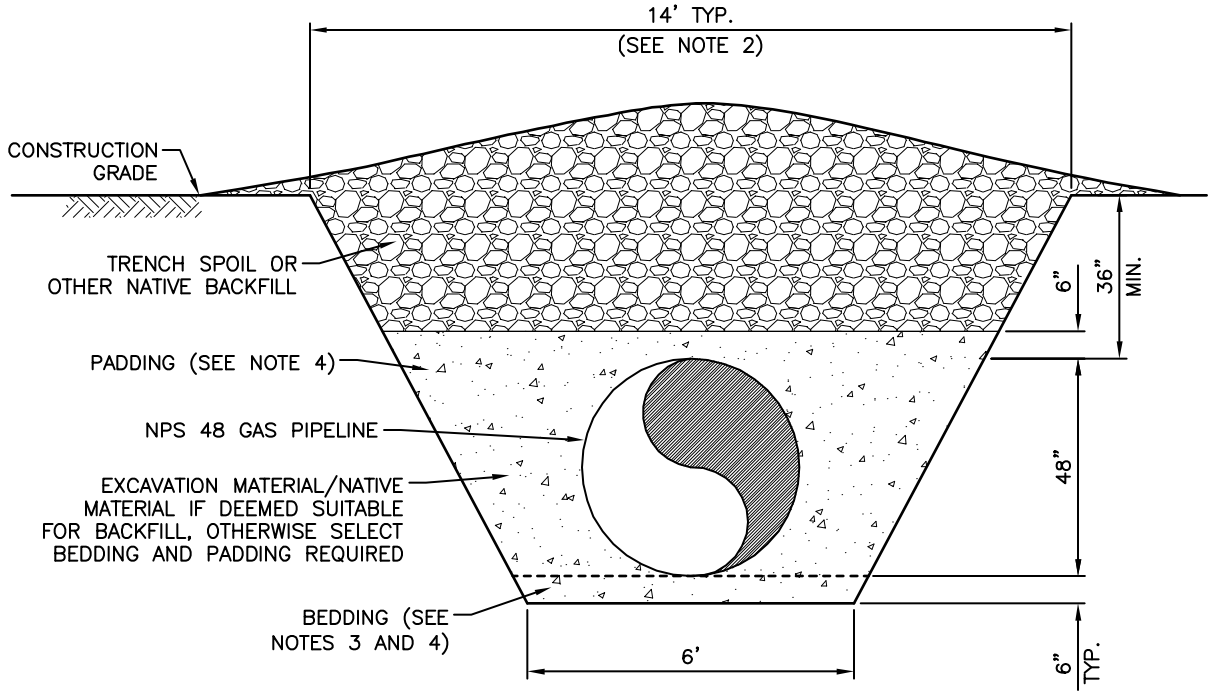
APPENDIX 1E TYPICAL DRAWINGS

TYPICAL DRAWING NUMBER	REV.	DRAWING CATEGORY	DRAWING DESCRIPTION
TRENCH-01	E	TRENCH MODES	BURIED PIPE IN EXCAVATOR TRENCH
TRENCH-03	C	TRENCH MODES	BURIED PIPE IN ROCK TRENCH
ROW-01	B	RIGHT-OF-WAY MODES	NORTH SLOPE (WINTER)
ROW-02	E	RIGHT-OF-WAY MODES	WINTER
ROW-03	F	RIGHT-OF-WAY MODES	SUMMER
ROW-04	B	RIGHT-OF-WAY MODES	CROSS SLOPES - NORTH SLOPE (WINTER)
ROW-05A	F	RIGHT-OF-WAY MODES	CROSS SLOPES (WINTER)
ROW-05B	A	RIGHT-OF-WAY MODES	CROSS SLOPES (SUMMER)
ROW-06	C	RIGHT-OF-WAY MODES	POINT THOMSON GAS TRANSMISSION PIPELINE (WINTER)
ROW-21	E	RIGHT-OF-WAY MODES	ADDITIONAL TEMPORARY WORKSPACE 1/2
ROW-22	D	RIGHT-OF-WAY MODES	ADDITIONAL TEMPORARY WORKSPACE 2/2
ROAD-01	H	ROAD CROSSINGS	ROAD CROSSINGS
FP-01	E	THIRD-PARTY “FOREIGN” PIPELINE AND UTILITY CROSSINGS	THIRD-PARTY “FOREIGN” PIPELINES
UT-01	E	THIRD-PARTY “FOREIGN” PIPELINE AND UTILITY CROSSINGS	BURIED UTILITY
WB-01	F	WATERBODY CROSSINGS	MAJOR/INTERMEDIATE - TRENCHED
WB-02	E	WATERBODY CROSSINGS	MAJOR/INTERMEDIATE - HDD
WB-03A	E	WATERBODY CROSSINGS	MAJOR/INTERMEDIATE - UNSUPPORTED OR SUPPORTED SPANBRIDGE
WB-03C	B	WATERBODY CROSSINGS	MAJOR/INTERMEDIATE - CABLE SUPPORTED SPAN
BC-01	C	BUOYANCY CONTROL	CONCRETE COATING
BC-02	D	BUOYANCY CONTROL	SADDLE BAGS
BC-03	D	BUOYANCY CONTROL	BOLT-ON RIVER WEIGHTS
BC-04	D	BUOYANCY CONTROL	SCREW ANCHORS
BC-05	C	BUOYANCY CONTROL	SET-ON WEIGHTS
CC-01	E	CORROSION CONTROL	COATINGS

