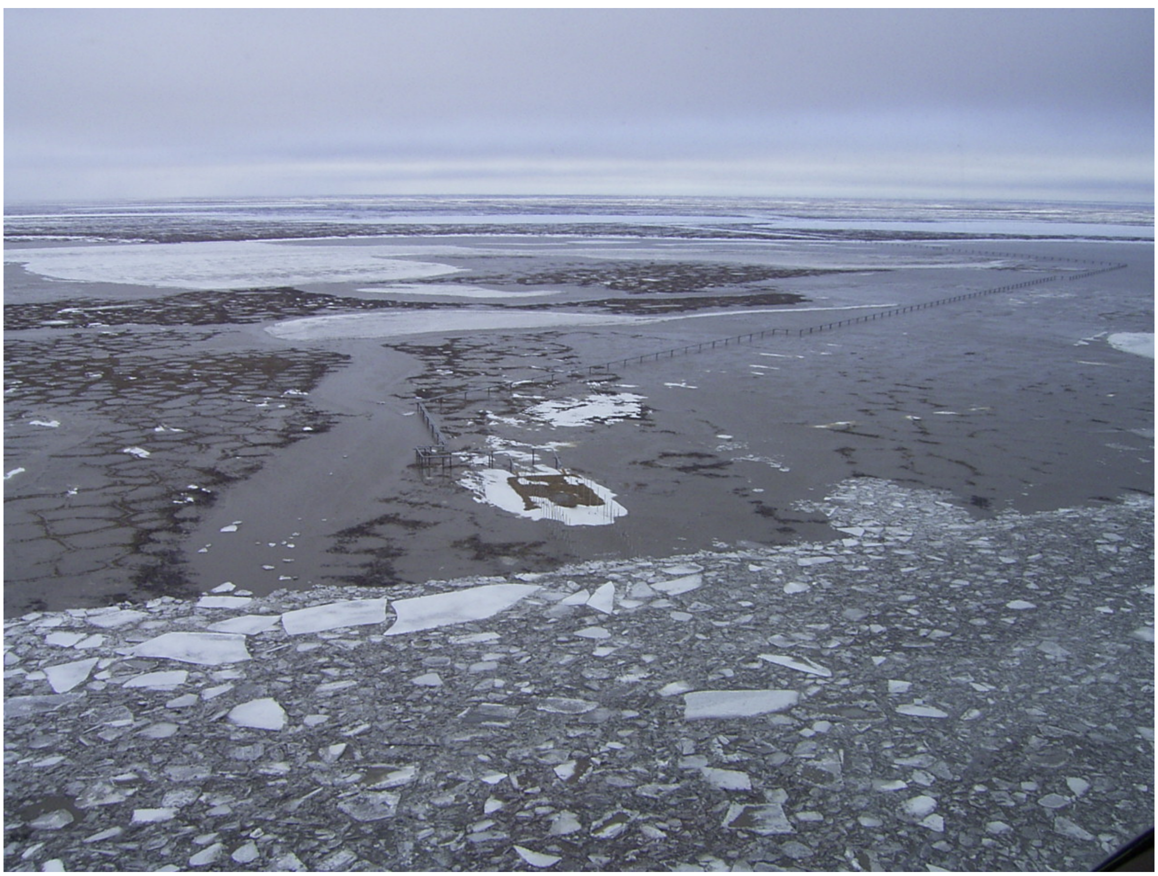


Photo A-6 HDD East, May 30, 2006. Bluff, thermosyphons, pad and pipeline at HDD East at peak stage, looking east.

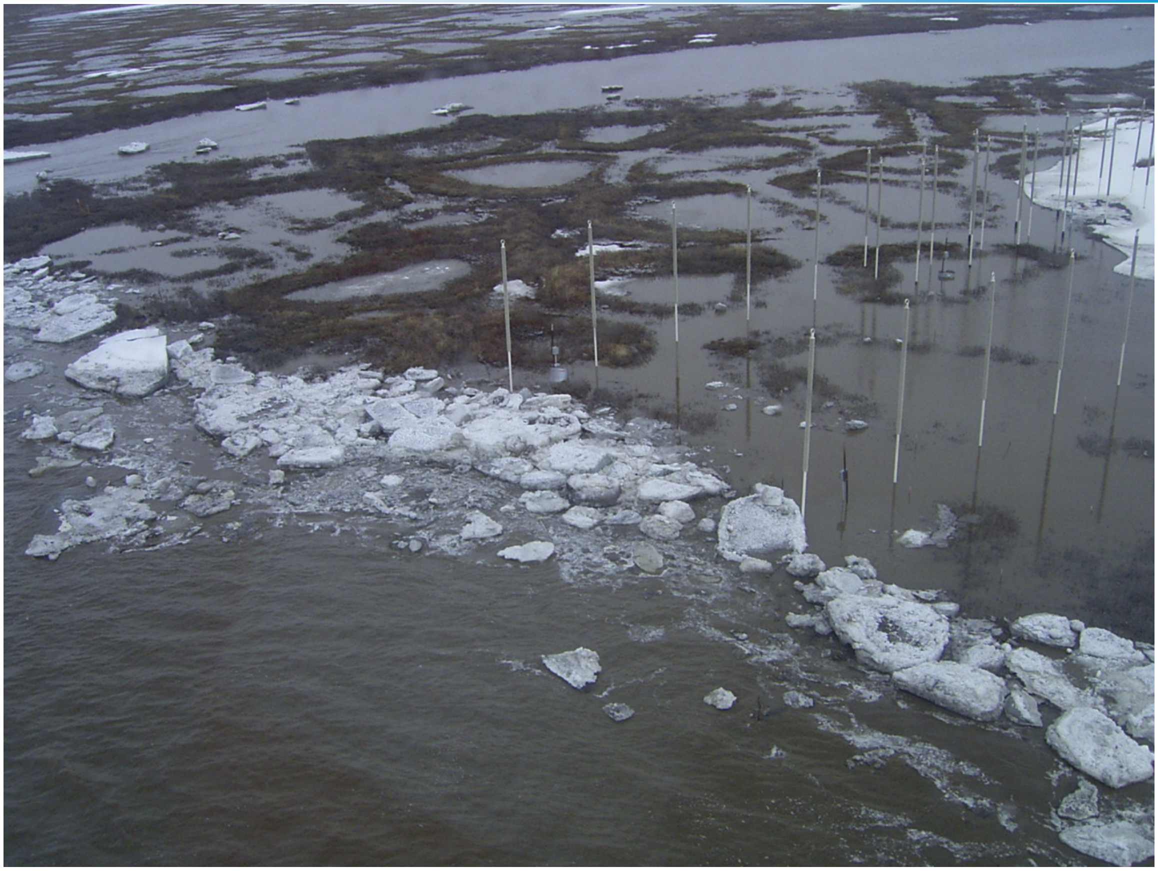


Photo A-7 HDD East, May 30, 2006. Bluff and thermosyphons at HDD East at peak stage, looking northeast.

Photo A-8 HDD East, July 20, 2006. Bluff, thermosyphons and pad at HDD East, looking south.

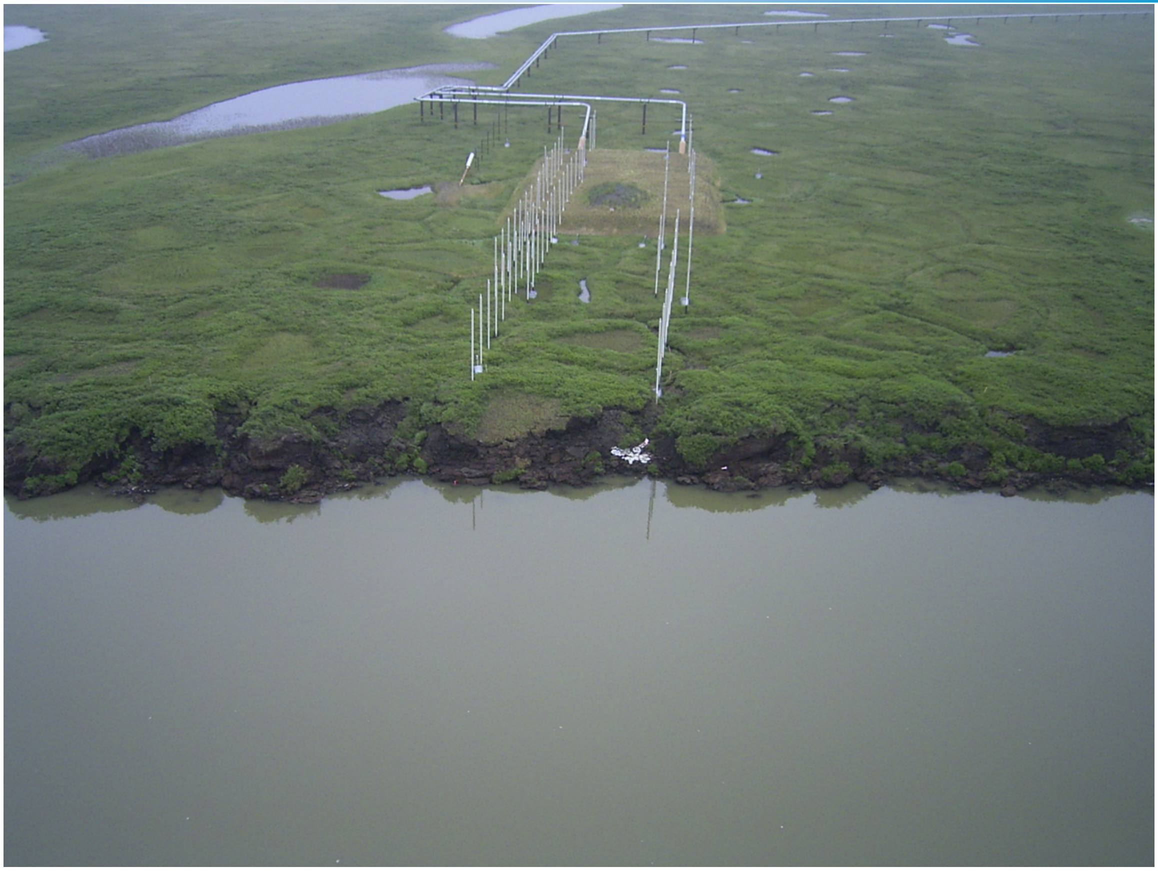


Photo A-9 HDD East, July 20, 2006. Bluff, thermosyphons, pad and pipeline at HDD East, looking east.

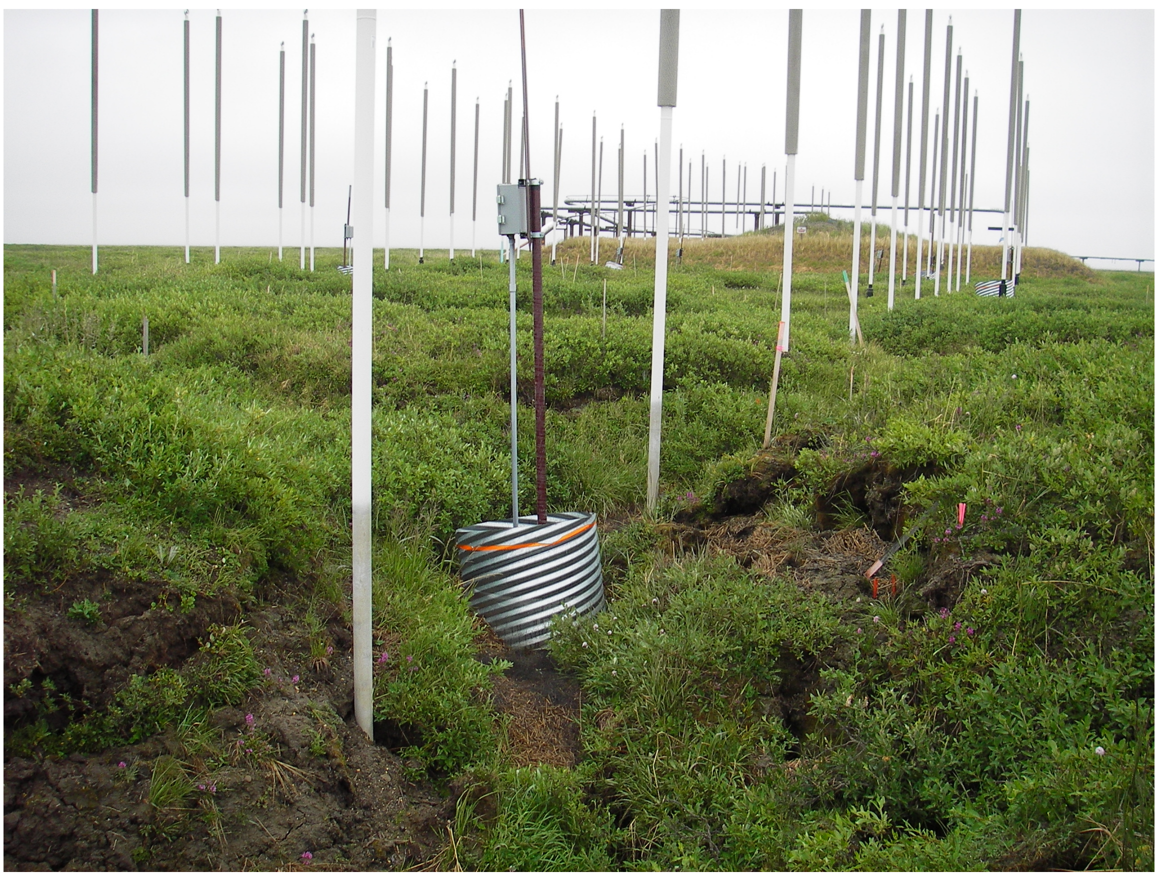


Photo A-10 HDD East, July 20, 2006. Thermosyphons, thermistor casing and pad at HDD East, looking east.

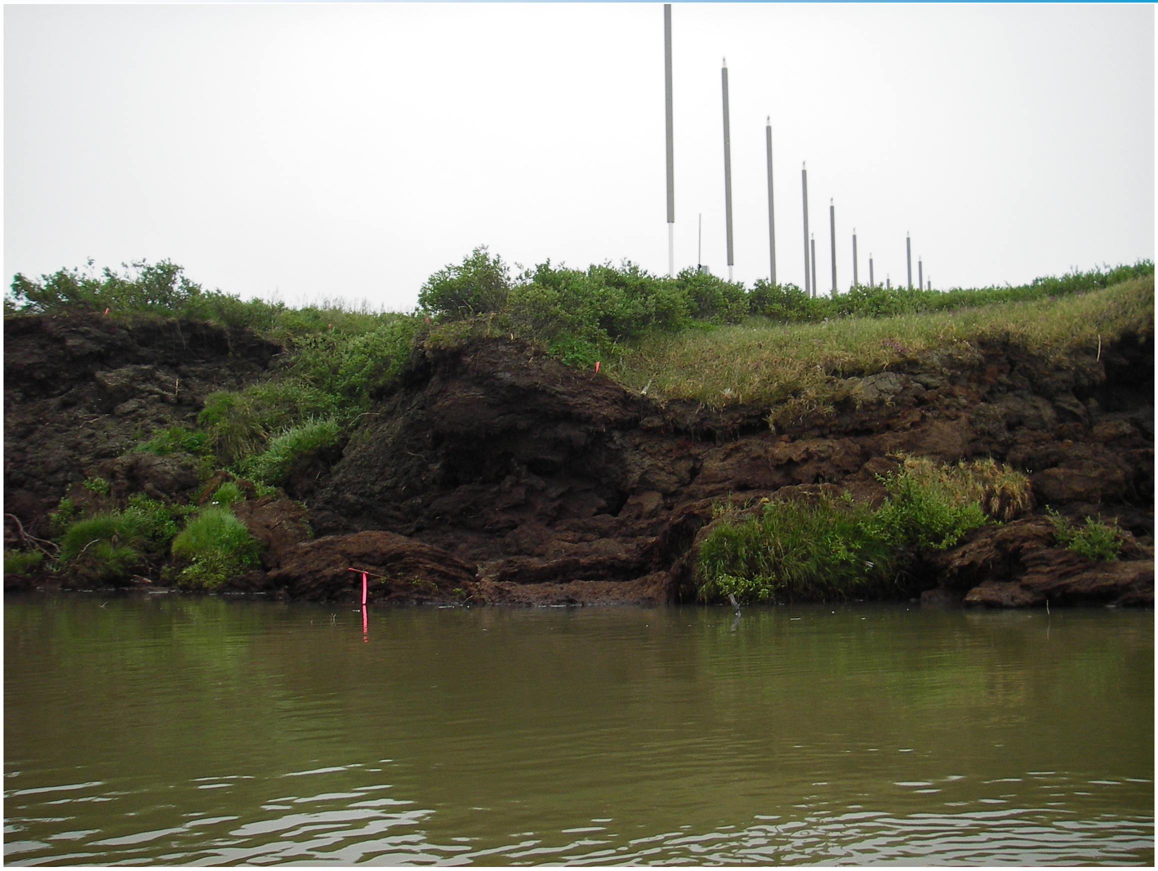


Photo A-11 HDD East, July 20, 2006. Bluff and thermosyphons at HDD East, looking east.

