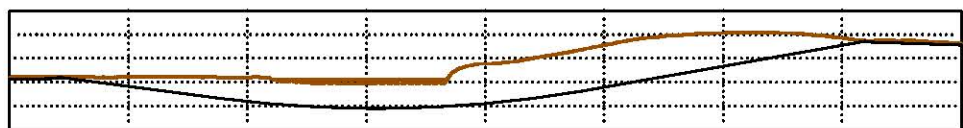
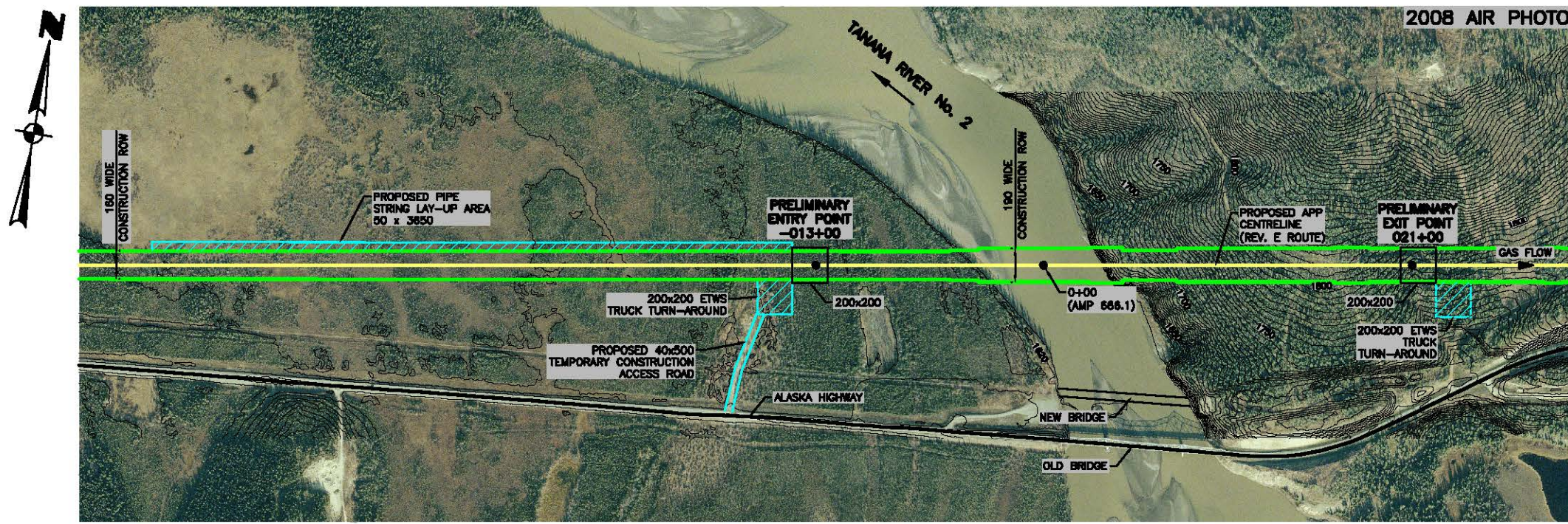
	ALASKA PIPELINE PROJECT DRAFT RESOURCE REPORT 2 WATER USE AND QUALITY APPENDIX 2C	USAG-UR-SGREG-000012 DECEMBER 2011 REVISION 0
	<b>FERC Docket No. PF09-11-000</b>	