TYPICAL DRAWING NUMBER	REV.	DRAWING CATEGORY	DRAWING DESCRIPTION
CC-02	E	CATHODIC PROTECTION	TYPICAL DEEP VERTICAL ANODE BED
CC-03	D	CATHODIC PROTECTION	TYPICAL HORIZONTAL ANODE BED
FC-01	D	FRACTURE CONTROL	TYPICAL FRACTURE CONTROL METHOD
ACC-01	D	ACCESS ROADS	TYPICAL PERMANENT ROAD SECTIONS
ACC-03	D	ACCESS ROADS	TYPICAL TEMPORARY SNOW/ICE ROAD SECTION
ACC-05	D	ACCESS ROADS	TYPICAL TEMPORARY SHOOFLY ROAD PLAN/SECTION
ACC-06	C	ACCESS ROADS	TYPICAL TEMPORARY GRANULAR ROAD OFF HIGHWAY
FAC-05	F	PIPELINE FACILITIES	TYPICAL MAINLINE BLOCK VALVE PLOT PLAN
FAC-08A	E	PIPELINE FACILITIES	TYPICAL TEE AND VALVE GAS DELIVERY POINT PLOT PLAN
CONST-02	D	CONSTRUCTION TYPICALS	HORIZONTAL BORING/DRILLING ROADS
CONST-03	F	CONSTRUCTION TYPICALS	OPEN-CUT ROADS
CONST-04	F	CONSTRUCTION TYPICALS	WATERBODIES – MAJOR/INTERMEDIATE OPEN-CUT
CONST-05	F	CONSTRUCTION TYPICALS	WATERBODIES – MINOR OPEN-CUT
CONST-06	F	CONSTRUCTION TYPICALS	WATERBODIES - ISOLATED OPEN-CUT - DAM AND PUMP
CONST-07	F	CONSTRUCTION TYPICALS	WATERBODIES - ISOLATED OPEN-CUT - DAM AND FLUME
CONST-08	F	CONSTRUCTION TYPICALS	WATERBODIES - ISOLATED OPEN-CUT - DAM AND DIVERT
CONST-09	C	CONSTRUCTION TYPICALS	WATERBODIES - HORIZONTAL DIRECTIONAL DRILL
CONST-11	D	CONSTRUCTION TYPICALS	EQUIPMENT CROSSING – FORD
CONST-12	C	CONSTRUCTION TYPICALS	EQUIPMENT CROSSING - MAT BRIDGE
CONST-13	D	CONSTRUCTION TYPICALS	EQUIPMENT CROSSING - MAT ROCK/CULVERT BRIDGE
CONST-14	D	CONSTRUCTION TYPICALS	EQUIPMENT CROSSING - ROCK/CULVERT BRIDGE
CONST-15	C	CONSTRUCTION TYPICALS	EQUIPMENT CROSSING - ICE BRIDGE
CONST-16	D	CONSTRUCTION TYPICALS	EQUIPMENT CROSSING - CLEAN SNOW FILL
CONST-17	D	CONSTRUCTION TYPICALS	EQUIPMENT CROSSING - LOG FILL

TYPICAL DRAWING NUMBER	REV.	DRAWING CATEGORY	DRAWING DESCRIPTION
CONST-20	F	CONSTRUCTION TYPICALS	HELIPADS
CONST-22A	C	CONSTRUCTION TYPICALS	1500 PERSON CAMP - 20 ACRES
CONST-22B	C	CONSTRUCTION TYPICALS	750 PERSON CAMP - 10 ACRES
CONST-22C	C	CONSTRUCTION TYPICALS	500 PERSON CAMP - 8 ACRES
CONST-22D	C	CONSTRUCTION TYPICALS	150 PERSON CAMP - 3 ACRES
CONST-22E	C	CONSTRUCTION TYPICALS	50 PERSON CAMP - 2 ACRES
CONST-23A	C	CONSTRUCTION TYPICALS	PIPE STORAGE/CAMP/ CONTRACTOR YARD - OPTION 1 - 50 ACRES
CONST-23B	C	CONSTRUCTION TYPICALS	PIPE STORAGE/CAMP/ CONTRACTOR YARD - OPTION 2 - 50 ACRES
CONST-23C	C	CONSTRUCTION TYPICALS	PIPE STORAGE/CAMP/ CONTRACTOR YARD - OPTION 3 - 50 ACRES
CONST-23D	B	CONSTRUCTION TYPICALS	STAND ALONE PIPE STORAGE YARD - 20 ACRES
CONST-24	C	CONSTRUCTION TYPICALS	STAND ALONE CONTRACTOR YARD - 8 ACRES
CONST-33	C	CONSTRUCTION TYPICALS	TYPICAL WATER DISCHARGE SITE
CONST-34	D	CONSTRUCTION TYPICALS	HYDROSTATIC TEST POINT
FAULT-01	C	CONCEPTUAL “ZEE” FAULT CROSSINGS DESIGN	STRIKE-SLIP FAULTS
FAULT-02	C	CONCEPTUAL "U" FAULT CROSSING DESIGN	STRIKE-SLIP FAULTS
FAULT-03	C	CONCEPTUAL "ZEE" FAULT CROSSING DESIGN	REVERSE OR THRUST FAULTS