Photo A-12 Kachemach River, June 1, 2006. Kachemach River pipeline crossing during breakup, looking south.

Photo A-13 Kachemach River, July 20, 2006. Kachemach River pipeline crossing, looking north.

Photo A-14 Kachemach River, July 20, 2006. Kachemach River pipeline crossing, looking southwest.

Photo A-15 Kachemach River, July 20, 2006. Kachemach River instream VSM, looking south.

Photo A-16 Kachemach River, July 20, 2006. Kachemach River instream VSM, looking northeast.

Photo A-17 Miluveach River, June 1, 2006. Miluveach River pipeline crossing during breakup, looking northwest.

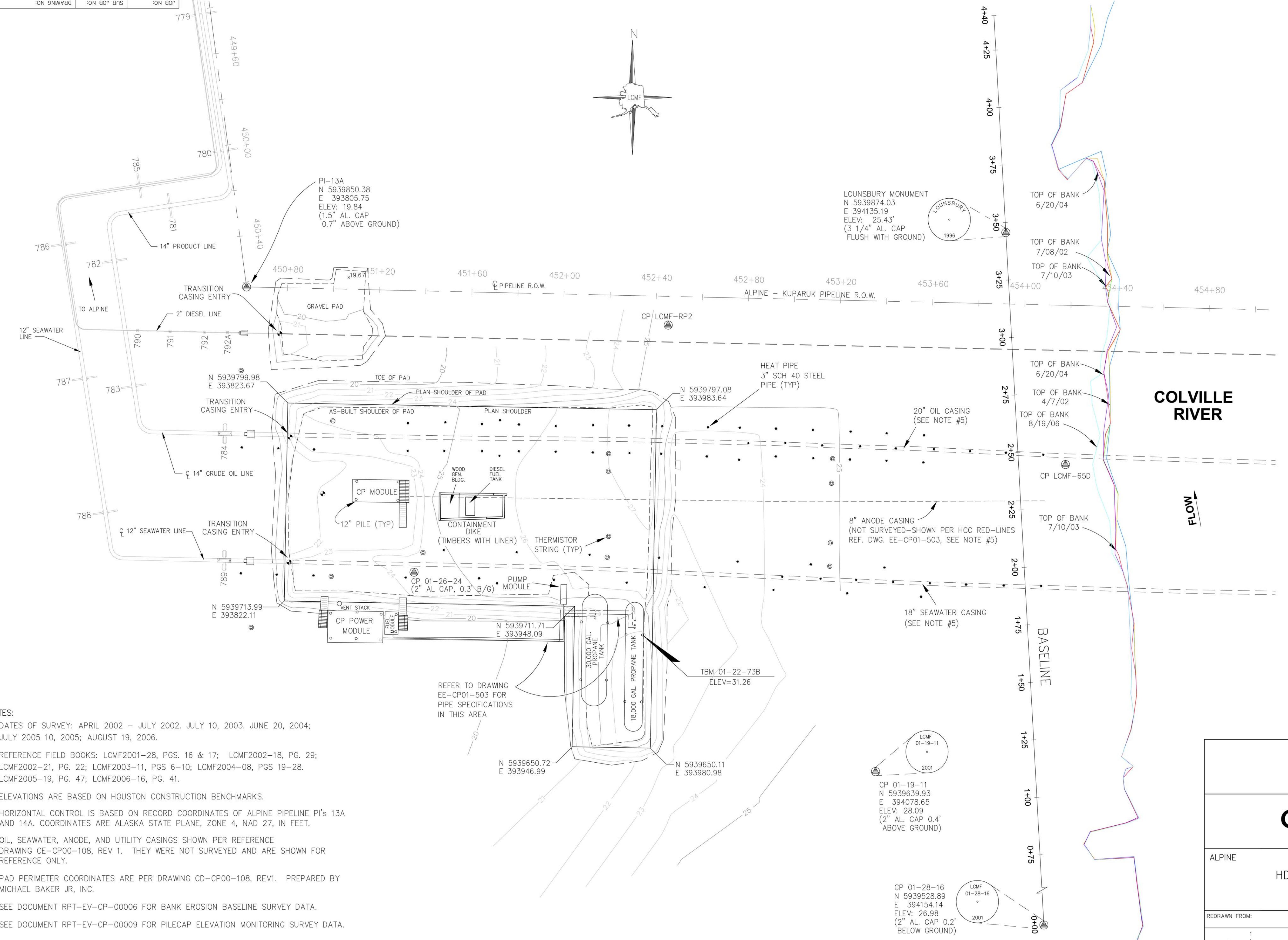
Photo A-18 Miluveach River, July 20, 2006. Miluveach River pipeline, looking northwest.

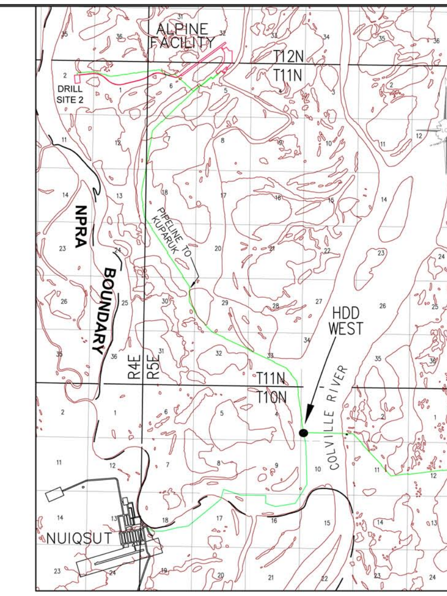
Photo A-19 Miluveach River, July 20, 2006. Miluveach River pipeline crossing, looking south.

Photo A-20 Miluveach River, July 20, 2006. Miluveach River instream VSM, looking north.

Photo A-21 Miluveach River, July 20, 2006. Miluveach River instream VSM, looking east.

Appendix B HDD West Survey Data





VICINITY MAP
NO SCALE

NOTES:

1. DATES OF SURVEY: APRIL 2002 – JULY 2002. JULY 10, 2003. JUNE 20, 2004; JULY 2005 10, 2005; AUGUST 19, 2006.
2. REFERENCE FIELD BOOKS: LCMF2001-28, PGS. 16 & 17; LCMF2002-18, PG. 29; LCMF2002-21, PG. 22; LCMF2003-11, PGS 6-10; LCMF2004-08, PGS 19-28. LCMF2005-19, PG. 47; LCMF2006-16, PG. 41.
3. ELEVATIONS ARE BASED ON HOUSTON CONSTRUCTION BENCHMARKS.
4. HORIZONTAL CONTROL IS BASED ON RECORD COORDINATES OF ALPINE PIPELINE PI's 13A AND 14A. COORDINATES ARE ALASKA STATE PLANE, ZONE 4, NAD 27, IN FEET.
5. OIL, SEAWATER, ANODE, AND UTILITY CASINGS SHOWN PER REFERENCE DRAWING CE-CP00-108, REV 1. THEY WERE NOT SURVEYED AND ARE SHOWN FOR REFERENCE ONLY.
6. PAD PERIMETER COORDINATES ARE PER DRAWING CD-CP00-108, REV1. PREPARED BY MICHAEL BAKER JR, INC.
7. SEE DOCUMENT RPT-EV-CP-00006 FOR BANK EROSION BASELINE SURVEY DATA.
8. SEE DOCUMENT RPT-EV-CP-00009 FOR PILECAP ELEVATION MONITORING SURVEY DATA.

REFERENCE DWG NO/SHT NO:

REV	DATE	REVISIONS	BY	CHK	JOB ENGR	PROJ ENGR	CUST APP
5	8/21/06	UPDATED PER 4116808ACS	AG	GD			
4	7/10/05	UPDATED PER 3391755ACS	CZ	DB			
3	6/25/04	UPDATED PER 2390460ACS	CZ	BD			
2	11/15/03	ISSUED PER 2094387ACS	GD	JZ			
1	11/5/02	ISSUED PER 1870227ACS	CZ	JZ			

Kuukpik/LCMF
A subsidiary of Kuukpik Corporation
Alpine Survey Office

ConocoPhillips Alaska, Inc.

ALPINE — MODULE: CP00 — UNIT: CP

HDD BANK EROSION MONITORING
HDD SITE – WEST
ALPINE FACILITY

REDRAWN FROM: — CONSTRUCTION SHEET OF

DO NOT SCALE — ABOVE SCALE FOR REFERENCE ONLY

DATE: 11/5/02	DRAWN: CZ	DESIGN:	ECM NO: 1870227ACS
SCALE: 1"=20'	CHECKED: JZ		CC NO:
	APPROVAL: ML		CADD FILE NO. 01-12-05-1WEST
JOB NO: 02-205 / SUB JOB NO:	DRAWING NO: CE-CP00-143		PART: 1 OF 1 / REV: 5

JOB NO: 02-205 SUB JOB NO: DRAWING NO: CE-CP00-143

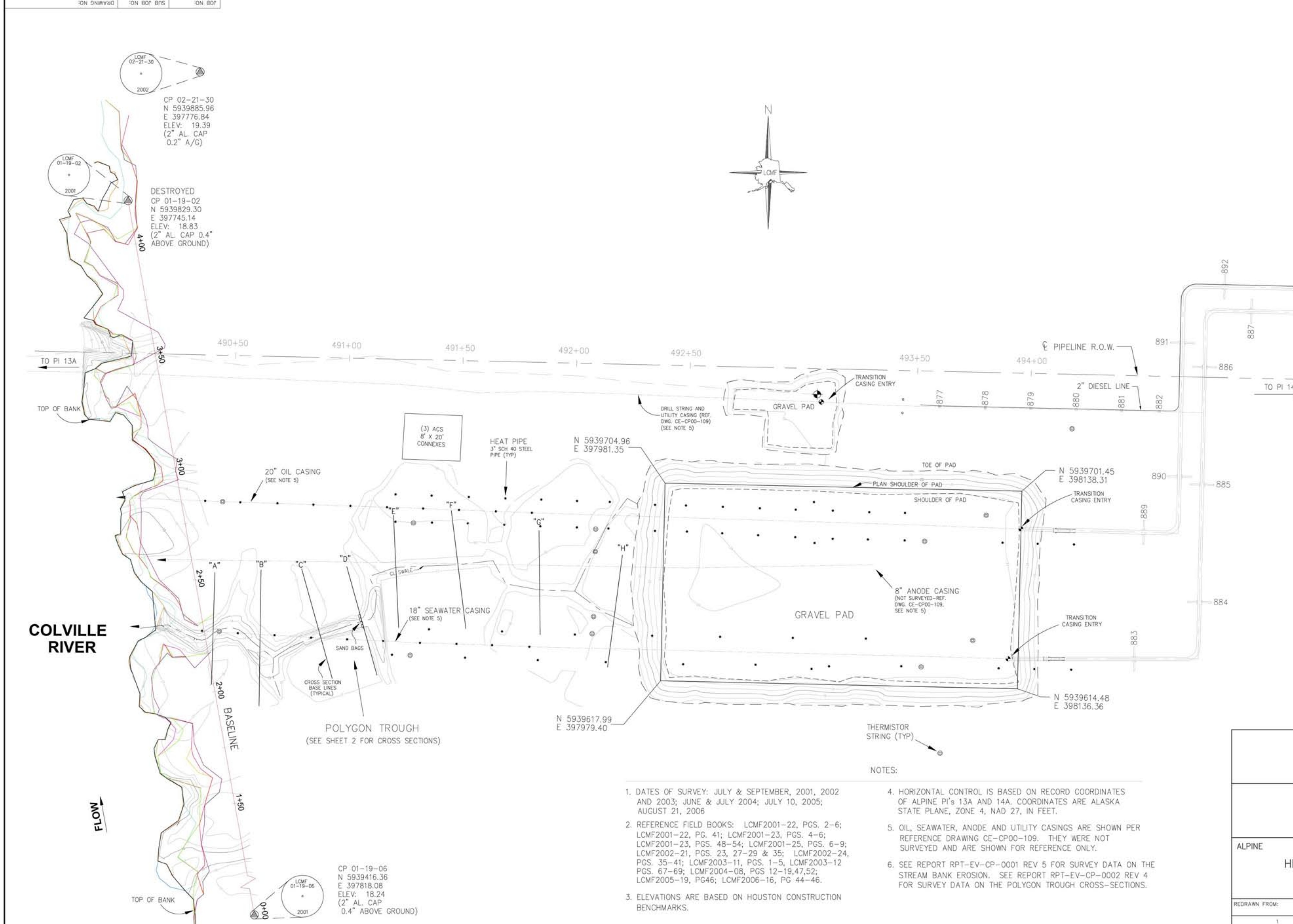
Alpine CP 00
HDD West Site
Streambank Monitor

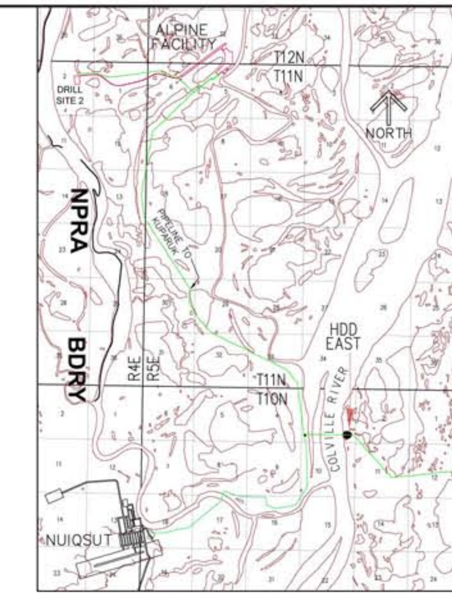
Baseline	Streambank Monitor - Top of Bank Locations					Description
Station	Drawing CE-CP00-143 Rev 5 for Survey Baseline Loc					
	7/8/2002	7/10/2003	6/20/2004	7/10/2005	8/19/2006	Date
0+00	39.5	39.5	39.5	39.3	39.3	Baseline Offset (In Feet)
0+05	39.3	39.3	39.3	37.6	37.6	Baseline Offset (In Feet)
0+10	39.4	39.4	39.4	38.5	38.5	Baseline Offset (In Feet)
0+20	45.8	45.8	45.8	41.9	41.9	Baseline Offset (In Feet)
0+25	41.5	41.5	41.5	39.1	39.1	Baseline Offset (In Feet)
0+30	37.9	37.9	37.9	37.9	37.9	Baseline Offset (In Feet)
0+40	41.9	41.9	41.9	41.9	41.9	Baseline Offset (In Feet)
0+50	42.0	42.0	42.0	42.0	42.0	Baseline Offset (In Feet)
0+60	41.4	41.4	41.4	41.4	41.4	Baseline Offset (In Feet)
0+70	40.7	40.7	40.7	40.7	40.7	Baseline Offset (In Feet)
0+75	21.4	21.4	21.4	21.4	21.4	Baseline Offset (In Feet)
0+80	20.1	20.1	20.1	20.1	20.1	Baseline Offset (In Feet)
0+85	29.0	29.0	29.0	29.0	29.0	Baseline Offset (In Feet)
0+90	42.8	42.8	42.8	42.8	42.8	Baseline Offset (In Feet)
1+00	38.7	38.7	38.7	38.7	38.7	Baseline Offset (In Feet)
1+05	37.9	37.9	37.9	37.9	37.9	Baseline Offset (In Feet)
1+10	41.4	41.4	41.4	39.2	39.2	Baseline Offset (In Feet)
1+15	38.2	38.2	38.2	38.2	38.2	Baseline Offset (In Feet)
1+20	39.4	39.4	39.4	39.4	39.4	Baseline Offset (In Feet)
1+25	41.4	41.4	41.4	41.4	41.4	Baseline Offset (In Feet)
1+30	43.0	43.0	43.0	43.0	43.0	Baseline Offset (In Feet)
1+40	45.3	45.3	45.3	43.4	43.4	Baseline Offset (In Feet)
1+45	45.7	45.7	45.7	43.4	43.4	Baseline Offset (In Feet)
1+50	45.7	45.7	45.7	43.9	43.9	Baseline Offset (In Feet)
1+60	45.8	45.8	44.9	44.2	44.3	Baseline Offset (In Feet)
1+65	45.9	45.9	45.0	44.3	44.4	Baseline Offset (In Feet)
1+75	45.9	45.9	45.9	44.4	44.4	Baseline Offset (In Feet)
1+90	45.0	44.1	44.1	44.1	44.1	Baseline Offset (In Feet)
2+00	44.7	41.8	41.8	41.1	40.4	Baseline Offset (In Feet)
2+05	44.6	40.4	40.4	39.7	38.4	Baseline Offset (In Feet)
2+10	43.7	40.4	40.2	40.2	38.3	Baseline Offset (In Feet)
2+20	41.5	41.5	40.6	40.6	37.5	Baseline Offset (In Feet)
2+25	42.0	42.0	40.7	40.7	37.5	Baseline Offset (In Feet)
2+30	42.3	42.2	40.9	40.9	34.2	Baseline Offset (In Feet)
2+35	40.4	40.4	40.4	40.4	33.1	Baseline Offset (In Feet)
2+45	36.8	36.8	36.8	36.8	32.7	Baseline Offset (In Feet)
2+50	38.1	37.8	37.5	37.1	34.3	Baseline Offset (In Feet)
2+55	39.3	38.2	38.2	37.4	35.9	Baseline Offset (In Feet)
2+60	40.7	40.7	40.7	38.3	35.1	Baseline Offset (In Feet)
2+65	40.9	40.9	40.6	39.2	34.1	Baseline Offset (In Feet)
2+70	41.1	41.1	40.3	40.3	33.3	Baseline Offset (In Feet)
2+75	41.3	41.3	39.9	39.9	33.3	Baseline Offset (In Feet)
2+80	41.5	41.5	39.4	39.4	34.6	Baseline Offset (In Feet)
2+85	41.7	41.7	39.6	39.6	37.8	Baseline Offset (In Feet)
2+90	43.5	41.5	40.8	40.8	38.5	Baseline Offset (In Feet)
3+00	47.0	46.1	46.1	44.8	41.6	Baseline Offset (In Feet)
3+10	43.6	43.6	43.6	43.6	43.2	Baseline Offset (In Feet)
3+15	42.9	42.9	42.9	42.3	42.9	Baseline Offset (In Feet)
3+25	44.6	44.6	44.4	42.3	38.9	Baseline Offset (In Feet)
3+30	44.0	44.0	43.2	42.7	36.2	Baseline Offset (In Feet)
3+35	43.4	43.4	43.4	42.0	36.4	Baseline Offset (In Feet)
3+40	44.8	44.0	44.0	41.3	41.1	Baseline Offset (In Feet)
3+45	45.2	44.2	44.2	42.8	41.5	Baseline Offset (In Feet)
3+50	44.9	44.2	44.2	42.3	41.4	Baseline Offset (In Feet)
3+60	44.1	44.1	44.1	43.4	41.4	Baseline Offset (In Feet)
3+70	44.7	42.8	41.8	41.0	26.0	Baseline Offset (In Feet)
3+75	23.6	23.6	23.6	23.6	23.6	Baseline Offset (In Feet)
3+85	23.1	23.1	23.1	23.1	23.0	Baseline Offset (In Feet)
4+00	28.4	28.4	28.4	26.5	26.5	Baseline Offset (In Feet)
4+10	37.1	37.1	37.1	33.0	33.0	Baseline Offset (In Feet)
4+25	42.2	42.2	42.2	40.4	40.3	Baseline Offset (In Feet)
4+30	43.2	43.2	42.1	41.2	41.1	Baseline Offset (In Feet)
4+35	43.1	43.1	41.9	41.9	41.8	Baseline Offset (In Feet)
4+40	42.5	42.5	42.1	42.1	42.1	Baseline Offset (In Feet)