## APPENDIX 2C

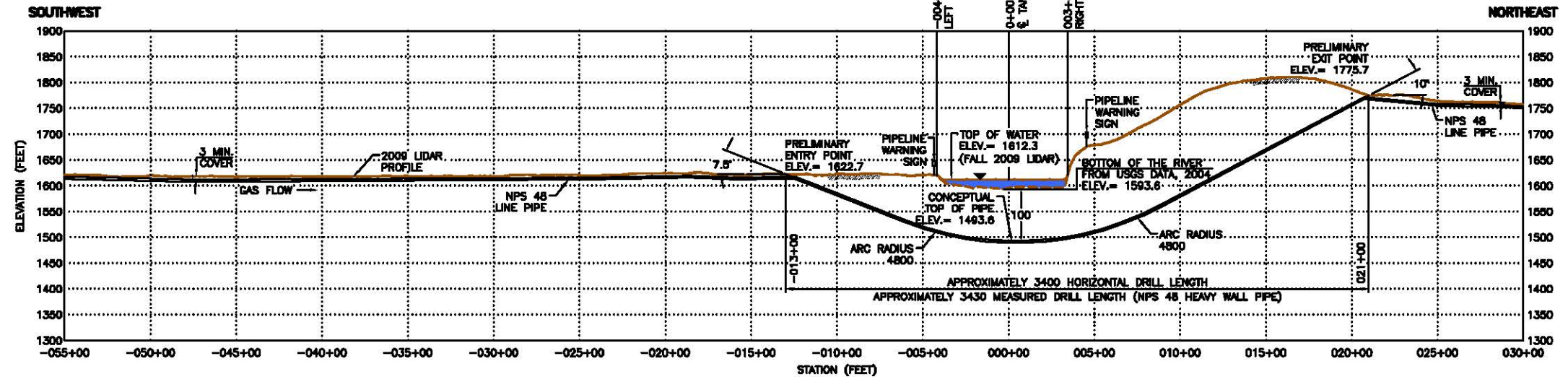
## WATERBODY CONCEPTUAL CROSSING DRAWINGS

DRAFT





**PLAN VIEW**  
SCALE: 1" = 400'  
COOPER RIVER MERIDIAN - T18N R14E - SECTION 25



**PROFILE ALONG PROPOSED NPS 48 GAS PIPELINE**  
SCALE: HORIZONTAL 1" = 400' - VERTICAL 1" = 100'

- NOTES:**
- GENERAL:**
- CENTERLINE IS BASED ON "APP PROPOSED ALASKA ROUTE REV. E - APRIL 13, 2011".
  - THE CROSSING DESIGN IS CONCEPTUAL AND HAS BEEN PREPARED WITHOUT THE BENEFIT OF GEOTECHNICAL INFORMATION AND RECOMMENDATIONS.
  - ALL DIMENSIONS ARE IN FEET UNLESS OTHERWISE NOTED.
  - THE SCALES OF THIS DRAWING ARE RELIABLE ONLY AT ANSI D SIZE (34"x22").
  - THE CROSSING SHALL BE CONSTRUCTED AND MAINTAINED IN ACCORDANCE WITH ASME CFR 40-182 B31.8-2010, FERC REGULATIONS, THE ENVIRONMENTAL PROTECTION MANAGEMENT PLAN (EPMP), CROSSING APPROVAL CONDITIONS AND THE CONTRACT DOCUMENTS.
  - CONTOUR INTERVAL FOR THIS DRAWING IS 5 FT.
- CROSSING INSTALLATION METHOD:**
- THE PROPOSED CONSTRUCTION PERIOD IS SUMMER (JUNE - NOVEMBER).
  - THIS CROSSING IS CURRENTLY PROPOSED TO BE CONSTRUCTED USING THE HORIZONTAL DIRECTIONAL DRILL (HDD) METHOD WITH A REVERSE PULL SECTION. THE BACK-UP CROSSING INSTALLATION METHOD TO HDD IS OPEN CUT. THE FINAL CROSSING METHODOLOGY SHOULD BE DETERMINED IN CONSULTATION WITH APPROPRIATE OWNER AND REGULATORY PERSONNEL.
  - THE PRIMARY VEHICLE CROSSING METHOD IS THE EXISTING HIGHWAY BRIDGE.
- MITIGATIVE MEASURES:**
- EROSION CONTROLS:**
- REFER TO THE PROJECT EROSION AND SEDIMENT CONTROL AND REVEGETATION PLAN FOR TYPICAL EROSION AND SEDIMENT CONTROL TOOLS. SPECIFIC RESTORATION MEASURES WILL BE IDENTIFIED IN THE IMPLEMENTATION PLAN.
- DRILLING FLUID:**
- COMPOSITION OF THE DRILLING FLUID USED SHALL MEET THE PROJECT SPECIFICATIONS OR AS APPROVED BY THE OWNER'S AUTHORIZED REPRESENTATIVE PRIOR TO COMMENCEMENT OF THE DRILLING OPERATION.
  - REFER TO THE PROJECT HDD PLAN FOR DETAILS ON INADVERTENT RELEASE PLANS.