NOTES:

1. MINIMUM DEPTH OF COVER SHOWN FOR TYPICAL CLASS 1, 2 OR 3 LOCATIONS. ADDITIONAL DEPTH MAY BE REQUIRED FOR CROSSINGS, AREAS REQUIRING BUOYANCY CONTROL, AREAS WITH FROST HEAVE POTENTIONAL AND OTHER AREAS AS IDENTIFIED SUCH AS ROAD ENCROACHMENTS.
2. TRENCH WALLS WILL BE AS VERTICAL AS SOIL CONDITIONS ALLOW.
3. BEDDING ONLY REQUIRED IF NATIVE TRENCH MATERIAL IS NOT SUITABLE, OTHERWISE PIPE CAN REST ON NATIVE SOIL TRENCH BOTTOM.
4. NATIVE MATERIAL EXCAVATED FROM TRENCH MAY BE USED FOR BEDDING AND PADDING IF SUITABLE.

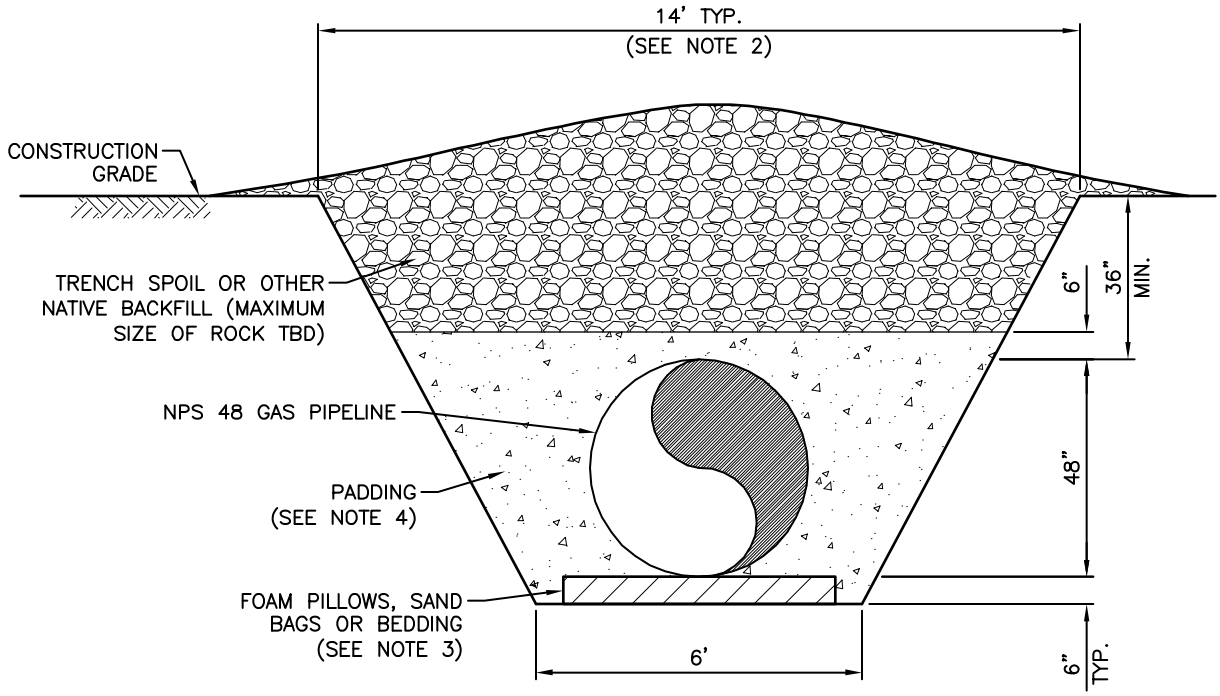
DRAFT 1 FERC APPLICATION NOT FOR CONSTRUCTION

Appendix 1E TRENCH–01

Alaska Pipeline Project

Trench Modes – Buried Pipe In Excavator Trench

Rev. E



NOTES:

1. MINIMUM DEPTH OF COVER SHOWN FOR TYPICAL CLASS 1, 2 AND 3 LOCATIONS BASED ON ALTERNATIVE MAXIMUM ALLOWABLE OPERATING PRESSURE CRITERIA (CFR 192.328). ADDITIONAL DEPTH MAY BE REQUIRED FOR CROSSINGS, AREAS REQUIRING BUOYANCY CONTROL, AND OTHER AREAS AS IDENTIFIED SUCH AS ROAD ENCROACHMENTS.
2. TRENCH WALLS WILL BE AS VERTICAL AS BEDROCK STABILITY CONDITIONS ALLOW.
3. FOAM PILLOWS, SAND BAGS OR IMPORTED SAND BEDDING REQUIRED TO SUPPORT PIPE.
4. IMPORT SAND PADDING REQUIRED.