Alpine CP 00
HDD West Site
Streambank Monitor

Pile Cap Designation	Pile Cap Monitor - Bottom of Pile Cap Locations ee Drawing CE-CP00-143 Rev 5 for Survey Baseline Locati			Description
	6/20/2004	**8/4/2005**	**8/19/2006**	**Date**
W-01 NE Cor	26.389	26.389	26.391	Bottom of Pile Cap (In Feet)
W-02 NE Cor	26.391	26.390	26.390	Bottom of Pile Cap (In Feet)
W-03 NE Cor	26.391	26.391	26.394	Bottom of Pile Cap (In Feet)
W-04 NE Cor	26.389	26.388	26.390	Bottom of Pile Cap (In Feet)
W-05 NE Cor	26.383	26.378	26.386	Bottom of Pile Cap (In Feet)
W-06 NE Cor	26.395	26.391	26.394	Bottom of Pile Cap (In Feet)
W-07 NE Cor	26.397	26.393	26.402	Bottom of Pile Cap (In Feet)
W-08 NE Cor	26.403	26.401	26.404	Bottom of Pile Cap (In Feet)
W-09 NE Cor	31.291	31.294	31.292	Bottom of Pile Cap (In Feet)
W-10 NE Cor	31.266	31.261	31.261	Bottom of Pile Cap (In Feet)
W-11 NE Cor	31.299	31.300	31.288	Bottom of Pile Cap (In Feet)
W-12 NE Cor	31.301	31.301	31.298	Bottom of Pile Cap (In Feet)
W-13 NE Cor	27.377	27.373	27.383	Bottom of Pile Cap (In Feet)
W-14 NE Cor	27.428	27.423	27.433	Bottom of Pile Cap (In Feet)
W-15 NE Cor	27.413	27.407	27.407	Bottom of Pile Cap (In Feet)
W-16 NE Cor	27.389	27.385	27.392	Bottom of Pile Cap (In Feet)
W-17 NE Cor	28.940	28.947	28.944	Bottom of Pile Cap (In Feet)
W-18 NE Cor	28.965	28.972	28.968	Bottom of Pile Cap (In Feet)
W-19 NE Cor	28.959	28.962	28.960	Bottom of Pile Cap (In Feet)
W-20 NE Cor	28.964	28.965	28.965	Bottom of Pile Cap (In Feet)

Appendix C HDD East Survey Data





VICINITY MAP
NO SCALE

LEGEND

- HEAT PIPE
- THERMISTOR STRING
- TRANSITION CASING ENTRY POINT
- 1' CONTOUR LINES
- PILE
- SURVEY CONTROL
- TOP OF BANK 8/7/01
- TOP OF BANK 9/8/01
- TOP OF BANK 7/9/02
- TOP OF BANK 9/12/02
- TOP OF BANK 7/9/03
- TOP OF BANK 9/8/03
- TOP OF BANK 6/19/04
- TOP OF BANK 7/10/05
- TOP OF BANK 8/21/06

GRAPHIC SCALE
20 0 10 20 40
(IN FEET)
1 inch = 20 ft.

NOTES:

1. DATES OF SURVEY: JULY & SEPTEMBER, 2001, 2002 AND 2003; JUNE & JULY 2004; JULY 10, 2005; AUGUST 21, 2006
2. REFERENCE FIELD BOOKS: LCMF2001-22, PGS. 2-6; LCMF2001-22, PG. 41; LCMF2001-23, PGS. 4-6; LCMF2001-23, PGS. 48-54; LCMF2001-25, PGS. 6-9; LCMF2002-21, PGS. 23, 27-29 & 35; LCMF2002-24, PGS. 35-41; LCMF2003-11, PGS. 1-5, LCMF2003-12 PGS. 67-69; LCMF2004-08, PGS 12-19,47,52; LCMF2005-19, PG46; LCMF2006-16, PG 44-46.
3. ELEVATIONS ARE BASED ON HOUSTON CONSTRUCTION BENCHMARKS.
4. HORIZONTAL CONTROL IS BASED ON RECORD COORDINATES OF ALPINE PI's 13A AND 14A. COORDINATES ARE ALASKA STATE PLANE, ZONE 4, NAD 27, IN FEET.
5. OIL, SEAWATER, ANODE AND UTILITY CASINGS ARE SHOWN PER REFERENCE DRAWING CE-CP00-109. THEY WERE NOT SURVEYED AND ARE SHOWN FOR REFERENCE ONLY.
6. SEE REPORT RPT-EV-CP-0001 REV 5 FOR SURVEY DATA ON THE STREAM BANK EROSION. SEE REPORT RPT-EV-CP-0002 REV 4 FOR SURVEY DATA ON THE POLYGON TROUGH CROSS-SECTIONS.

Kuukpik/LCMF
Alpine Survey Office

ConocoPhillips Alaska, Inc.

ALPINE | MODULE: CP00 | UNIT: CP

HDD BANK EROSION TOPO/MONITORING
HDD SITE – EAST
ALPINE FACILITY

REFERENCE DWG NO/SHT NO:
CE-CP00-109
PD-CP00-130 SHEET 1

REV	DATE	REVISIONS	BY	CHK	JOB ENGR	PROJ ENGR	CUST APP
5	8/25/06	UPDATED PER 4116808ACS	AG	DB			
4	7/11/05	UPDATED PER 3391755ACS	CZ	GD			
3	6/27/04	ISSUED PER 2390460ACS	CZ	BD			
2	12/31/03	ISSUED PER 2094387ACS-ADDED SHEET 2 AND 2003 DATA	GD/CZ	JZ			C/K
1	11/1/02	ISSUED PER 1870227ACS	CZ	JZ			TM
0	7/31/01	ISSUED PER A01007ACS	RLW	JZ			CD

REDRAWN FROM: | CONSTRUCTION SHEET OF

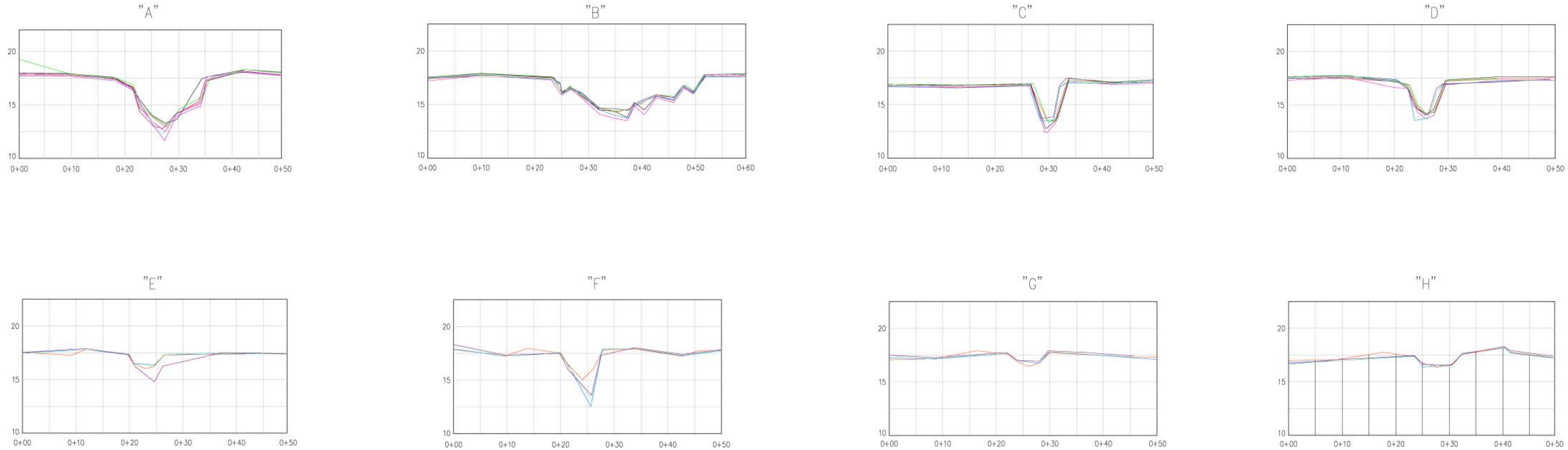
DO NOT SCALE | ABOVE SCALE FOR REFERENCE ONLY

DATE: 7/31/01	DRAWN: GD/CZ	DESIGN:	ECM NO: A01007ACS
SCALE: 1"=20'	CHECKED: JZ		CC NO:
	APPROVAL: CD		CADD FILE NO. 01-12-05-1EAST
JOB NO: 02-205 / SUB JOB NO:	DRAWING NO: CE-CP00-134	PART: 1 OF 2	REV: 5

JOB NO:	SUB JOB NO:	DRAWING NO:
02-205		CE-CP00-134

CROSS SECTIONS, POLYGON TROUGH

HORIZONTAL SCALE = 1"=10' VERTICAL SCALE = 1"=5'

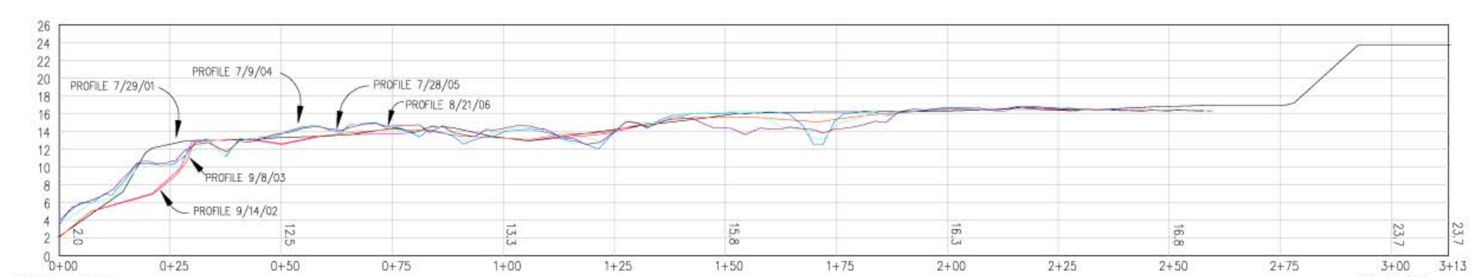


LEGEND

- CROSS SECTION 8/23/01
- CROSS SECTION 9/14/02
- CROSS SECTION 7/9/03
- CROSS SECTION 9/8/03
- CROSS SECTION 7/9/04
- CROSS SECTION 7/28/05
- CROSS SECTION 8/21/06

CENTERLINE PROFILE, POLYGON TROUGH

HORIZONTAL SCALE = 1"=20' VERTICAL SCALE = 1"=10'



Kuukpik/LCMF
A subsidiary of Kuukpik Corporation
Alpine Office (907) 670-4739
Anchorage, Alaska (907) 273-1830
Alpine Survey Office

ConocoPhillips
Alaska, Inc.

ALPINE MODULE: CP00 UNIT: CP

HDD BANK EROSION TOPO/MONITORING
HDD SITE – EAST
ALPINE FACILITY

REDRAWN FROM: | CONSTRUCTION SHEET OF

DO NOT SCALE — ABOVE SCALE FOR REFERENCE ONLY

FORM: D9IZE

REFERENCE DWG NO/SHT NO:
CE-CP00-109
PD-CP00-130 SHEET 1

REV	DATE	REVISIONS	BY	CHK	JOB ENGR	PROJ ENGR	CUST APP
4	8/25/06	UPDATED PER 4116808ACS	AG	DB			
3	7/28/05	UPDATED PER 3391755ACS	CZ	GD			
2	7/9/04	ISSUED PER 2390460ACS	AG	GD			
1	12/31/03	ISSUED PER 2094387ACS	GD	JZ			C/K

DATE: 12/31/03	DRAWN: GD/CZ	DESIGN:	ECM NO: 2094387ACS
SCALE: 1"=20'	CHECKED: JZ		CC NO:
	APPROVAL: COLEGROVE/KANADY		CADD FILE NO. 01-12-05-1EAST
JOB NO: 02-205	SUB JOB NO:	DRAWING NO: CE-CP00-134	PART: 2 OF 2 REV: 4