REFERENCE DRAWINGS	
DRAWING No	TITLE
US-03-057-048	APP PROPOSED ALASKA ROUTE REV. E - ROUTE MAP

REVISION			APPROVAL					
REV No	DATE	DESCRIPTION	PROJECT CODE	DRAFTER	DRAWING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER
0A	2011-04-07	ISSUED FOR REVIEW	2101108	MM		JS	NPB	VI
0B	2011-06-16	RE-ISSUED FOR REVIEW	2101108	MM		JS	NPB	VI
0C	2011-06-29	RE-ISSUED FOR REVIEW	2101108	MM		JS	NPB	VI

APP PROPRIETARY

PROFESSIONAL ENGINEER/RPT	PERMIT/ ENG. APPROVAL

**PRELIMINARY ONLY  
NOT FOR  
CONSTRUCTION**

REV. NO.	DATE	PERMIT NUMBER

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**TransCanada** **ExxonMobil** **WorleyParsons**

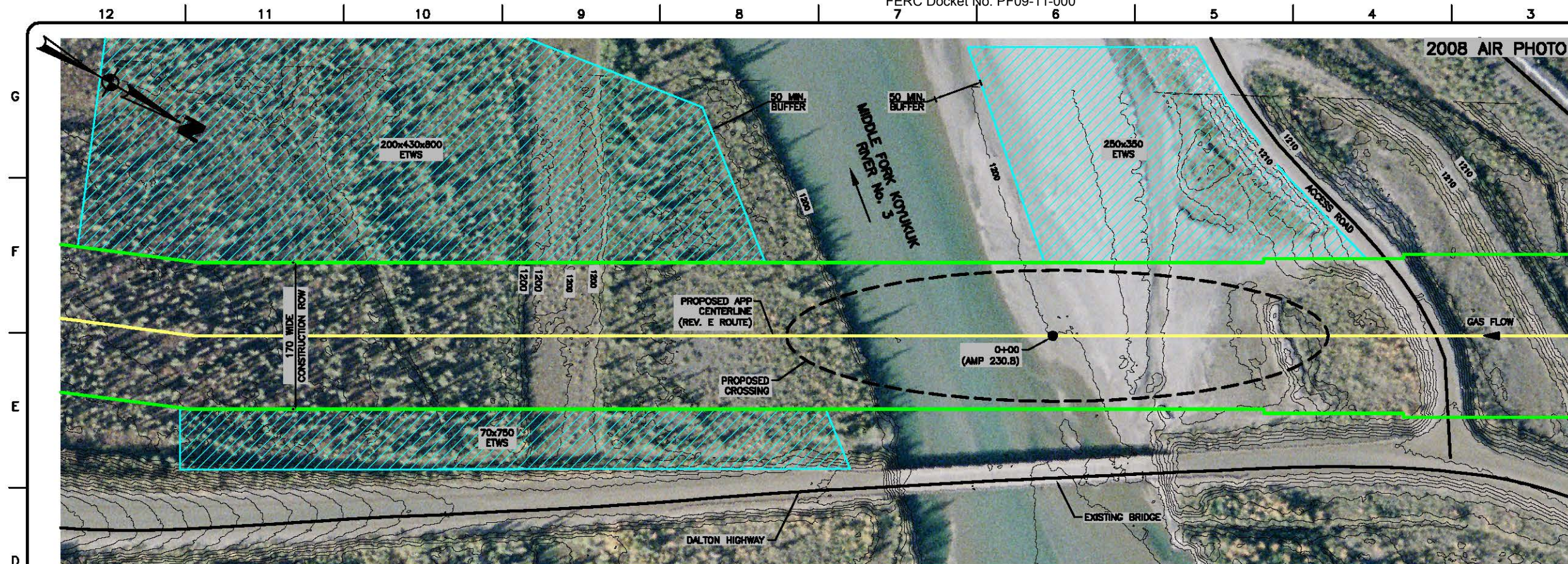
GENERAL INFORMATION - ALASKA PIPELINE SYSTEM