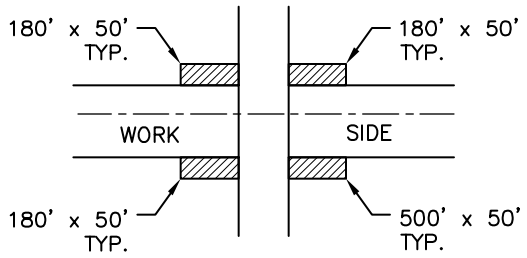
DRAFT 1 FERC APPLICATION NOT FOR CONSTRUCTION

Appendix 1E TRENCH–03

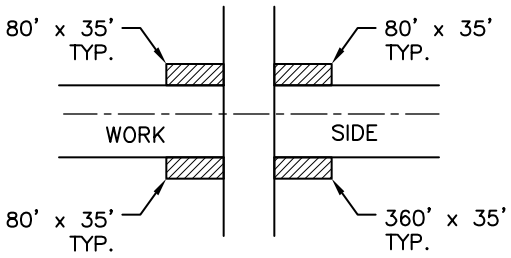
Alaska Pipeline Project

Trench Modes – Buried Pipe In Rock Trench

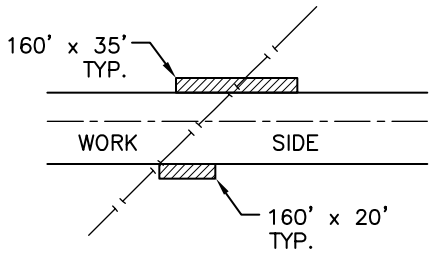
Rev. C



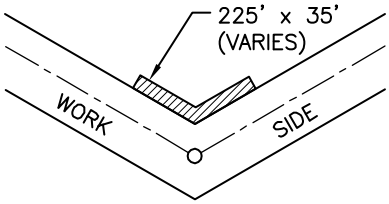
HIGHWAY CROSSING
(BORED)



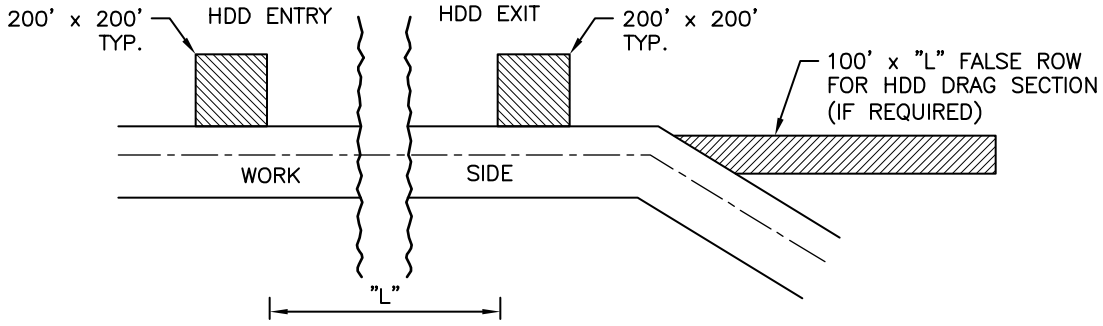
ROAD CROSSING
(OPEN CUT)



FOREIGN PIPELINE
CROSSING



BEND



HORIZONTAL DIRECTIONAL
DRILL (HDD)

PROPOSED GAS PIPELINE

CONSTRUCTION ROW BOUNDARY

ADDITIONAL TEMPORARY
WORKSPACE (N.T.S.)

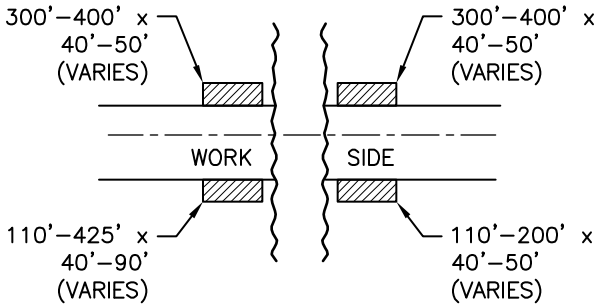
**DRAFT 1 FERC APPLICATION
NOT FOR CONSTRUCTION**