Alpine CP 00
HDD East Site
Streambank Monitor

Baseline Station	Streambank Monitor - Top of Bank Locations See Drawing CE-CP00-134 Rev 3 for Survey Baseline Stations						Description
	9/8/2001	9/12/2002	9/8/2003	6/19/2004	7/10/2005	8/21/2006	Date
0+10	N/A	-25.3	-25.3	-25.3	-25.3	-25.3	Baseline Offset (In Feet)
0+20	N/A	-32.1	-30.9	-30.9	-30.9	-30.9	Baseline Offset (In Feet)
0+25	N/A	-38.2	-38.2	-38.2	-37.0	-37.0	Baseline Offset (In Feet)
0+30	N/A	-41.1	-41.1	-41.1	-36.9	-36.9	Baseline Offset (In Feet)
0+40	N/A	-37.7	-37.7	-37.7	-36.5	-35.1	Baseline Offset (In Feet)
0+50	N/A	-30.3	-30.3	-30.3	-30.3	-30.3	Baseline Offset (In Feet)
0+60	N/A	-28.0	-27.5	-27.5	-27.5	-27.5	Baseline Offset (In Feet)
0+65	N/A	-39.8	-23.9	-23.9	-23.4	-23.4	Baseline Offset (In Feet)
0+70	-31.2	-27.7	-20.0	-20.0	-16.2	-16.2	Baseline Offset (In Feet)
0+75	-27.1	-27.2	-21.1	-21.0	-18.0	-18.0	Baseline Offset (In Feet)
0+80	-26.5	-27.5	-22.4	-22.4	-22.4	-22.4	Baseline Offset (In Feet)
0+90	-29.2	-29.2	-29.2	-27.8	-27.8	-27.2	Baseline Offset (In Feet)
1+00	-26.8	-26.7	-26.7	-26.7	-26.7	-26.7	Baseline Offset (In Feet)
1+10	-25.4	-25.6	-23.9	-23.9	-23.9	-23.9	Baseline Offset (In Feet)
1+30	-36.1	-28.0	-17.3	-17.3	-17.0	-17.0	Baseline Offset (In Feet)
1+40	-34.9	-20.6	-17.1	-17.1	-15.8	-15.8	Baseline Offset (In Feet)
1+50	-23.8	-15.6	-13.8	-13.8	-13.4	-13.4	Baseline Offset (In Feet)
1+55	-22.2	-14.5	-11.5	-11.5	-7.1	-7.1	Baseline Offset (In Feet)
1+65	-26.5	-24.9	-11.4	-9.7	-6.9	-6.9	Baseline Offset (In Feet)
1+70	-30.1	-29.7	-15.7	-13.0	-10.8	-10.8	Baseline Offset (In Feet)
1+75	-30.5	-29.6	-16.1	-14.4	-12.0	-12.0	Baseline Offset (In Feet)
1+80	-29.4	-24.6	-13.9	-13.9	-12.8	-12.8	Baseline Offset (In Feet)
1+85	-24.5	-20.5	-12.7	-12.7	-12.3	-12.3	Baseline Offset (In Feet)
1+90	-21.5	-21.9	-16.9	-16.9	-16.9	-16.9	Baseline Offset (In Feet)
1+95	-28.5	-27.7	-27.7	-27.7	-27.7	-26.3	Baseline Offset (In Feet)
2+00	-33.4	-27.8	-27.8	-27.8	-27.8	-26.4	Baseline Offset (In Feet)
2+05	-32.6	-27.3	-27.3	-27.3	-27.3	-26.8	Baseline Offset (In Feet)
2+10	-33.5	-26.0	-26.0	-26.0	-26.0	-26.0	Baseline Offset (In Feet)
2+15	-34.5	-23.2	-23.2	-23.2	-23.2	-23.2	Baseline Offset (In Feet)
2+20	-34.9	-21.0	-21.0	-20.4	-17.4	-17.3	Baseline Offset (In Feet)
2+25	-31.2	-18.4	-8.0	-5.2	-5.2	-5.2	Baseline Offset (In Feet)
2+30	-23.2	-13.7	-2.4	-2.4	-2.4	-2.4	Baseline Offset (In Feet)
2+35	-18.8	-8.9	-7.0	-7.1	-7.1	-7.1	Baseline Offset (In Feet)
2+40	-15.9	-8.3	-8.3	-8.3	-8.3	-8.3	Baseline Offset (In Feet)
2+50	-21.0	-14.7	-14.6	-14.6	-14.6	-13.6	Baseline Offset (In Feet)
2+60	-26.0	-20.5	-20.6	-20.5	-19.8	-17.7	Baseline Offset (In Feet)
2+70	-30.0	-25.5	-20.8	-20.8	-20.8	-20.6	Baseline Offset (In Feet)
2+75	-30.7	-26.1	-20.9	-20.9	-20.8	-19.7	Baseline Offset (In Feet)
2+85	-26.8	-22.8	-22.8	-22.8	-20.4	-17.9	Baseline Offset (In Feet)
2+90	-24.5	-21.4	-21.4	-21.3	-21.3	-17.3	Baseline Offset (In Feet)
3+00	-8.7	-9.0	-6.0	-6.0	0.3	0.3	Baseline Offset (In Feet)
3+10	-11.0	-11.4	-11.4	-11.4	-6.9	-5.2	Baseline Offset (In Feet)
3+15	-16.2	-16.0	-15.9	-15.9	-10.5	-9.6	Baseline Offset (In Feet)
3+20	-15.8	-11.9	-11.9	-11.8	-11.8	-8.9	Baseline Offset (In Feet)
3+25	-17.3	-11.4	-11.1	-11.1	-10.3	-9.5	Baseline Offset (In Feet)
3+30	-35.0	-23.4	-11.5	-11.5	-11.2	-11.2	Baseline Offset (In Feet)
3+35	-35.0	-23.8	-23.5	-23.5	-23.5	-23.5	Baseline Offset (In Feet)
3+40	-33.9	-25.4	-25.4	-25.4	-25.4	-25.4	Baseline Offset (In Feet)
3+45	-32.4	-27.3	-27.4	-26.4	-24.1	-24.1	Baseline Offset (In Feet)
3+52	-10.4	-9.9	-8.4	-8.4	-8.4	2.4	Baseline Offset (In Feet)
3+60	-12.4	-11.3	-11.2	-10.8	-10.8	3.0	Baseline Offset (In Feet)
3+65	-18.9	-18.7	-18.7	-18.4	-18.4	-3.3	Baseline Offset (In Feet)
3+70	-23.8	-24.0	-24.0	-24.1	-21.2	-9.6	Baseline Offset (In Feet)
3+75	-23.3	-20.2	-20.2	-20.2	-19.3	-11.3	Baseline Offset (In Feet)
3+80	-19.3	-12.9	-12.9	-11.6	-11.6	-9.0	Baseline Offset (In Feet)
3+85	-19.5	-13.2	-12.3	-12.0	-12.0	-11.1	Baseline Offset (In Feet)
3+95	-25.9	-22.4	-22.4	-21.9	-21.9	-16.1	Baseline Offset (In Feet)
4+00	-29.7	-21.2	-21.2	-21.9	-21.9	-18.6	Baseline Offset (In Feet)
4+05	-29.4	-19.5	-19.5	-19.5	-19.5	-21.7	Baseline Offset (In Feet)
4+15	-30.6	2.7	2.6	2.6	2.6	2.7	Baseline Offset (In Feet)
4+25	-5.4	5.1	5.1	5.1	5.1	5.1	Baseline Offset (In Feet)
4+35	-5.4	4.4	4.5	4.5	4.5	4.5	Baseline Offset (In Feet)
4+45	N/A	1.3	1.2	1.9	1.9	1.9	Baseline Offset (In Feet)
4+50	N/A	1.9	4.1	4.1	4.1	4.1	Baseline Offset (In Feet)

Alpine CP 00
HDD East Site
Subsidence Monitor - Seawater Line

Baseline Station	Point Description	Subsidence Monitor - Cross-Section A See Drawing CE-CP00-134 for Survey Cross-Section Locations						
		9/8/2001	**9/14/2002**	**9/8/2003**	**7/9/2004**	**7/28/2005**	**8/21/2006**	**Date**
0+00	**Tundra**	18.0	17.8	17.8	17.7	17.9	18.0	Elevation (In Feet)
0+09	**Tundra**	18.0	17.8	17.8	17.7	17.8	17.9	Elevation (In Feet)
0+18	**Tundra**	17.5	17.5	17.4	17.2	17.4	17.4	Elevation (In Feet)
0+21	**Top Bank**	16.7	16.5	16.8	16.4	16.6	16.6	Elevation (In Feet)
0+22.5	**Gradebreak**	15.4	14.8	14.8	14.8	14.6	14.4	Elevation (In Feet)
0+25	**Toe Bank**	13.9	13.6	13.7	13.0	13.3	13.0	Elevation (In Feet)
0+27	**CL Swale**	13.5	12.5	13.1	11.7	12.2	12.8	Elevation (In Feet)
0+29	**Toe Bank**	13.5	14.2	14.5	13.9	14.1	14.0	Elevation (In Feet)
0+34	**Gradebreak**	15.6	15.2	15.5	14.8	15.3	15.3	Elevation (In Feet)
0+35	**Top Bank**	17.6	17.4	17.4	17.6	17.2	17.2	Elevation (In Feet)
0+42	**Tundra**	18.4	18.1	18.1	18.0	18.1	18.1	Elevation (In Feet)
0+50	**Tundra**	18.1	17.8	17.8	17.7	17.8	17.8	Elevation (In Feet)

Baseline Station	Point Description	Subsidence Monitor - Cross-Section B See Drawing CE-CP00-134 for Survey Cross-Section Locations						
		9/8/2001	**9/14/2002**	**9/8/2003**	**7/9/2004**	**7/28/2005**	**8/21/2006**	**Date**
0+00	**Tundra**	17.6	17.2	17.4	17.5	17.4	17.5	Elevation (In Feet)
0+10	**Tundra**	18.0	17.7	17.7	17.7	17.7	17.8	Elevation (In Feet)
0+23	**Tundra**	17.6	17.3	17.4	17.3	17.4	17.5	Elevation (In Feet)
0+25	**Top of Bank**	17.2	16.0	16.0	15.9	16.0	16.1	Elevation (In Feet)
0+27	**Gradebreak**	16.6	16.5	16.5	16.4	16.4	16.5	Elevation (In Feet)
0+32	**Toe Bank**	14.4	14.1	14.5	14.5	14.7	14.6	Elevation (In Feet)
0+35	**CL Swale**	14.3	13.7	14.2	14.2	14.6	14.6	Elevation (In Feet)
0+37	**Toe Bank**	14.2	13.5	14.4	13.7	14.4	14.5	Elevation (In Feet)
0+38	**Gradebreak**		14.9	14.9	14.9	15.0	15.1	Elevation (In Feet)
0+40	**Gradebreak**		14.0	15.4	15.4	15.5	15.5	Elevation (In Feet)
0+42	**Gradebreak**	16.1	15.6	15.8	15.8	15.9	15.9	Elevation (In Feet)
0+49	**Gradebreak**	16.2	16.0	16.0	16.0	16.2	16.2	Elevation (In Feet)
0+52	**Top Bank**	17.6	17.6	17.7	17.6	17.7	17.8	Elevation (In Feet)
0+60	**Tundra**	17.8	17.7	17.7	17.6	17.8	17.9	Elevation (In Feet)

Baseline Station	Point Description	Subsidence Monitor - Cross-Section C See Drawing CE-CP00-134 for Survey Cross-Section Locations						
		9/8/2001	**9/14/2002**	**9/8/2003**	**7/9/2004**	**7/28/2005**	**8/21/2006**	**Date**
0+00	**Tundra**	16.9	16.8	16.8	16.7	16.7	16.8	Elevation (In Feet)
0+13	**Tundra**	16.7	16.6	16.7	16.6	16.7	16.8	Elevation (In Feet)
0+27	**Top Bank**	16.8	16.8	16.8	16.8	16.8	16.9	Elevation (In Feet)
0+29	**Toe Bank**	12.9	12.4	13.2	13.5	13.7	13.8	Elevation (In Feet)
0+31	**Toe Bank**	13.9	13.4	13.6	13.5	13.6	13.9	Elevation (In Feet)
0+32	**Gradebreak**	16.7	N/A	16.7	16.6	16.7	16.7	Elevation (In Feet)
0+33	**Top Bank**	17.5	17.2	17.2	17.1	17.1	17.5	Elevation (In Feet)
0+42	**Tundra**	17.1	16.9	16.9	17.0	17.0	17.1	Elevation (In Feet)
0+50	**Tundra**	17.2	17.0	17.2	17.1	17.2	17.3	Elevation (In Feet)
0+60	**Tundra**	N/A	N/A	N/A	N/A			Elevation (In Feet)

Baseline Station	Point Description	Subsidence Monitor - Cross-Section D See Drawing CE-CP00-134 for Survey Cross-Section Locations						
		9/8/2001	**9/14/2002**	**9/8/2003**	**7/9/2004**	**7/28/2005**	**8/21/2006**	**Date**
0+00	**Tundra**	17.6	17.3	17.5	17.5	17.4	17.5	Elevation (In Feet)
0+10	**Tundra**	17.9	17.6	17.6	17.6	17.6	17.6	Elevation (In Feet)
0+20	**Gradebreak**	17.6	16.6	NA	NA	17.2	17.2	Elevation (In Feet)
0+22	**Top Bank**	16.7	16.6	16.8	16.8	16.5	16.5	Elevation (In Feet)
0+24	**Toe Bank**	14.7	14.3	14.8	14.8	13.9	14.9	Elevation (In Feet)
0+25	**CL Swale**	14.2	13.7	14.1	14.1	13.7	14.0	Elevation (In Feet)
0+27	**Toe Bank**	14.6	14.0	14.2	14.2	16.2	16.5	Elevation (In Feet)
0+29	**Top Bank**	17.4	16.9	17.1	17.0	17.0	17.0	Elevation (In Feet)
0+38	**Tundra**	17.7	17.3	17.3	17.2	17.2	17.1	Elevation (In Feet)
0+50	**Tundra**	17.6	17.3	16.8	17.4	17.4	17.4	Elevation (In Feet)

Alpine CP 00
HDD East Site
Subsidence Monitor - Seawater Line

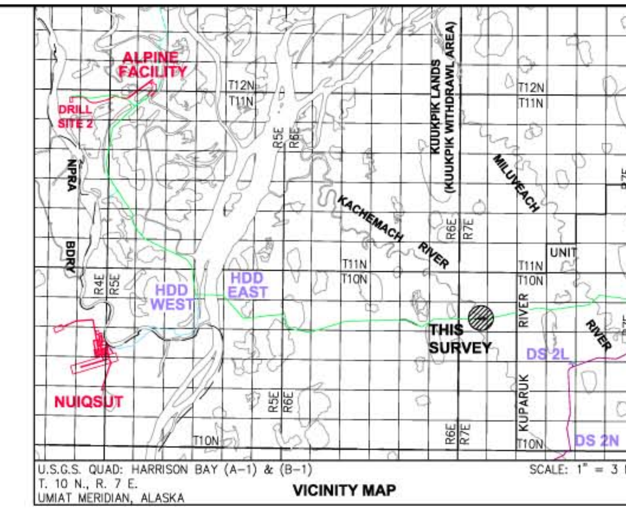
Baseline	**Point**	**Subsidence Monitor - Cross-Section E**						
Station	**Description**	See Drawing CE-CP00-134 for Survey Cross-Section Locations						
		9/8/2003	**7/9/2004**	**7/28/2005**	**8/21/2006**	**Future**	**Future**	**Date**
0+00	**Tundra**	17.5	17.5	17.4	17.5			Elevation (In Feet)
0+9	**Tundra**	17.3	17.3	17.3	N/A			Elevation (In Feet)
0+12	**Gradebreak**	17.8	17.8	17.4	17.9			Elevation (In Feet)
0+20	**Top Bank**	17.3	17.3	17.3	17.3			Elevation (In Feet)
0+21	**Toe Bank**	16.5	16.5	16.5	16.2			Elevation (In Feet)
0+23	**CL Swale**	16.0	16.0	16.0	14.7			Elevation (In Feet)
0+24	**Toe Bank**	16.2	16.4	16.3	14.8			Elevation (In Feet)
0+27	**Top Bank**	17.3	17.4	17.4	16.3			Elevation (In Feet)
0+38	**Tundra**	17.4	17.4	17.5	17.5			Elevation (In Feet)
0+49	**Tundra**	17.4	17.4	17.4	17.4			Elevation (In Feet)
Baseline	**Point**	**Subsidence Monitor - Cross-Section F**						
Station	**Description**	See Drawing CE-CP00-134 for Survey Cross-Section Locations						
		9/8/2003	**7/9/2004**	**7/28/2005**	**8/21/2006**	**Future**	**Future**	**Date**
0+00	**Tundra**	17.9	17.9	18.2	18.3			Elevation (In Feet)
0+10	**Tundra**	17.3	17.2	17.2	17.3			Elevation (In Feet)
0+14	**Gradebreak**	18.0	18.0	18.0	18.0			Elevation (In Feet)
0+20	**Top Bank**	17.5	17.5	17.6				Elevation (In Feet)
0+21	**Toe Bank**	16.5	16.3	16.3	16.0			Elevation (In Feet)
0+24	**CL Swale**	15.0	12.5	15.0	13.8			Elevation (In Feet)
0+26	**Toe Bank**	16.1	12.5	13.1	13.6			Elevation (In Feet)
0+28	**Top Bank**	17.8	17.9	17.9	17.3			Elevation (In Feet)
0+34	**Gradebreak**	17.9	17.9	18.0	18.0			Elevation (In Feet)
0+43	**Gradebreak**	17.2	17.3	17.2	17.4			Elevation (In Feet)
0+46	**Gradebreak**	17.8	17.8	17.8	N/A			Elevation (In Feet)
0+52	**Tundra**	17.8	17.9	17.9	18.0			Elevation (In Feet)
Baseline	**Point**	**Subsidence Monitor - Cross-Section G**						
Station	**Description**	See Drawing CE-CP00-134 for Survey Cross-Section Locations						
		9/8/2003	**7/9/2004**	**7/28/2005**	**8/21/2006**	**Future**	**Future**	**Date**
0+00	**Tundra**	17.1	17.3	17.4	17.5			Elevation (In Feet)
0+09	**Tundra**	17.2	17.1	17.2	17.3			Elevation (In Feet)
0+16	**Gradebreak**	17.9	17.9	17.9	N/A			Elevation (In Feet)
0+22	**Top Bank**	17.6	17.7	17.7	17.8			Elevation (In Feet)
0+24	**Toe Bank**	16.9	17.0	17.0	17.0			Elevation (In Feet)
0+26	**CL Swale**	16.5	16.5	16.5	16.5			Elevation (In Feet)
0+28	**Toe Bank**	16.8	16.7	16.9	16.9			Elevation (In Feet)
0+30	**Top Bank**	17.7	17.8	17.8	17.9			Elevation (In Feet)
0+37	**Tundra**	17.6	17.6	17.6	17.7			Elevation (In Feet)
0+46	**Tundra**	17.3	17.3	17.3	17.4			Elevation (In Feet)
Baseline	**Point**	**Subsidence Monitor - Cross-Section H**						
Station	**Description**	See Drawing CE-CP00-134 for Survey Cross-Section Locations						
		9/8/2003	**7/9/2004**	**7/28/2005**	**8/21/2006**	**Future**	**Future**	**Date**
0+00	**Tundra**	17.0	16.8	16.6	16.7			Elevation (In Feet)
0+09	**Tundra**	17.1	16.9	16.9	17.0			Elevation (In Feet)
0+18	**Gradebreak**	17.8	17.8	17.8	N/A			Elevation (In Feet)
0+24	**Top Bank**	17.3	17.4	17.4	17.5			Elevation (In Feet)
0+25	**Toe Bank**	16.8	16.4	16.6	16.6			Elevation (In Feet)
0+28	**CL Swale**	16.3	16.3	16.3	16.3			Elevation (In Feet)
0+30	**Toe Bank**	16.6	16.6	16.4	16.5			Elevation (In Feet)
0+32	**Top Bank**	17.6	17.7	17.6	17.6			Elevation (In Feet)
0+40	**Gradebreak**	18.2	18.2	18.2	18.3			Elevation (In Feet)
0+42	**Gradebreak**	17.7	17.7	17.8	17.9			Elevation (In Feet)
0+50	**Tundra**	17.2	17.2	17.3	17.4			Elevation (In Feet)