TA # 4451 CHANGE AMP 668, REV. E ROUTE DISCURE # 03

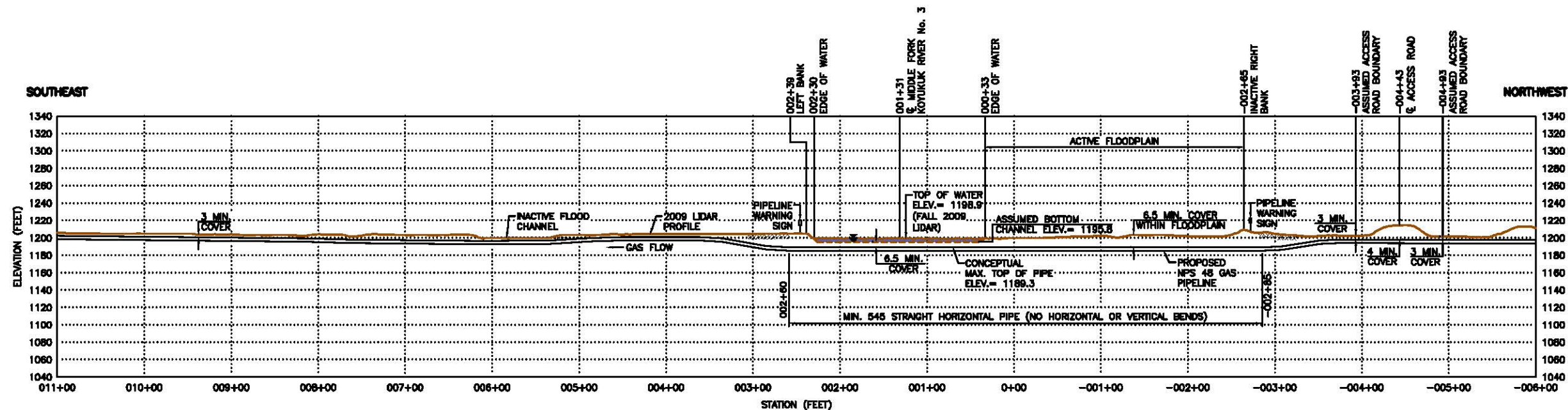
ALASKA PIPELINE PROJECT  
TANANA RIVER No. 2 (AL440)  
CONCEPTUAL HDD CROSSING DESIGN

SCALE AS SHOWN DRAWING No 4451-03-ML-03-002 REV 0C





**PLAN VIEW**  
SCALE: 1" = 70'  
FARBANKS MERIDIAN - T30N R11W - SECTION 7



**PROFILE ALONG PROPOSED NPS 48 GAS PIPELINE**

SCALE: HORIZONTAL 1" = 70' - VERTICAL 1" = 70'

#### NOTES:

##### GENERAL:

1. CENTERLINE IS BASED ON "APP PROPOSED ALASKA ROUTE REV. E - APRIL 13, 2011".
2. THE CROSSING DESIGN IS CONCEPTUAL AND IS TO BE FINALIZED DURING DETAILED ENGINEERING.
3. ALL DIMENSIONS ARE IN FEET UNLESS OTHERWISE NOTED. ELEVATIONS ARE GEODETIC.
4. THE SCALES OF THIS DRAWING ARE RELIABLE ONLY WHEN PRINTED AT ANSI D SIZE (34" x 22").
5. THE CROSSING SHALL BE CONSTRUCTED AND MAINTAINED IN ACCORDANCE WITH ASME CFR 49-102 B31.8-2010, FERC REGULATIONS, THE ENVIRONMENTAL PROTECTION MANAGEMENT PLAN (EPM), CROSSING APPROVAL CONDITIONS AND THE CONTRACT DOCUMENTS.
6. CONTOUR INTERVAL FOR THIS DRAWING IS 2 ft.