Appendix 1E ROW–21

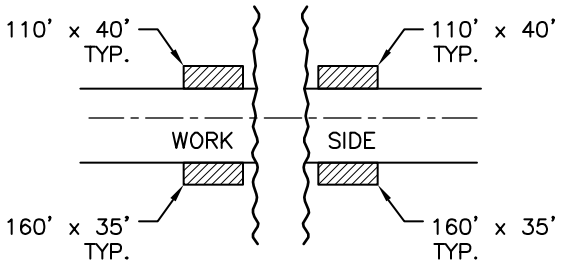
Alaska Pipeline Project

Right–of–Way Modes – Additional Temporary Workspace 1/2

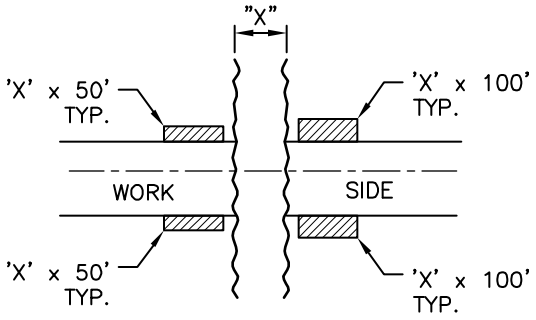
Rev. E



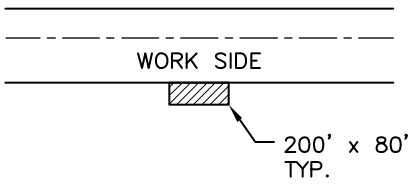
WATERCOURSE CROSSING INTERMEDIATE/LARGE



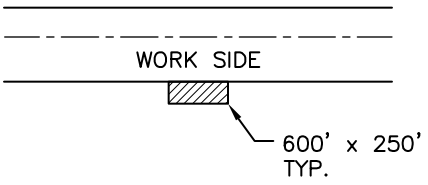
WATERCOURSE CROSSING MINOR



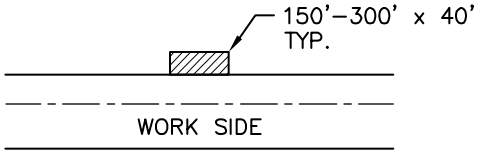
WETLAND CROSSING



TURN AROUND



BEGINNING/END OF SPREAD



TIMBER DECK

PROPOSED GAS PIPELINE

CONSTRUCTION ROW BOUNDARY

ADDITIONAL TEMPORARY WORKSPACE (N.T.S.)

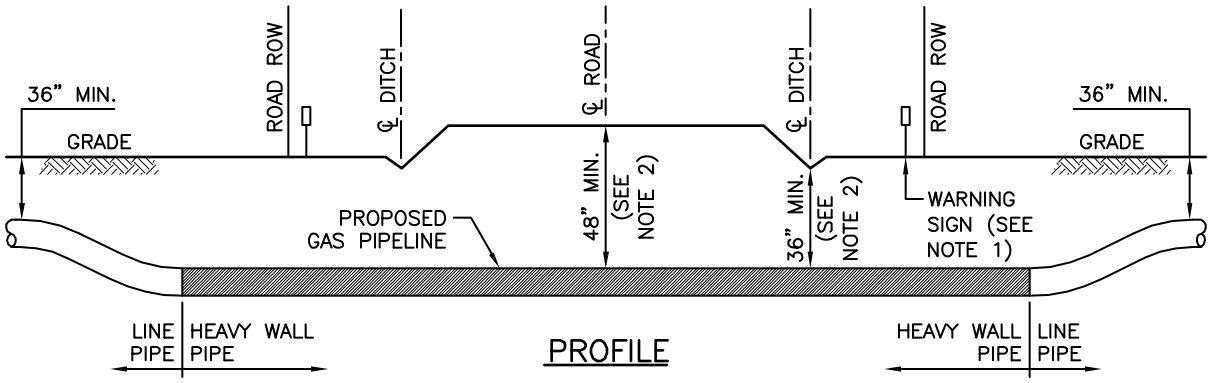
DRAFT 1 FERC APPLICATION NOT FOR CONSTRUCTION

Appendix 1E ROW–22

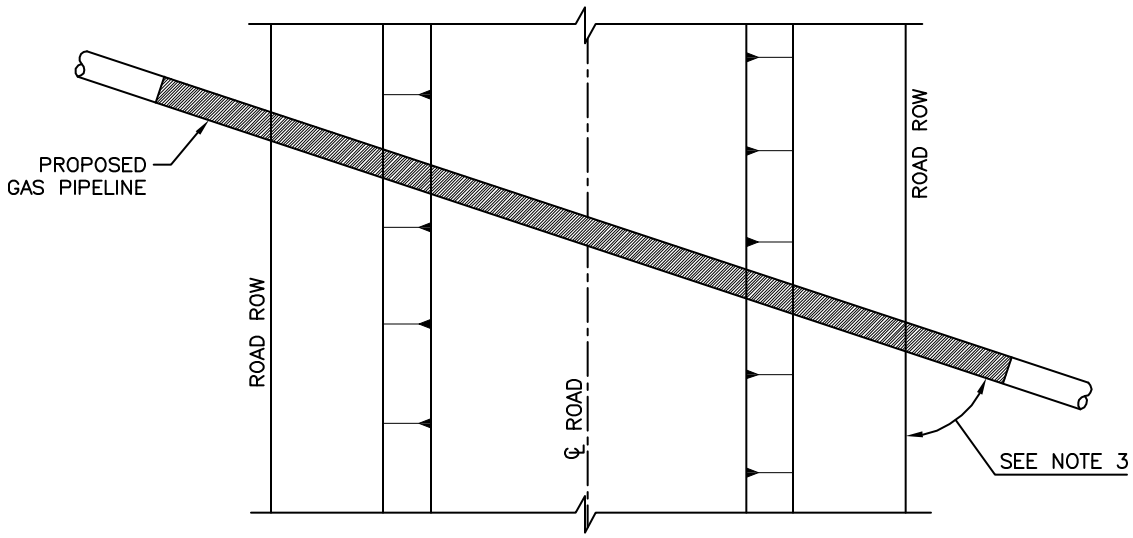
Alaska Pipeline Project

Right–of–Way Modes – Additional Temporary Workspace 2/2

Rev. D



PROFILE



PLAN

NOTES:

1. WARNING SIGNS TO BE INSTALLED ON EACH SIDE OF ROAD ROW.
2. MINIMUM DEPTHS OF COVER SHOWN, CROSSING AGREEMENTS MAY DICTATE ADDITIONAL DEPTH.
3. CROSSING ANGLE TO BE AS CLOSE AS PRACTICAL TO 90° OR AS SPECIFIED IN THE CROSSING AGREEMENT.

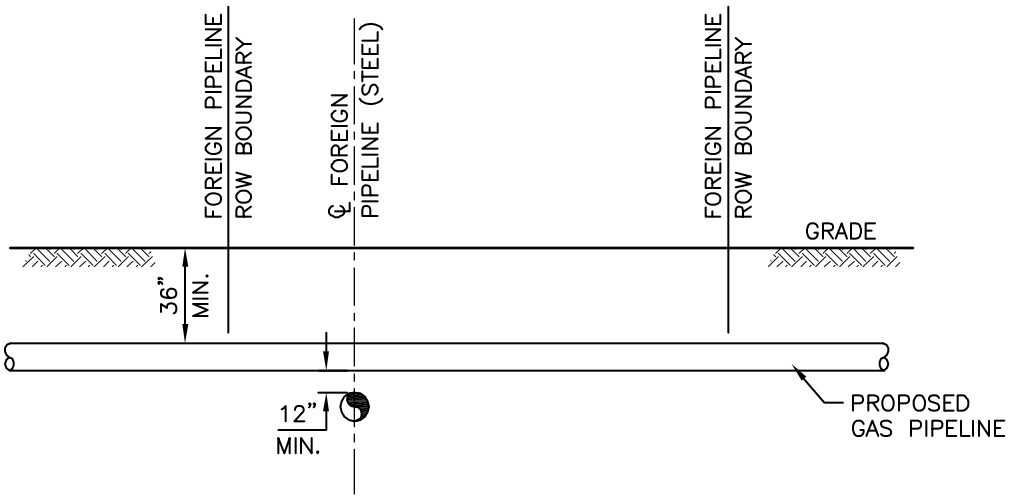
DRAFT 1 FERC APPLICATION NOT FOR CONSTRUCTION

Appendix 1E ROAD–01

Alaska Pipeline Project

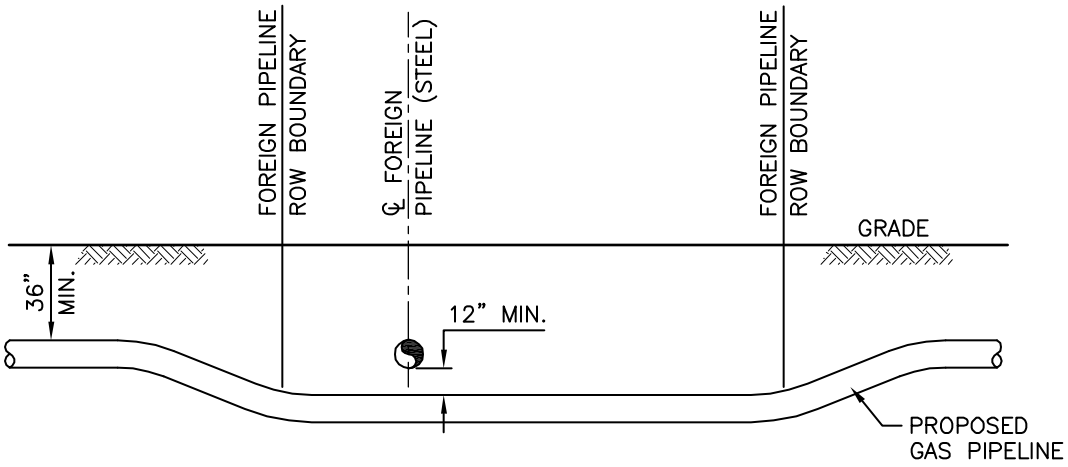
Road Crossings

Rev. H



DETAIL "A"

NEW PIPELINE IS PLACED OVER EXISTING FOREIGN PIPELINE



DETAIL "B"