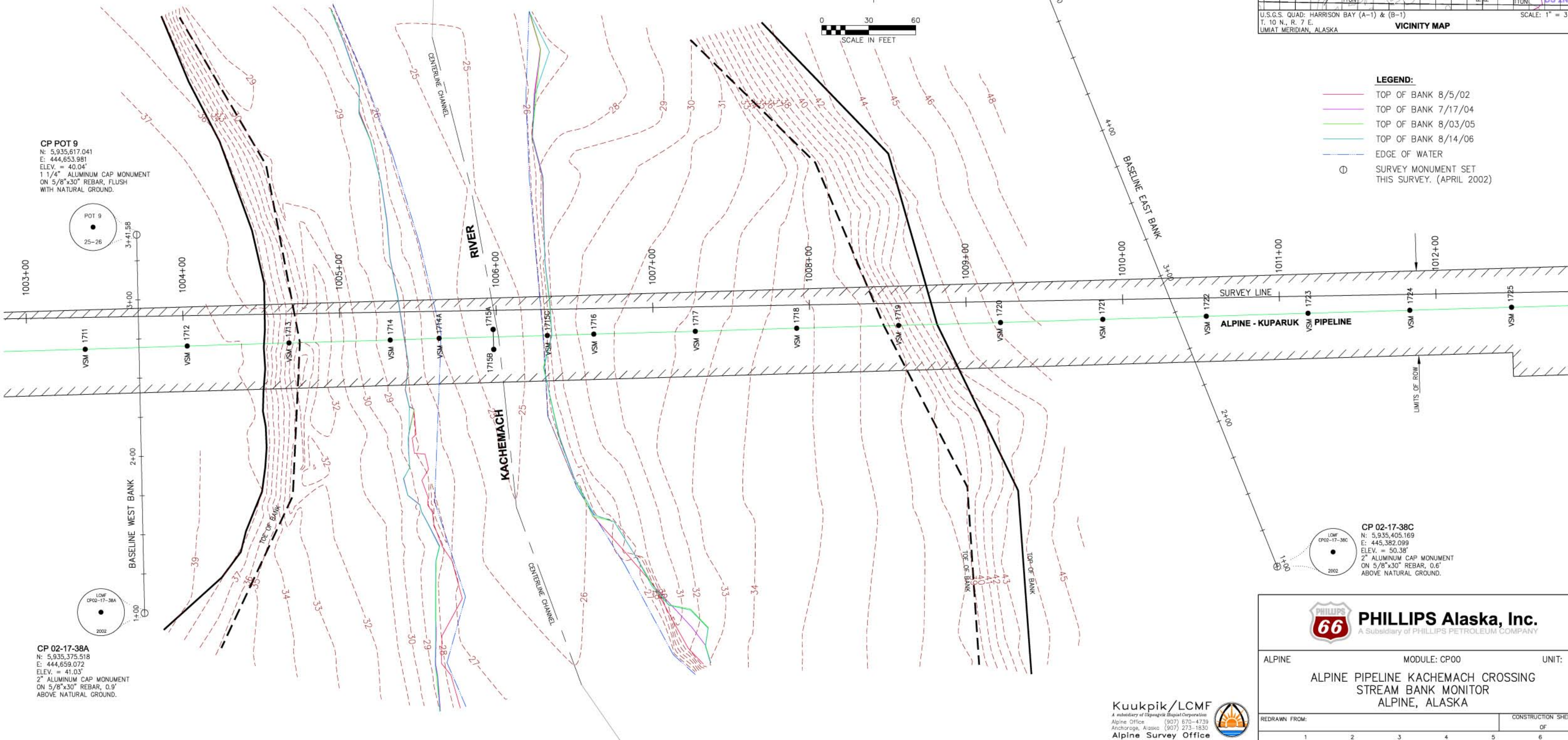
Appendix D Kachemach Crossing Survey Data

JOB NO:	SUB JOB NO:	DRAWING NO:
02-205		CE-CP00-145

NOTES:

1. DATES OF SURVEY: APRIL 2002 – AUGUST 2002. JULY 11, 2003. JULY 17, 2004; AUGUST 3 & 4, 2005. AUGUST 14, 2006.
2. REFERENCE FIELD BOOKS: LCMF2002-17, PGS. 37-39, & 44; LCMF2002-23, PG. 22; LCMF2003-11, PGS. 15-17; LCMF2004-08, PGS 56-60; LCMF2005-21, PGS. 13 & 22; LCMF2006-12. PG 58.
3. VERTICAL CONTROL IS BASED ON AS-BUILT TOP OF STEEL ELEVATIONS AT VSM 1712, 1713 AND 1724 PER DRAWING PD-CP00-109, SHEETS 31 AND 32.
4. HORIZONTAL CONTROL IS BASED ON RECORD COORDINATES OF ALPINE PIPELINE PI 13A AND ALPINE MONUMENT No. 19. COORDINATES ARE ALASKA STATE PLANE, ZONE 4, NAD 27, IN FEET.
5. SEE DOCUMENT RPT-EV-CP-00007 FOR STREAM BANK EROSION BASELINE SURVEY DATA.
6. VSM 1714A AND 1715C (identified as 1715A and 1715B during construction) DO NOT HAVE SUFFICIENT DEPTH TO MEET SCOUR DESIGN. THE PIPELINE SADDLES ARE UNBOLTED TO ENSURE NO PIPELINE DAMAGE SHOULD THE VSM FAIL DURING A SCOUR EVENT.





Kuukpik/LCMF
A subsidiary of Ukpeagvik Iñupiat Corporation
Alpine Office (907) 670-4739
Anchorage, Alaska (907) 273-1830
Alpine Survey Office

FORM: DSIZE

PHILLIPS Alaska, Inc.
A Subsidiary of PHILLIPS PETROLEUM COMPANY

ALPINE | MODULE: CP00 | UNIT: CP

ALPINE PIPELINE KACHEMACH CROSSING
STREAM BANK MONITOR
ALPINE, ALASKA

REDRAWN FROM: | CONSTRUCTION SHEET OF

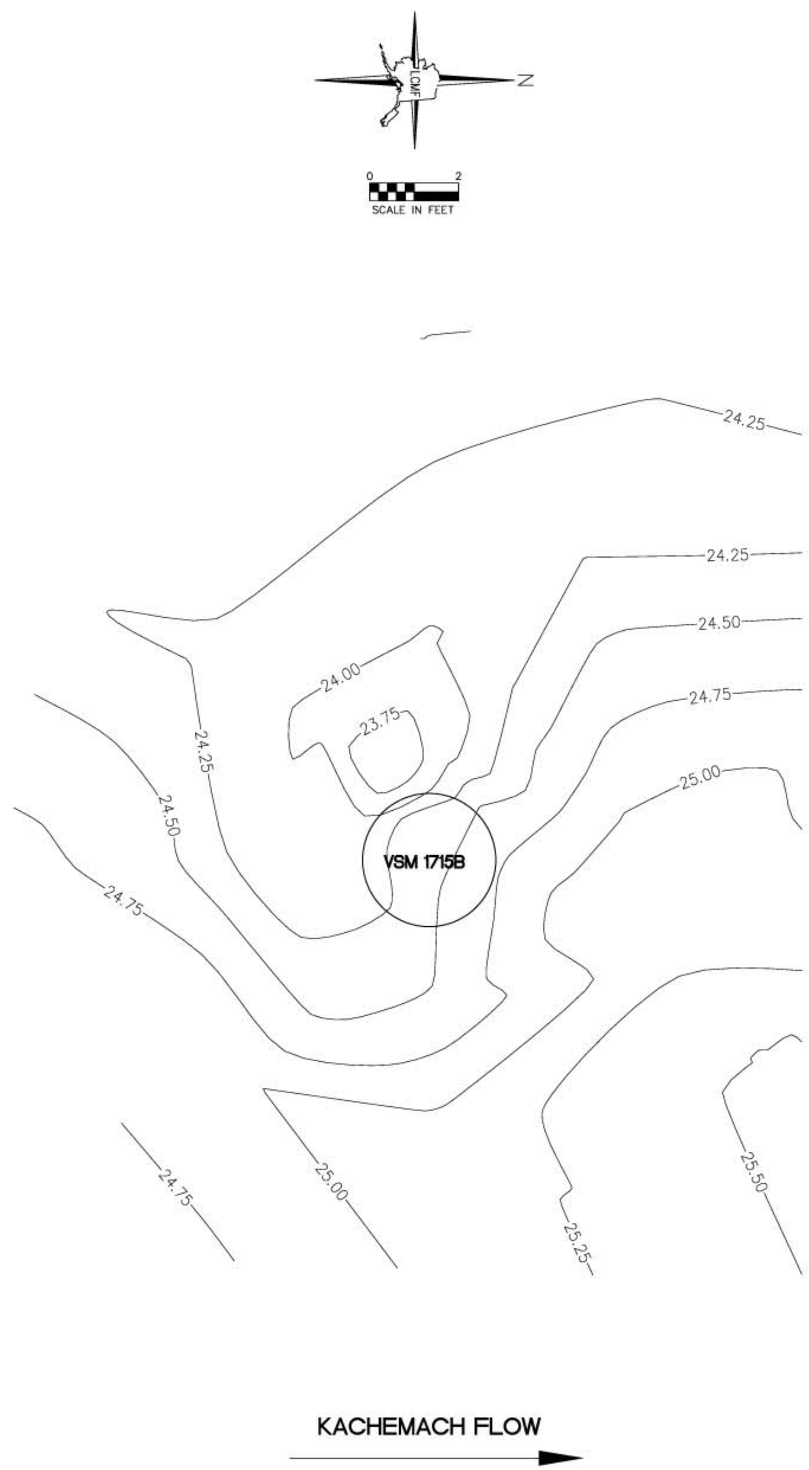
DO NOT SCALE — ABOVE SCALE FOR REFERENCE ONLY

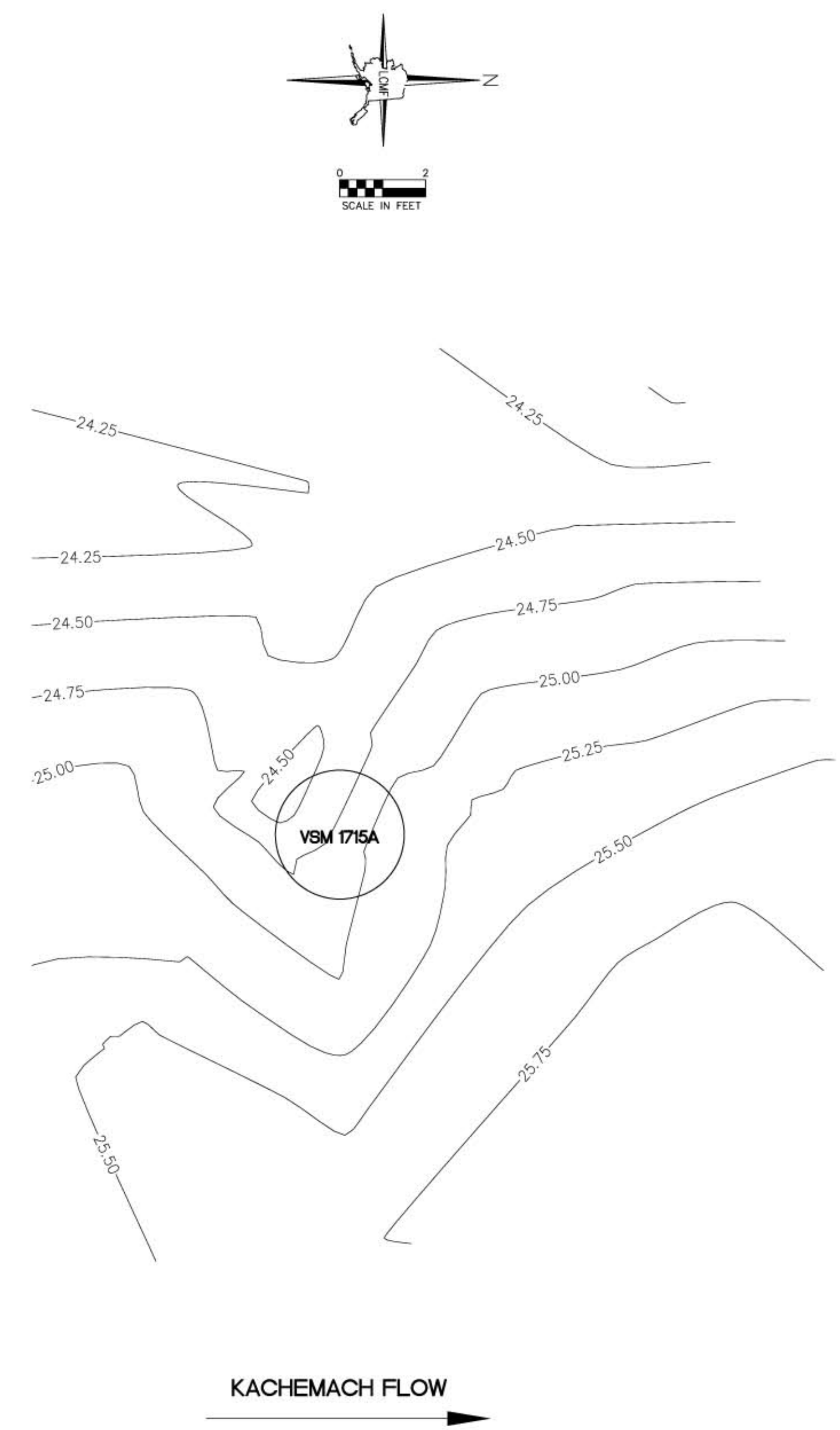
DATE: 12/16/02	DRAWN: CZ	DESIGN:	FCR NO: 1870229ACS
SCALE: 1" = 30'	CHECKED: JZ		AFC/CC NO: 1870229
	APPROVAL:		CADD FILE NO. 02-04-06-2
JOB NO: 02-205	SUB JOB NO:	DRAWING NO: CE-CP00-145	SHEET: 1 of 2 — REV: 6

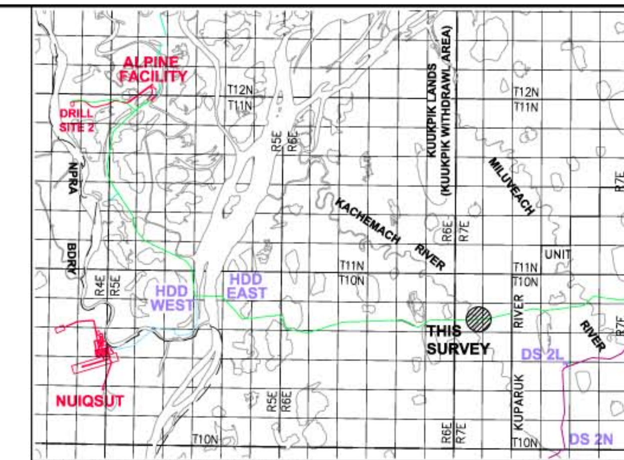
REFERENCE DWG NO/SHT NO:

REV	DATE	REVISIONS	BY	CHK	JOB ENGR	PROJ ENGR	CUST APP
6	8/14/2006	UPDATED PER 4083251	CZ	GD			
5	10/23/05	UPDATED PER 3423995ACS – ADD VSM LABELS 1714A&1715C	CZ	GD			
4	8/4/05	UPDATED PER 3423995ACS	CZ	DB			
3	7/17/04	ISSUED PER 2390461ACS	AG	GD			
2	7/11/03	ISSUED PER 2094388ACS TOP OF BANK 2003 – RECONTOURED	GD	JZ			
1	12/16/02	ISSUED PER 1870229ACS	CZ	JZ			

JOB NO: 02-205 | SUB JOB NO: | DRAWING NO: CE-CP00-145







U.S.G.S. QUAD: HARRISON BAY (A-1) & (B-1)
T. 10 N., R. 7 E.
UMIAT MERIDIAN, ALASKA

SCALE: 1" = 3 MILE

VICINITY MAP

NOTES:

1. DATES OF SURVEY: JULY 17, & AUGUST 30, 2004, AUGUST 4, 2005, AUGUST 14, 2006.
2. REFERENCE FIELD BOOKS: LCMF 2004-08, PGS 56-60, LCMF 2004-11 PGS 20,21; LCMF2005-21, PGS 13 & 22; LCMF2006-12, PG. 58.
3. VERTICAL CONTROL IS BASED ON AS-BUILT TOP OF STEEL ELEVATIONS AT VSM 1712, 1713 AND 1724 PER DRAWING PD-CP00-109, SHEETS 31 AND 32.
4. HORIZONTAL CONTROL IS BASED ON RECORD COORDINATES OF ALPINE PIPELINE PI 13A AND ALPINE MONUMENT No, 19. COORDINATES ARE ALASKA STATE PLANE, ZONE 4, NAD 27, IN FEET.