##### CROSSING INSTALLATION METHOD:

7. THE PROPOSED CONSTRUCTION PERIOD IS SUMMER (JUNE TO OCTOBER).
8. THIS CROSSING IS CURRENTLY PROPOSED TO BE CONSTRUCTED USING THE OPEN CUT METHOD. THE FINAL CROSSING METHODOLOGY SHOULD BE DETERMINED IN CONSULTATION WITH APPROPRIATE OWNER AND REGULATORY PERSONNEL.
9. THE PRIMARY VEHICLE CROSSING METHOD IS THE EXISTING HIGHWAY BRIDGE.

##### CROSSING BURAL DESIGN:

10. THE PIPELINE IS TO BE INSTALLED/PLACED BELOW THE 100 YEAR FLOOD SCOUR DEPTH FOR THE MAIN CHANNEL WHILE MAINTAINING A MINIMUM COVER OF 6.5 ft. WITHIN THE NORTHWEST FLOODPLAIN.
11. THE SAGBENDS ARE TO BE LOCATED OUTSIDE THE ZONE OF POTENTIAL CHANNEL MIGRATION.
12. CONTINUOUS CONCRETE COATING AND RIVER WEIGHTS WILL BE ADDED FOR BUOYANCY CONTROL.

##### MITIGATIVE MEASURES:

##### EROSION CONTROLS:

13. REFER TO THE PROJECT EROSION AND SEDIMENT CONTROL AND REVEGETATION PLAN FOR TYPICAL EROSION AND SEDIMENT CONTROL TOOLS. SPECIFIC BED AND BANK RESTORATION MEASURES WILL BE IDENTIFIED IN THE IMPLEMENTATION PLAN.
14. ALL SITE PREPARATION SUCH AS GRADING, WELDING, CONCRETE COATING AND QUALITY TESTING, SHOULD BE COMPLETED IN ADVANCE OF COMPLETION OF INSTREAM EXCAVATION IN ORDER TO MINIMIZE THE DURATION OF INSTREAM ACTIVITY.

##### CHANNEL AND BANK RECLAMATION:

15. DISTURBED BANK AREAS ARE TO BE RECLAIMED TO A MAXIMUM SLOPE OF 3H : 1V OR TO MATCH EXISTING BANK SLOPES, WHICHEVER IS FLATTER.
16. CHANNEL BED AND FLOODPLAIN ARE TO BE RECLAIMED TO MATCH THE PRE-CONSTRUCTION ELEVATIONS AS MUCH AS PRACTICAL.

APP PROPRIETARY

REFERENCE DRAWINGS	
DRAWING No	TITLE
US-03-057-016	APP PROPOSED ALASKA ROUTE REV. E - ROUTE MAP

REVISION			APPROVAL					
REV No	DATE	DESCRIPTION	PROJECT CODE	DRAFTER	DRAWING CHECKER	DESIGNER	DESIGN CHECKER	PROJECT MANAGER
0A	2011-06-18	ISSUED FOR REVIEW	2101106	MM		JS	NPB	VI
0B	2011-08-29	RE-ISSUED FOR REVIEW	2101106	MM		JS	NPB	VI

PROFESSIONAL ENGINEER/PT		PERMIT/ ENL. APPROVAL	
DATE			
<b>PRELIMINARY ONLY</b>			
<b>NOT FOR</b>			
<b>CONSTRUCTION</b>			
REV. NO.	DATE	PERMIT NUMBER	

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<b>TransCanada</b> <b>ExxonMobil</b> <b>WorleyParsons</b>			
GENERAL INFORMATION - ALASKA PIPELINE SYSTEM			
PA #	4451	CHANGE	AMP 230, REV. E ROUTE
DISCURE #	03		
ALASKA PIPELINE PROJECT			
MIDDLE FORK KOYUKUK RIVER No. 3 (AL197)			
CONCEPTUAL CROSSING DESIGN			
SCALE	AS SHOWN	DRAWING No	4405-03-ML-03-005
		REV	0B