NEW PIPELINE IS PLACED UNDER EXISTING FOREIGN PIPELINE

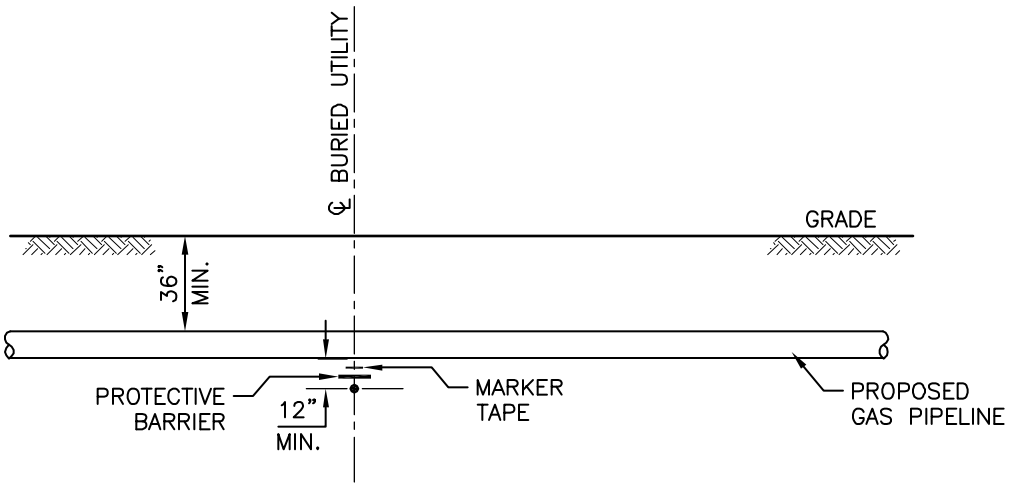
DRAFT 1 FERC APPLICATION NOT FOR CONSTRUCTION

Appendix 1E FP–01

Alaska Pipeline Project

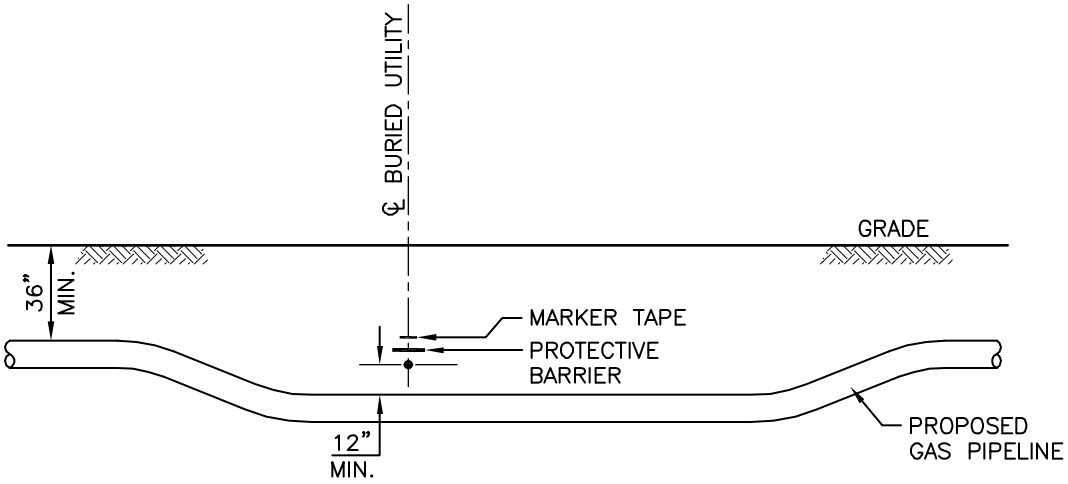
Foreign Pipeline And Utility Crossings – Foreign Pipelines

Rev. D



DETAIL "A"

NEW PIPELINE IS PLACED OVER EXISTING BURIED UTILITY



DETAIL "B"

NEW PIPELINE IS PLACED UNDER EXISTING BURIED UTILITY

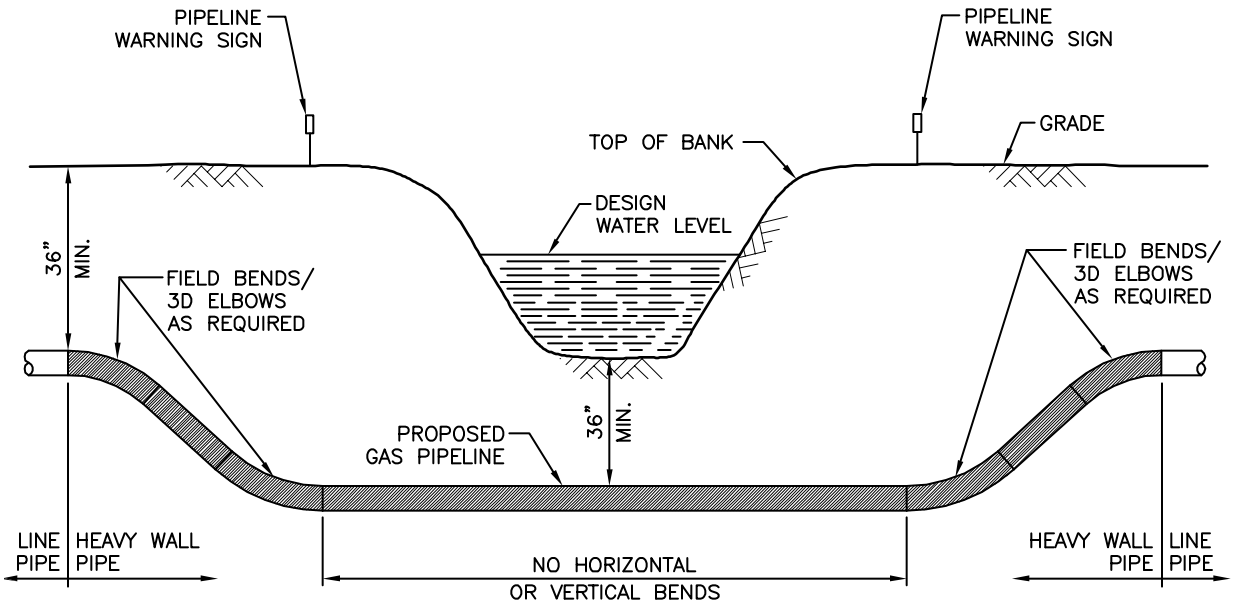
DRAFT 1 FERC APPLICATION NOT FOR CONSTRUCTION