Kuukpik/LCMF
A subsidiary of Kuukpik Corporation
Alpine Office (907) 670-4739
Anchorage, Alaska (907) 273-1830
Alpine Survey Office

ConocoPhillips
Alaska, Inc.

ALPINE | MODULE: CP00 | UNIT: CP

ALPINE PIPELINE KACHEMACH CROSSING
PILE SCOURING MONITOR
ALPINE, ALASKA

REDRAWN FROM: | CONSTRUCTION SHEET OF

DO NOT SCALE — ABOVE SCALE FOR REFERENCE ONLY

DATE: 8/17/04	DRAWN: AG	DESIGN:	ECM NO: 2390461ACS	
SCALE: 1" = 2'	CHECKED: GD		CC NO: 2390461	
	APPROVAL:		CADD FILE NO. 04-06-14-3	
JOB NO: 02-205	SUB JOB NO:	DRAWING NO: CE-CP00-145	PART: 1 OF 2	REV: 3

REFERENCE DWG NO/SHT NO:

REV	DATE	REVISIONS	BY	CHK	JOB ENGR	PROJ ENGR	CUST APP
3	8/14/06	UPDATED PER 4083251ACS	AG	GD			
2	8/4/05	UPDATED PER 3423995ACS	CZ	DB			
1	8/17/04	ISSUED PER 2390461ACS	AG	GD			

FORM: DSIZE

Alpine CP00
Alpine Pipeline Kachemach Crossing
West Streambank Erosion Monitor

Baseline Station	Streambank Monitor - Top of West Bank Locations See Drawing CE-CP00-145 Rev 6 for Survey Baseline Location					Description
	8/5/2002	7/11/2003	7/17/2004	8/3/2005	8/14/2006	Date
0+40	199.0	199.0	187.1	187.1	187.1	Baseline Offset (In Feet)
0+50	196.3	196.3	186.5	186.5	186.5	Baseline Offset (In Feet)
0+60	191.8	191.8	185.5	185.5	185.5	Baseline Offset (In Feet)
0+70	189.0	189.0	185.3	185.3	185.3	Baseline Offset (In Feet)
0+80	189.4	189.4	185.7	185.7	185.7	Baseline Offset (In Feet)
0+90	194.4	194.4	185.8	185.8	185.8	Baseline Offset (In Feet)
1+00	200.1	200.1	185.9	185.9	185.9	Baseline Offset (In Feet)
1+10	201.7	201.7	186.1	186.1	186.1	Baseline Offset (In Feet)
1+20	199.2	199.2	186.4	186.4	186.4	Baseline Offset (In Feet)
1+30	196.4	196.4	186.7	186.7	186.7	Baseline Offset (In Feet)
1+40	190.4	190.4	188.6	188.6	188.6	Baseline Offset (In Feet)
1+50	186.8	186.8	183.7	183.7	183.7	Baseline Offset (In Feet)
1+60	185.1	185.1	178.6	178.6	178.6	Baseline Offset (In Feet)
1+70	182.4	182.4	171.7	171.7	171.7	Baseline Offset (In Feet)
1+80	179.1	179.1	167.7	167.7	167.7	Baseline Offset (In Feet)
1+90	182.8	182.8	171.2	171.2	171.2	Baseline Offset (In Feet)
2+00	174.2	174.2	170.8	170.8	170.8	Baseline Offset (In Feet)
2+10	175.3	175.3	170.9	170.9	170.9	Baseline Offset (In Feet)
2+20	175.1	175.1	173.1	173.1	171.5	Baseline Offset (In Feet)
2+30	171.2	171.2	171.2	171.2	171.2	Baseline Offset (In Feet)
2+40	169.5	169.5	169.5	169.5	169.5	Baseline Offset (In Feet)
2+50	171.0	171.0	171.0	171.0	171.0	Baseline Offset (In Feet)
2+60	170.9	170.9	170.9	170.9	170.9	Baseline Offset (In Feet)
2+71	169.4	169.4	169.4	169.4	169.4	Baseline Offset (In Feet)
2+80	168.2	168.2	168.2	168.2	168.2	Baseline Offset (In Feet)
2+90	166.8	166.8	166.8	166.8	166.8	Baseline Offset (In Feet)
3+00	165.4	165.4	165.4	165.4	165.4	Baseline Offset (In Feet)
3+10	163.7	163.7	163.7	163.7	163.7	Baseline Offset (In Feet)
3+20	161.9	161.9	161.9	161.9	161.9	Baseline Offset (In Feet)
3+30	160.9	160.9	160.9	160.9	160.9	Baseline Offset (In Feet)
3+40	160.3	160.3	160.3	160.3	160.3	Baseline Offset (In Feet)
3+50	159.4	159.4	159.4	159.4	159.4	Baseline Offset (In Feet)
3+60	158.1	158.1	158.1	158.1	158.1	Baseline Offset (In Feet)
3+70	156.8	156.8	156.8	156.8	156.8	Baseline Offset (In Feet)
3+80	154.8	154.8	154.8	154.8	154.8	Baseline Offset (In Feet)
3+90	152.5	152.5	152.5	152.5	152.5	Baseline Offset (In Feet)
4+00	150.1	150.1	150.1	150.1	150.1	Baseline Offset (In Feet)
4+10	146.5	146.5	146.5	146.5	146.5	Baseline Offset (In Feet)
4+20	143.8	143.8	143.8	143.8	143.8	Baseline Offset (In Feet)
4+30	144.0	144.0	144.0	144.0	144.0	Baseline Offset (In Feet)
4+40	141.8	141.8	141.8	141.8	141.8	Baseline Offset (In Feet)
4+50	138.7	138.7	138.7	138.7	138.7	Baseline Offset (In Feet)
4+60	135.5	135.5	135.5	135.5	135.5	Baseline Offset (In Feet)
4+70	131.8	131.8	131.8	131.8	131.8	Baseline Offset (In Feet)
4+80	128.1	128.1	128.1	128.1	128.1	Baseline Offset (In Feet)
VSM 1714	160.5	160.5	160.5	160.5	160.5	Baseline Offset (In Feet)

Alpine CP00
Alpine Pipeline Kachemach Crossing
East Streambank Erosion Monitor

Baseline	Streambank Monitor - Top of East Bank Locations					Description
Station	See Drawing CE-CP00-145 Rev 6 for Survey Baseline Location					
	8/5/2002	7/11/2003	7/17/2004	8/3/2005	8/14/2006	Date
1+80	363.8	363.8	358.2	358.2	358.2	Baseline Offset (In Feet)
1+90	367.8	367.8	357.7	356.8	356.8	Baseline Offset (In Feet)
2+00	369.4	369.4	360.4	351.9	351.9	Baseline Offset (In Feet)
2+10	370.7	370.7	363.9	356.0	356.0	Baseline Offset (In Feet)
2+20	371.9	371.9	367.7	366.7	366.7	Baseline Offset (In Feet)
2+30	373.0	373.0	371.6	372.1	372.1	Baseline Offset (In Feet)
2+40	374.8	374.8	374.8	374.8	374.8	Baseline Offset (In Feet)
2+50	378.3	378.3	376.3	376.3	376.3	Baseline Offset (In Feet)
2+60	381.8	381.8	377.9	377.9	377.9	Baseline Offset (In Feet)
2+70	385.3	385.3	379.7	379.7	379.7	Baseline Offset (In Feet)
2+80	388.9	388.9	381.4	381.4	381.4	Baseline Offset (In Feet)
2+90	392.6	392.6	390.4	390.4	389.0	Baseline Offset (In Feet)
3+00	394.0	394.0	394.0	394.0	393.1	Baseline Offset (In Feet)
3+10	394.8	394.8	394.8	394.8	394.4	Baseline Offset (In Feet)
3+20	395.5	395.5	395.5	395.5	395.5	Baseline Offset (In Feet)
3+30	395.1	395.1	395.1	395.1	395.1	Baseline Offset (In Feet)
3+40	394.8	394.8	394.8	394.8	394.8	Baseline Offset (In Feet)
3+50	394.0	394.0	394.0	394.0	394.0	Baseline Offset (In Feet)
3+60	392.6	392.6	392.6	392.6	392.6	Baseline Offset (In Feet)
3+70	391.1	391.1	391.1	391.1	391.1	Baseline Offset (In Feet)
3+80	389.4	389.4	389.4	389.4	389.4	Baseline Offset (In Feet)
3+90	387.6	387.6	387.6	387.6	387.6	Baseline Offset (In Feet)
4+00	381.6	381.6	381.6	381.6	381.6	Baseline Offset (In Feet)
4+10	375.0	375.0	375.0	375.0	375.0	Baseline Offset (In Feet)
4+20	371.3	371.3	371.3	371.3	371.3	Baseline Offset (In Feet)
4+30	368.0	368.0	368.0	368.0	368.0	Baseline Offset (In Feet)
4+40	365.4	365.4	365.4	365.4	365.4	Baseline Offset (In Feet)
4+50	362.7	362.7	362.7	362.7	362.7	Baseline Offset (In Feet)
4+60	358.5	358.5	358.5	358.5	359.5	Baseline Offset (In Feet)
4+70	356.0	356.0	356.0	356.0	356.0	Baseline Offset (In Feet)
4+80	352.4	352.4	352.4	352.4	352.4	Baseline Offset (In Feet)
4+90	348.6	348.6	348.6	348.6	348.6	Baseline Offset (In Feet)
5+00	344.8	344.8	344.8	344.8	344.8	Baseline Offset (In Feet)
5+10	342.3	342.3	342.3	342.3	342.3	Baseline Offset (In Feet)
5+20	341.0	341.0	341.0	341.0	341.0	Baseline Offset (In Feet)
5+30	339.8	339.8	339.8	339.8	339.8	Baseline Offset (In Feet)
5+40	335.5	335.5	335.5	335.5	335.5	Baseline Offset (In Feet)
5+50	330.7	330.7	330.7	330.7	330.7	Baseline Offset (In Feet)
5+60	325.6	325.6	325.6	325.6	324.3	Baseline Offset (In Feet)
5+70	320.1	320.1	320.1	320.1	315.7	Baseline Offset (In Feet)
5+80	314.6	314.6	314.6	314.6	309.1	Baseline Offset (In Feet)
5+90	313.0	313.0	313.0	313.0	310.0	Baseline Offset (In Feet)
6+00	312.1	312.1	312.1	312.1	310.9	Baseline Offset (In Feet)
VSM 1716	349.7	349.7	349.7	349.7	349.7	Baseline Offset (In Feet)

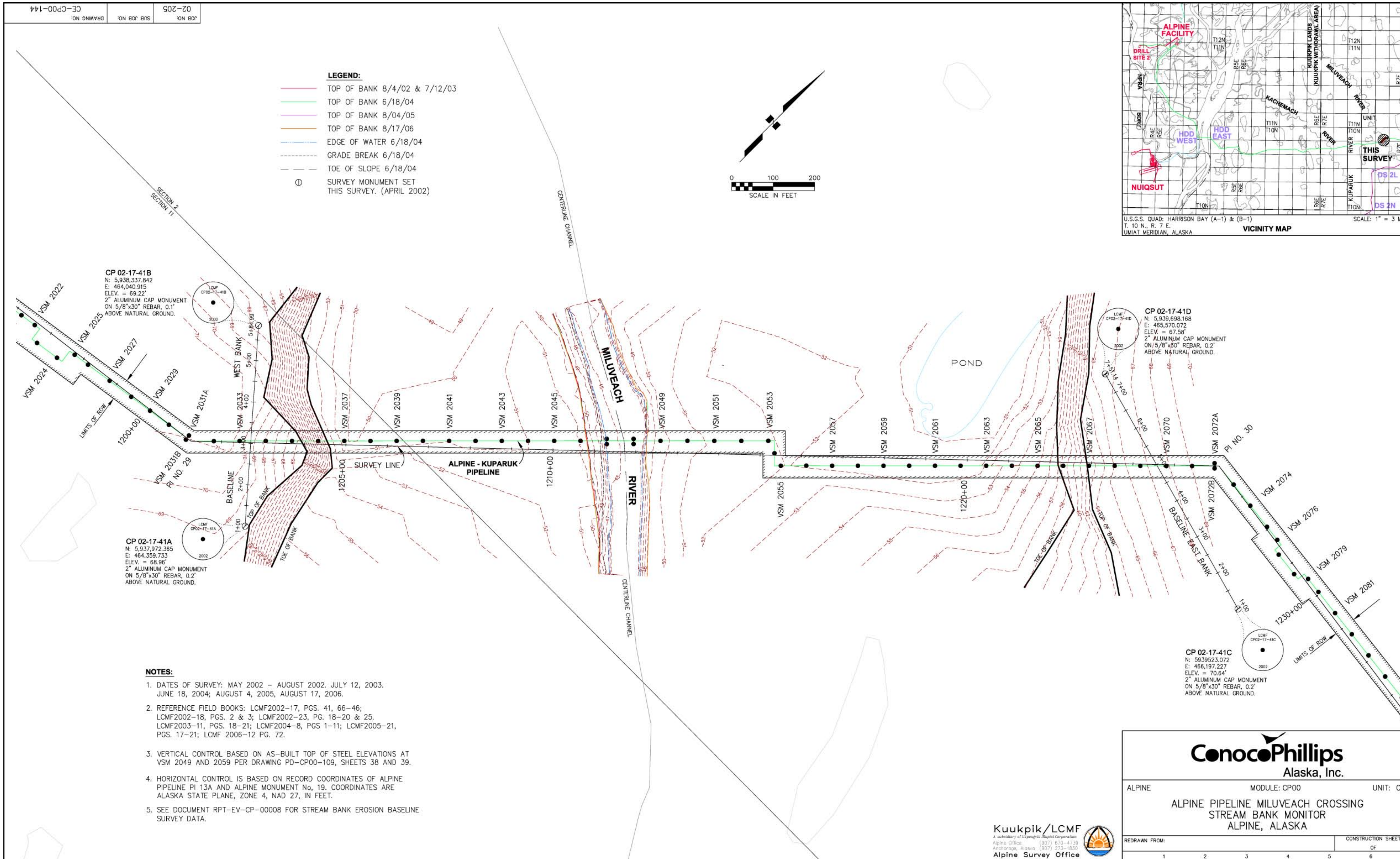
Alpine CP00

Alpine Pipeline Kachemach Crossing

Pilecap Monitor

Location	7/16/2004	8/3/2005	8/3/2006	Description
VSM 1713	N/A	43.812	43.840	Monitor Point Elev. at Bottom NE Cor Pile Cap
VSM 1714	N/A	42.812	42.815	Monitor Point Elev. at Bottom NE Cor Pile Cap
VSM 1714A	N/A	N/A	42.720	Monitor Point Elev. at Bottom NE Cor Pile Cap
VSM 1715A	42.272	42.268	42.285	Monitor Point Elev. at Bottom NE Cor Pile Cap
VSM 1715B	42.263	42.272	42.285	Monitor Point Elev. at Bottom NE Cor Pile Cap
VSM 1715C	N/A	42.612	42.520	Monitor Point Elev. at Bottom NE Cor Pile Cap

Appendix E Miluveach Crossing Survey Data



NOTES:

1. DATES OF SURVEY: MAY 2002 – AUGUST 2002. JULY 12, 2003. JUNE 18, 2004; AUGUST 4, 2005, AUGUST 17, 2006.
2. REFERENCE FIELD BOOKS: LCMF2002-17, PGS. 41, 66-46; LCMF2002-18, PGS. 2 & 3; LCMF2002-23, PG. 18-20 & 25. LCMF2003-11, PGS. 18-21; LCMF2004-8, PGS 1-11; LCMF2005-21, PGS. 17-21; LCMF 2006-12 PG. 72.
3. VERTICAL CONTROL BASED ON AS-BUILT TOP OF STEEL ELEVATIONS AT VSM 2049 AND 2059 PER DRAWING PD-CP00-109, SHEETS 38 AND 39.
4. HORIZONTAL CONTROL IS BASED ON RECORD COORDINATES OF ALPINE PIPELINE PI 13A AND ALPINE MONUMENT No, 19. COORDINATES ARE ALASKA STATE PLANE, ZONE 4, NAD 27, IN FEET.
5. SEE DOCUMENT RPT-EV-CP-00008 FOR STREAM BANK EROSION BASELINE SURVEY DATA.

Kuukpik/LCMF
A subsidiary of Kuukpik Corporation
Alpine Survey Office

ConocoPhillips Alaska, Inc.

ALPINE MODULE: CP00 UNIT: CP

ALPINE PIPELINE MILUVEACH CROSSING
STREAM BANK MONITOR
ALPINE, ALASKA

REV	DATE	REVISIONS	BY	CHK	JOB ENGR	PROJ ENGR	CUST APP
5	8/19/06	UPDATED PER 4083252ACS	AG	GD			
4	8/5/05	UPDATED PER 3423996ACS	CZ	DB			
3	6/??/04	REVISED PER 2390462ACS	CZ	BD			
2	7/11/03	ISSUED PER 2094389ACS CHECKED SUBSIDENCE-RECONTOURED	GD	JZ			
1	12/19/02	ISSUED PER 1870228ACS	CZ	JZ			

REFERENCE DWG NO/SHT NO:

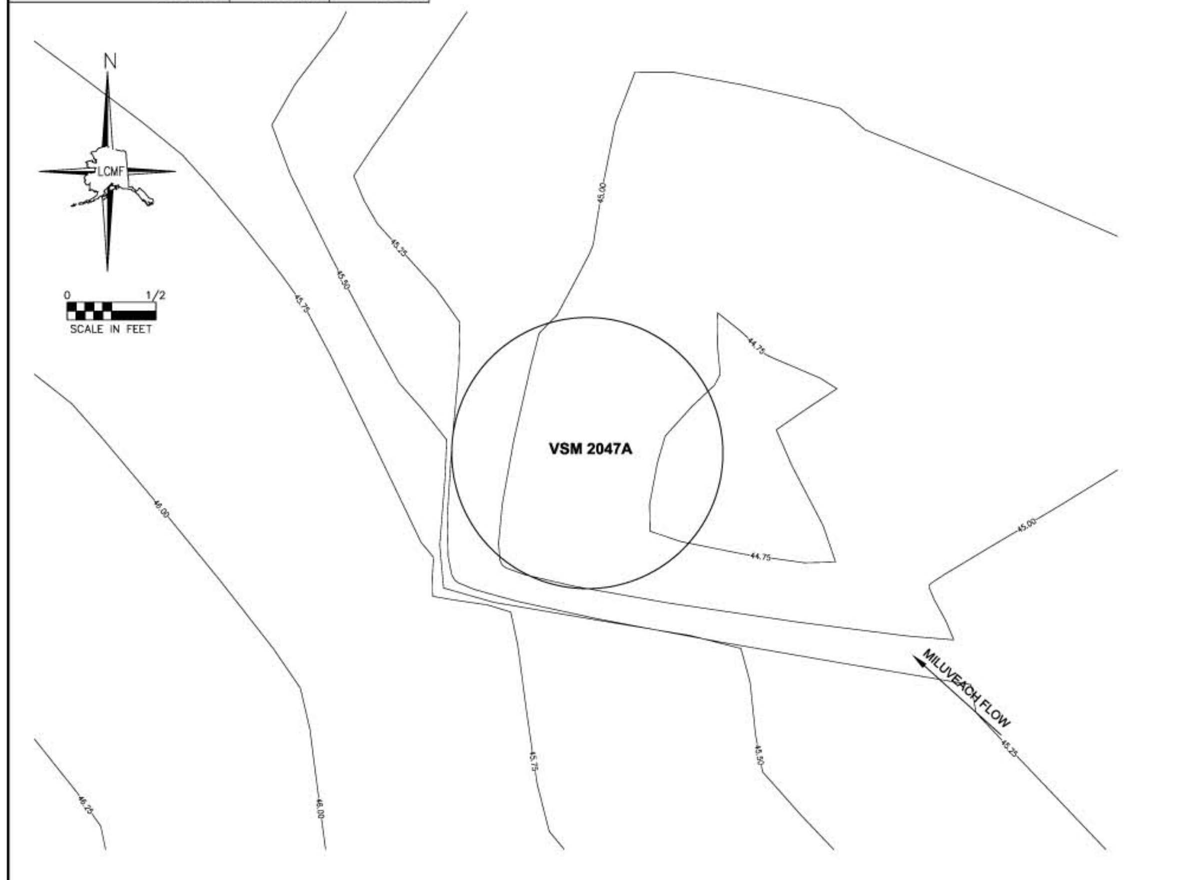
REDRAWN FROM:	CONSTRUCTION SHEET OF
DATE: 12/19/02	DRAWN: CZ
DESIGN:	ECM NO: 1870228ACS
SCALE: 1" = 100'	CHECKED: JZ
CC NO: 1870228	APPROVAL:
CADD FILE NO.: 02-04-06-1	JOB NO: 02-205
SUB JOB NO:	DRAWING NO: CE-CP00-144
PART: 1 OF 2	REV: 5

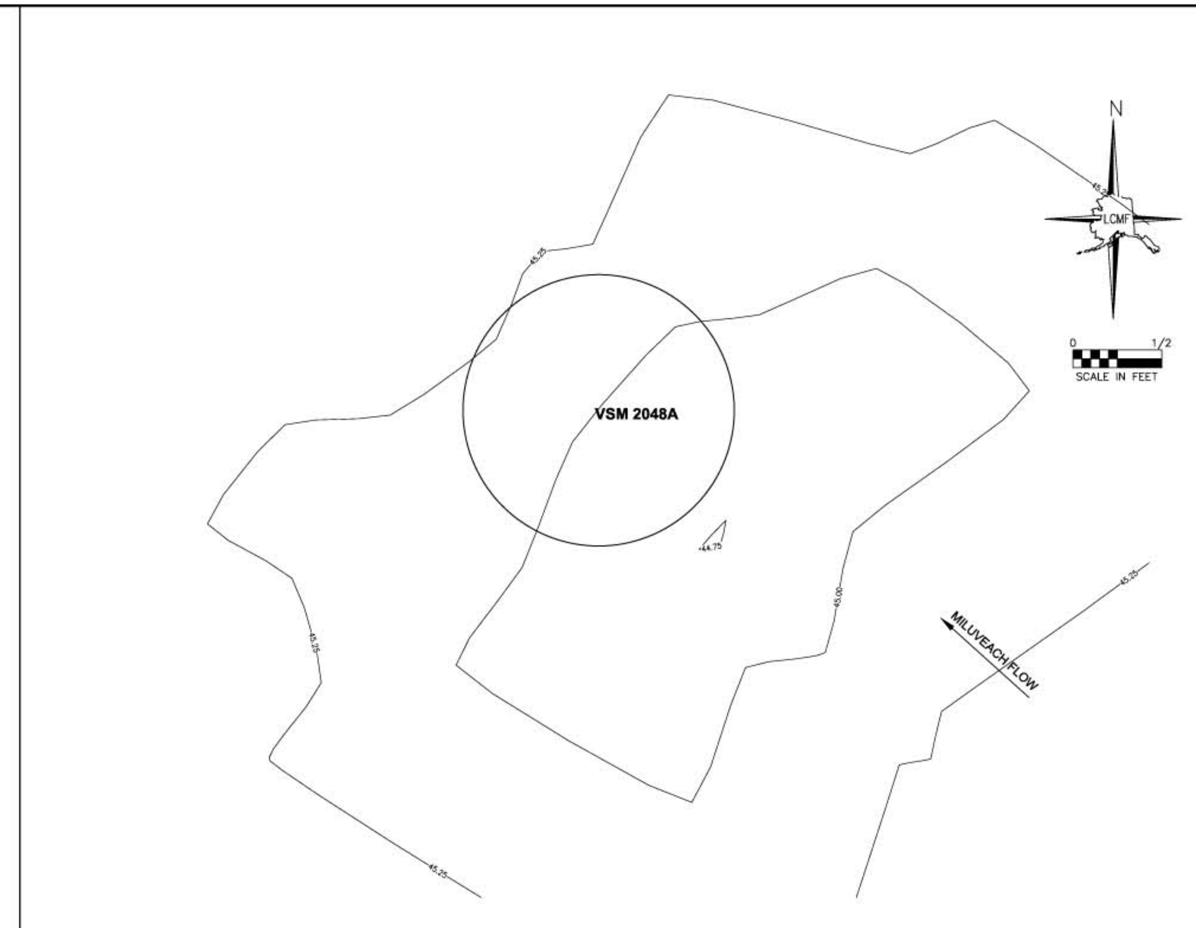
DO NOT SCALE — ABOVE SCALE FOR REFERENCE ONLY

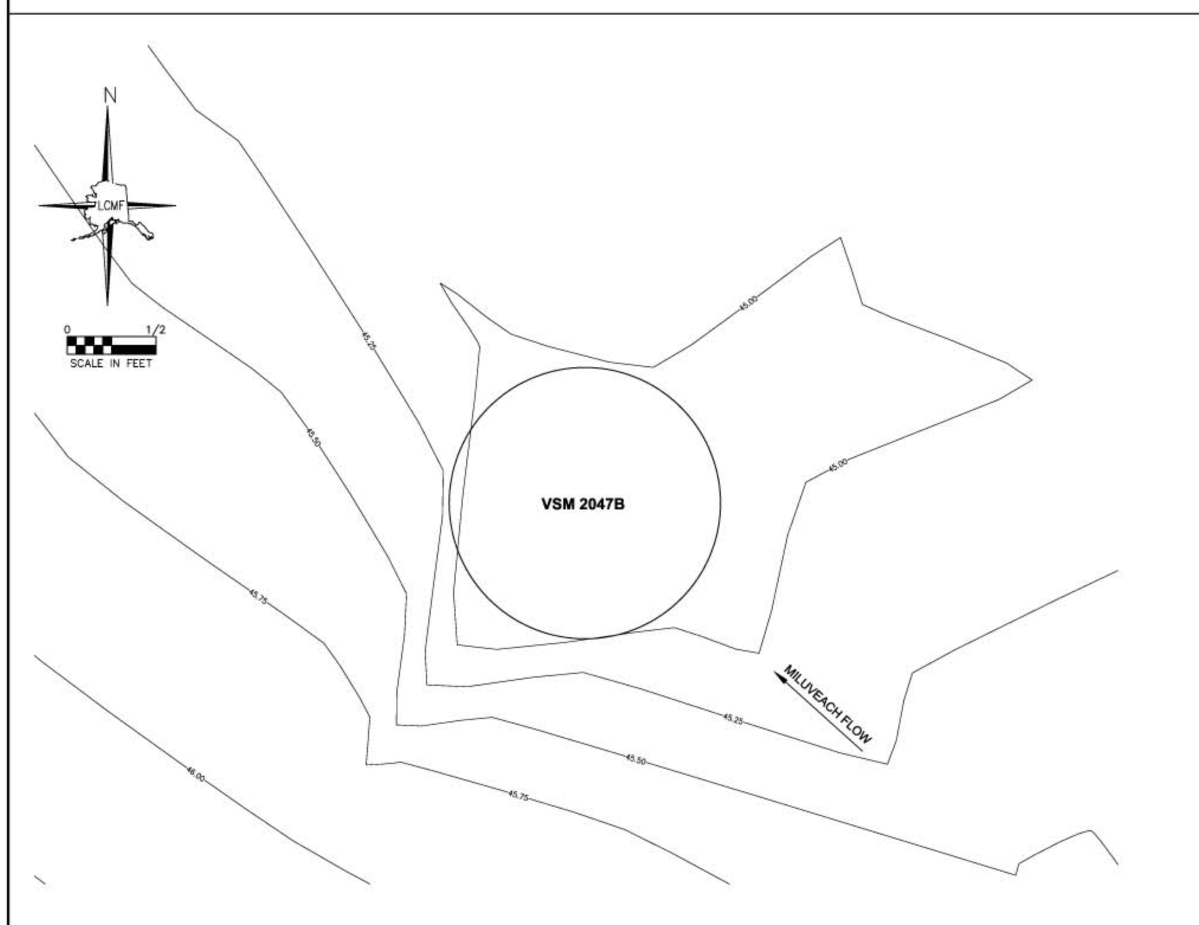
FORM: DSIZE

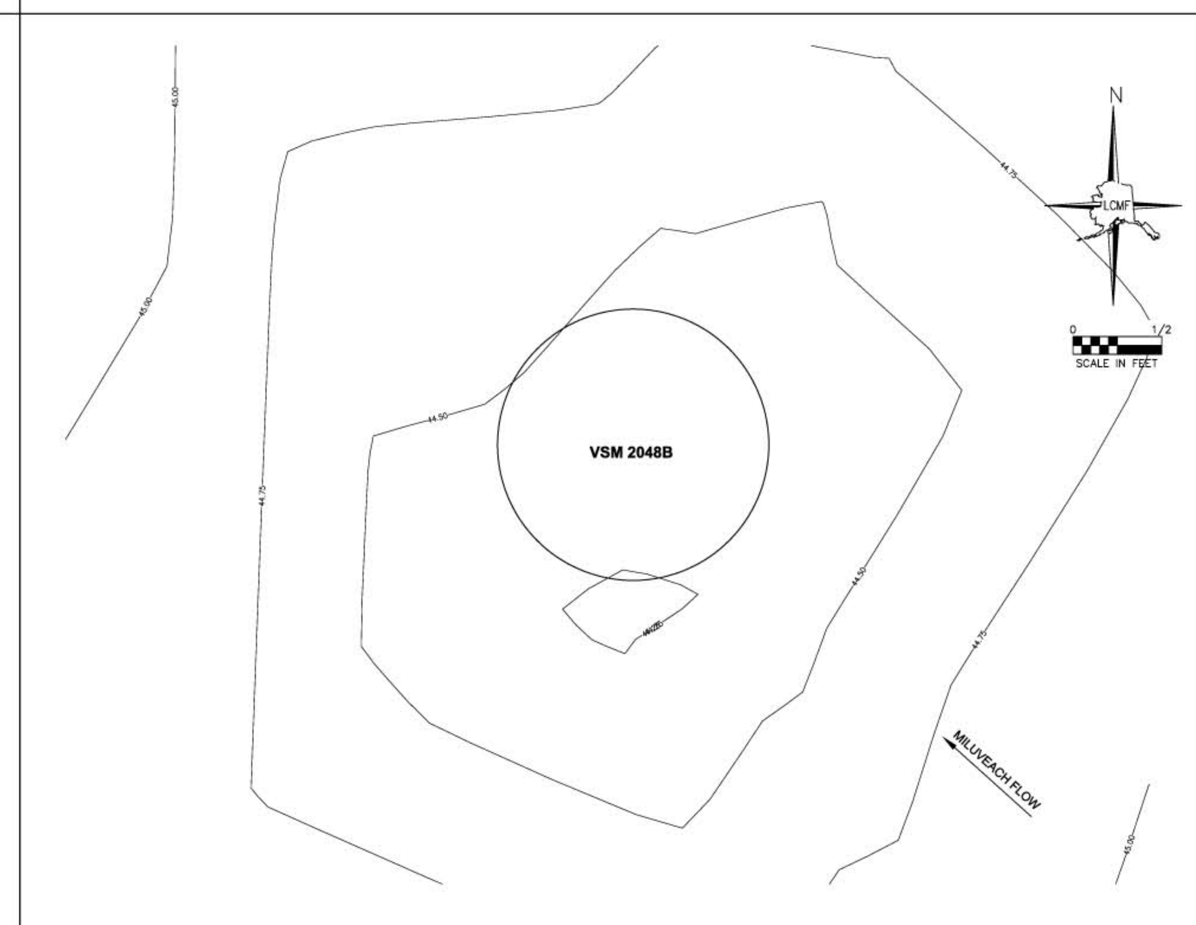
JOB NO: 02-205 SUB JOB NO: DRAWING NO: CE-CP00-144

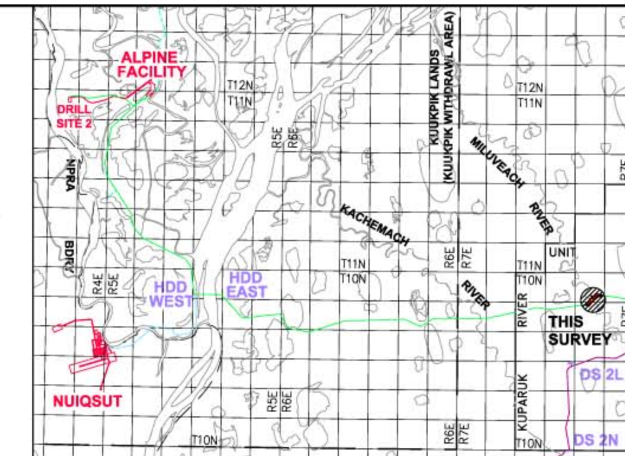
JOB NO: 02-205 SUB JOB NO: DRAWING NO: CE-CP00-144











U.S.G.S. QUAD: HARRISON BAY (A-1) & (B-1)
T. 10 N., R. 7 E.
UMIAT MERIDIAN, ALASKA

VICINITY MAP

SCALE: 1" = 3 MILE

NOTES:

1. DATE OF SURVEY: JUNE 18, 2004; AUGUST 4, 2005, AUGUST 17, 2006.
2. REFERENCE FIELD BOOK: LCMF2004-8, PGS 1-11; LCMF2005-21, PGS. 17-21; LCMF2006-12, PG. 72.
3. VERTICAL CONTROL BASED ON AS-BUILT TOP OF STEEL ELEVATIONS AT VSM 2049 AND 2059 PER DRAWING PD-CP00-109, SHEETS 38 AND 39.
4. HORIZONTAL CONTROL IS BASED ON RECORD COORDINATES OF ALPINE PIPELINE PI 13A AND ALPINE MONUMENT No, 19. COORDINATES ARE ALASKA STATE PLANE, ZONE 4, NAD 27, IN FEET.

Kuukpik/LCMF
A subsidiary of Kuukpik Corporation
Alpine Office (907) 670-4739
Anchorage, Alaska (907) 273-1830
Alpine Survey Office

ConocoPhillips
Alaska, Inc.

ALPINE MODULE: CP00 UNIT: CP

ALPINE PIPELINE MILUVEACH CROSSING
PILE SCOURING MONITOR
ALPINE, ALASKA

REDRAWN FROM: CONSTRUCTION SHEET OF

DO NOT SCALE — ABOVE SCALE FOR REFERENCE ONLY

FORM: DSIZE

REFERENCE DWG NO/SHT NO:

REV	DATE	REVISIONS	BY	CHK	JOB ENGR	PROJ ENGR	CUST APP
3	8/19/06	UPDATED PER 4083252ACS	AG	GD			
2	8/5/05	UPDATED PER 3423996ACS	CZ	DB			
1	6/21/04	ISSUED PER 2390462ACS	CZ	BD			

DATE: 6/22/04	DRAWN: CZ	DESIGN:	ECM NO: 2390462ACS
	CHECKED: BD		CC NO:
SCALE: 1" = 1/2'	APPROVAL:		CADD FILE NO. 04-06-16-4
JOB NO: 02-205	SUB JOB NO:	DRAWING NO: CE-CP00-144	PART: 2 OF 2 REV: 3

Alpine CP 00
Alpine Pipeline Miluveach Crossing
West Streambank Erosion Monitor

Baseline Station	Streambank Monitor - Top of West Bank Locations					Description
	;e Drawing CE-CP00-144 Rev 5 for Survey Baseline Locati(					
	8/4/2002	**7/12/2003**	**6/18/2004**	**8/4/2005**	**8/17/2006**	**Date**
0+50	859.5	859.5	858.0	858.0	858.0	Baseline Offset (In Feet)
0+60	859.7	859.7	856.9	856.9	856.9	Baseline Offset (In Feet)
0+70	859.0	859.0	856.2	856.2	856.2	Baseline Offset (In Feet)
0+80	859.2	859.2	855.6	855.6	855.6	Baseline Offset (In Feet)
0+90	858.7	858.7	855.9	855.9	855.9	Baseline Offset (In Feet)
1+00	858.1	858.1	856.1	856.1	856.1	Baseline Offset (In Feet)
1+10	857.4	857.4	855.8	855.8	855.8	Baseline Offset (In Feet)
1+20	856.5	856.5	854.8	854.8	854.8	Baseline Offset (In Feet)
1+30	854.6	854.6	852.5	852.5	852.5	Baseline Offset (In Feet)
1+40	854.4	854.4	851.1	851.1	851.1	Baseline Offset (In Feet)
1+50	854.0	854.0	849.7	849.7	849.7	Baseline Offset (In Feet)
1+60	851.8	851.8	847.9	847.9	847.9	Baseline Offset (In Feet)
1+70	850.3	850.3	845.9	845.9	845.9	Baseline Offset (In Feet)
1+80	848.8	848.8	843.8	843.8	843.8	Baseline Offset (In Feet)
1+90	846.4	846.4	841.7	841.7	841.7	Baseline Offset (In Feet)
2+00	842.2	842.2	839.4	839.4	839.4	Baseline Offset (In Feet)
2+10	838.1	838.1	837.2	837.2	837.2	Baseline Offset (In Feet)
2+20	837.1	837.1	835.7	835.7	835.7	Baseline Offset (In Feet)
2+30	836.1	836.1	834.1	834.1	834.1	Baseline Offset (In Feet)
2+40	834.7	834.7	832.4	832.4	832.4	Baseline Offset (In Feet)
2+50	830.5	830.5	829.3	829.3	829.3	Baseline Offset (In Feet)
2+60	827.7	827.7	827.1	827.1	827.1	Baseline Offset (In Feet)
2+70	826.0	826.0	825.5	825.5	825.5	Baseline Offset (In Feet)
2+80	824.6	824.6	823.8	823.8	823.8	Baseline Offset (In Feet)
2+90	823.5	823.5	822.1	822.1	822.1	Baseline Offset (In Feet)
3+00	822.3	822.3	820.4	820.4	820.4	Baseline Offset (In Feet)
3+10	821.1	821.1	818.8	818.8	818.8	Baseline Offset (In Feet)
3+20	818.9	818.9	816.8	816.8	816.8	Baseline Offset (In Feet)
3+30	816.4	816.4	814.8	814.8	814.8	Baseline Offset (In Feet)
3+40	814.9	814.9	812.7	812.7	812.7	Baseline Offset (In Feet)
3+50	812.0	812.0	810.7	810.7	810.7	Baseline Offset (In Feet)
VSM 2046	793.8	793.8	793.8	793.8	793.8	Baseline Offset (In Feet)
3+60	810.3	810.3	809.1	809.1	809.1	Baseline Offset (In Feet)
3+70	807.8	807.8	805.9	805.9	805.9	Baseline Offset (In Feet)
3+80	805.2	805.2	804.3	804.3	804.3	Baseline Offset (In Feet)
3+90	802.7	802.7	801.4	801.4	801.4	Baseline Offset (In Feet)
4+00	801.7	801.7	800.4	800.4	800.4	Baseline Offset (In Feet)
4+10	799.2	799.2	798.4	798.4	798.4	Baseline Offset (In Feet)
4+20	797.0	797.0	796.3	796.3	796.3	Baseline Offset (In Feet)
4+30	794.9	794.9	793.8	793.8	793.8	Baseline Offset (In Feet)
4+40	792.2	792.2	791.3	791.3	791.3	Baseline Offset (In Feet)
4+50	789.9	789.9	789.1	789.1	789.1	Baseline Offset (In Feet)
4+60	788.7	788.7	787.3	787.3	787.3	Baseline Offset (In Feet)
4+70	786.3	786.3	784.8	784.8	784.8	Baseline Offset (In Feet)
4+80	783.1	783.1	781.7	781.7	781.7	Baseline Offset (In Feet)
4+90	780.0	780.0	778.6	778.6	778.6	Baseline Offset (In Feet)
5+00	776.3	776.3	775.1	775.1	775.1	Baseline Offset (In Feet)
5+10	772.4	772.4	771.3	771.3	771.3	Baseline Offset (In Feet)
5+20	768.7	768.7	767.5	767.5	767.5	Baseline Offset (In Feet)
5+30	765.1	765.1	763.7	763.7	763.7	Baseline Offset (In Feet)
5+40	761.4	761.4	759.8	759.8	759.8	Baseline Offset (In Feet)
5+50	757.0	757.0	755.8	755.8	755.8	Baseline Offset (In Feet)
5+60	752.6	752.6	751.6	751.6	751.6	Baseline Offset (In Feet)
5+70	748.0	748.0	747.0	747.0	747.0	Baseline Offset (In Feet)
5+80	743.5	743.5	742.4	742.4	742.4	Baseline Offset (In Feet)
5+90	739.4	739.4	738.4	738.4	738.4	Baseline Offset (In Feet)
6+00	735.5	735.5	734.2	734.2	734.2	Baseline Offset (In Feet)
6+10	731.5	731.5	730.0	730.0	730.0	Baseline Offset (In Feet)
6+20	726.6	726.6	725.3	725.3	725.3	Baseline Offset (In Feet)
6+30	721.7	721.7	720.5	720.5	720.5	Baseline Offset (In Feet)
6+40	716.9	716.9	715.6	715.6	715.6	Baseline Offset (In Feet)
6+50	712.0	712.0	710.8	710.8	710.8	Baseline Offset (In Feet)
6+60	707.1	707.1	705.9	705.9	705.9	Baseline Offset (In Feet)

Alpine CP 00
Alpine Pipeline Miluveach Crossing
East Streambank Erosion Monitor

Baseline Station	Streambank Monitor - Top of East Bank Locations					Description
	ɛe Drawing CE-CP00-144 Rev 5 for Survey Baseline Locati					
	8/4/2002	7/12/2003	6/18/2004	8/4/2005	8/17/2006	Date
8+80	1196.2	1196.2	1196.2	1196.2	1196.2	Baseline Offset (In Feet)
8+90	1190.3	1190.3	1190.3	1190.3	1190.3	Baseline Offset (In Feet)
9+00	1184.3	1184.3	1184.3	1184.3	1184.3	Baseline Offset (In Feet)
9+10	1178.3	1178.3	1178.3	1178.3	1178.3	Baseline Offset (In Feet)
9+20	1172.4	1172.4	1172.4	1172.4	1172.4	Baseline Offset (In Feet)
9+30	1166.4	1166.4	1166.4	1166.4	1166.4	Baseline Offset (In Feet)
9+40	1160.3	1160.3	1160.3	1160.3	1160.3	Baseline Offset (In Feet)
9+50	1154.3	1154.3	1154.3	1154.3	1154.3	Baseline Offset (In Feet)
9+60	1148.2	1148.2	1148.2	1148.2	1148.2	Baseline Offset (In Feet)
9+70	1142.0	1142.0	1142.0	1142.0	1142.0	Baseline Offset (In Feet)
9+80	1135.5	1135.5	1135.5	1135.5	1135.5	Baseline Offset (In Feet)
9+90	1129.0	1129.0	1129.0	1129.0	1129.0	Baseline Offset (In Feet)
10+00	1122.5	1122.5	1122.5	1122.5	1122.5	Baseline Offset (In Feet)
10+10	1116.0	1116.0	1116.0	1116.0	1116.0	Baseline Offset (In Feet)
10+20	1110.7	1110.7	1110.7	1110.7	1110.7	Baseline Offset (In Feet)
10+30	1105.7	1105.7	1105.7	1105.7	1105.7	Baseline Offset (In Feet)
10+40	1100.6	1100.6	1100.6	1100.6	1100.6	Baseline Offset (In Feet)
10+50	1095.5	1095.5	1095.5	1095.5	1095.5	Baseline Offset (In Feet)
10+60	1090.5	1090.5	1090.5	1090.5	1090.5	Baseline Offset (In Feet)
10+70	1086.2	1086.2	1086.2	1086.2	1086.2	Baseline Offset (In Feet)
10+80	1082.3	1082.3	1082.3	1082.3	1082.3	Baseline Offset (In Feet)
10+90	1078.4	1078.4	1078.4	1078.4	1078.4	Baseline Offset (In Feet)
11+00	1074.4	1074.4	1074.4	1074.4	1074.4	Baseline Offset (In Feet)
11+10	1070.5	1070.5	1070.5	1070.5	1070.5	Baseline Offset (In Feet)
11+20	1065.1	1065.1	1065.1	1065.1	1065.1	Baseline Offset (In Feet)
11+30	1058.3	1058.3	1058.3	1058.3	1058.3	Baseline Offset (In Feet)
VSM 2049	1013.8	1013.8	1013.8	1013.8	1013.8	Baseline Offset (In Feet)
11+40	1051.6	1051.6	1051.6	1051.6	1051.6	Baseline Offset (In Feet)
11+55	1042.9	1042.9	1042.9	1042.9	1042.9	Baseline Offset (In Feet)
11+70	1033.0	1033.0	1033.0	1033.0	1033.0	Baseline Offset (In Feet)
11+80	1027.5	1027.5	1027.5	1027.5	1027.5	Baseline Offset (In Feet)
11+90	1024.0	1024.0	1024.0	1024.0	1024.0	Baseline Offset (In Feet)
12+00	1017.6	1017.6	1017.6	1017.6	1017.6	Baseline Offset (In Feet)
12+10	1012.1	1012.1	1010.9	1010.9	1010.9	Baseline Offset (In Feet)
12+20	1007.1	1007.1	1004.8	1007.1	1007.1	Baseline Offset (In Feet)
12+30	1001.8	1001.8	999.4	1001.8	1001.8	Baseline Offset (In Feet)
12+40	994.5	994.5	994.5	994.5	994.5	Baseline Offset (In Feet)
12+50	993.8	993.8	993.8	993.8	993.8	Baseline Offset (In Feet)
12+60	993.2	993.2	993.2	993.2	993.2	Baseline Offset (In Feet)
12+70	998.0	998.0	998.0	998.0	998.0	Baseline Offset (In Feet)
12+80	1001.9	1001.9	1001.9	1001.9	1001.9	Baseline Offset (In Feet)
12+90	1001.1	1001.1	1001.1	1001.1	1001.1	Baseline Offset (In Feet)
13+00	1000.3	1000.3	1000.3	1000.3	1000.3	Baseline Offset (In Feet)
13+10	999.4	999.4	999.4	999.4	999.4	Baseline Offset (In Feet)
13+20	998.8	998.8	998.8	998.8	998.8	Baseline Offset (In Feet)
13+30	997.8	997.8	997.8	997.8	997.8	Baseline Offset (In Feet)
13+40	996.8	996.8	996.8	996.8	996.8	Baseline Offset (In Feet)
13+50	995.8	995.8	995.8	995.8	995.8	Baseline Offset (In Feet)
13+60	994.7	994.7	994.7	994.7	994.7	Baseline Offset (In Feet)
13+70	993.7	993.7	993.7	993.7	993.7	Baseline Offset (In Feet)
13+80	992.6	992.6	992.6	992.6	992.6	Baseline Offset (In Feet)
13+90	991.4	991.4	991.4	991.4	991.4	Baseline Offset (In Feet)
14+00	988.1	988.1	988.1	988.1	988.1	Baseline Offset (In Feet)
14+10	984.8	984.8	984.8	984.8	984.8	Baseline Offset (In Feet)
14+20	981.5	981.5	981.5	981.5	981.5	Baseline Offset (In Feet)
14+30	978.2	978.2	978.2	978.2	978.2	Baseline Offset (In Feet)
14+40	976.2	976.2	976.2	976.2	976.2	Baseline Offset (In Feet)
14+50	975.6	975.6	975.6	975.6	975.6	Baseline Offset (In Feet)
14+60	975.0	975.0	975.0	975.0	975.0	Baseline Offset (In Feet)
14+70	974.4	974.4	974.4	974.4	974.4	Baseline Offset (In Feet)
14+80	973.8	973.8	973.8	973.8	973.8	Baseline Offset (In Feet)
14+90	973.0	973.0	973.0	973.0	973.0	Baseline Offset (In Feet)
15+00	972.1	972.1	972.1	972.1	972.1	Baseline Offset (In Feet)

Calc'd By: AG
Date: 8/19/2006

Kuukpik/LCMF
Alpine Survey Office

Alpine CP 00
Alpine Pipeline Miluveach Crossing
Pile Monitor

Location	6/18/2004	8/3/2005	8/17/2006	Description
VSM 2046	57.611	57.595	57.590	Monitor Point Elev. at Bottom SE Cor Pile Cap
HSM 2046 (North)	57.791	57.785	57.780	Monitor Point Elev. at North End, Bottom NE Cor.
HSM 2046 (South)	57.631	57.620	57.610	Monitor Point Elev. at South End, Bottom SE Cor.
VSM 2047A	57.528	57.465	57.480	Monitor Point Elev. at Bottom SE Cor Pile Cap
HSM 2047A (North)	57.449	57.540	57.560	Monitor Point Elev. at North End, Bottom NE Cor.
VSM 2047B	57.433	57.450	57.460	Monitor Point Elev. at South End, Bottom SE Cor.
HSM 2047B (South)	57.527	57.540	57.560	Monitor Point Elev. at South End, Bottom SE Cor.
VSM 2048A	57.635	57.665	57.740	Monitor Point Elev. at Bottom SE Cor Pile Cap
HSM 2048A (North)	57.725	57.760	57.830	Monitor Point Elev. at North End, Bottom NE Cor.
VSM 2048B	57.591	57.615	57.680	Monitor Point Elev. at South End, Bottom SE Cor.
HSM 2048B (South)	57.691	57.710	57.770	Monitor Point Elev. at South End, Bottom SE Cor.
VSM 2049	57.494	57.475	57.470	Monitor Point Elev. at Bottom SE Cor Pile Cap
HSM 2049 (North)	57.564	57.550	57.540	Monitor Point Elev. at North End, Bottom NE Cor.
HSM 2049 (South)	57.587	57.565	57.560	Monitor Point Elev. at South End, Bottom SE Cor.