Appendix 1E UT–01

Alaska Pipeline Project

Foreign Pipeline And Utility Crossings – Buried Utility

Rev. D



PROFILE

NOTES:

1. CROSSING SHALL BE CONSTRUCTED IN ACCORDANCE WITH APPROVED METHOD(S) FROM AUTHORITIES HAVING JURISDICTION.
2. EROSION CONTROL DESIGN SHALL BE IMPLEMENTED AS PER THE SEDIMENT AND EROSION CONTROL PLAN.
3. INSTALL APPROVED AND APPROPRIATE VEHICLE CROSSING AS REQUIRED.
4. ALL MAJOR AND INTERMEDIATE WATERBODY CROSSINGS WILL HAVE A DETAILED SITE SPECIFIC CROSSING DRAWING INCLUDING RECLAMATION PLANS. PROFILE SHOWN IS FOR ILLUSTRATIVE PURPOSES ONLY.
5. INSULATION MAY BE REQUIRED IN SOME CIRCUMSTANCES.

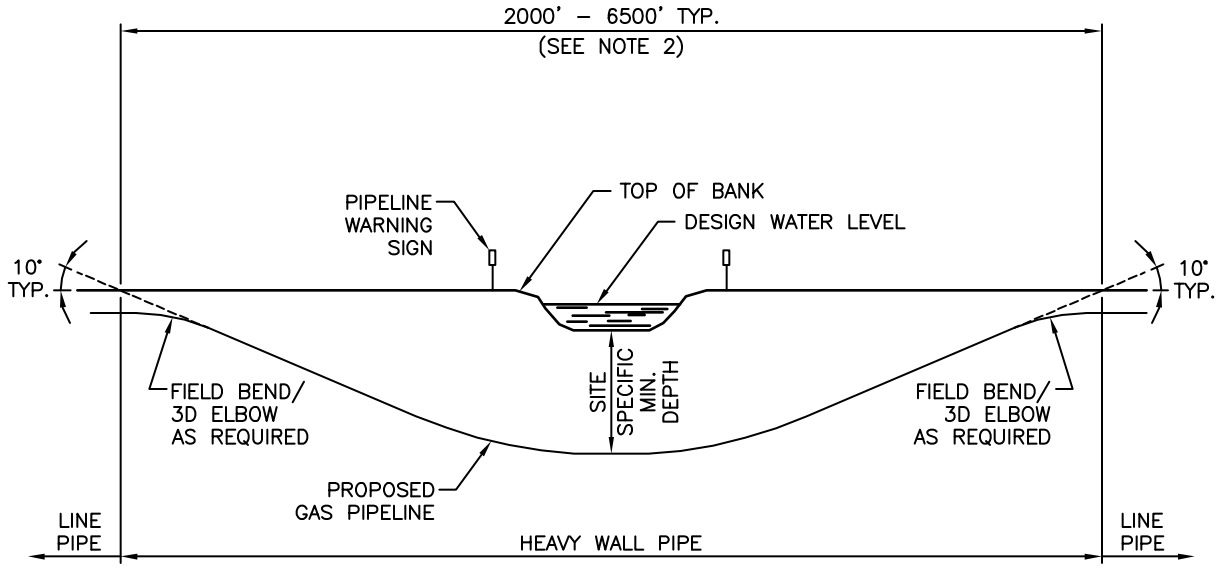
DRAFT 1 FERC APPLICATION NOT FOR CONSTRUCTION

Appendix 1E WB–01

Alaska Pipeline Project

Waterbody Crossings – Major/Intermediate – Trenched

Rev. E



PROFILE

NOTES:

1. ALL HDD INSTALLATIONS WILL HAVE A DETAILED SITE SPECIFIC CROSSING DRAWING.
2. LENGTH OF HDD DEPENDS ON WATERBODY CROSSING WIDTH, DEPTH OF CHANNEL AND APPROACH SLOPE ANGLES.

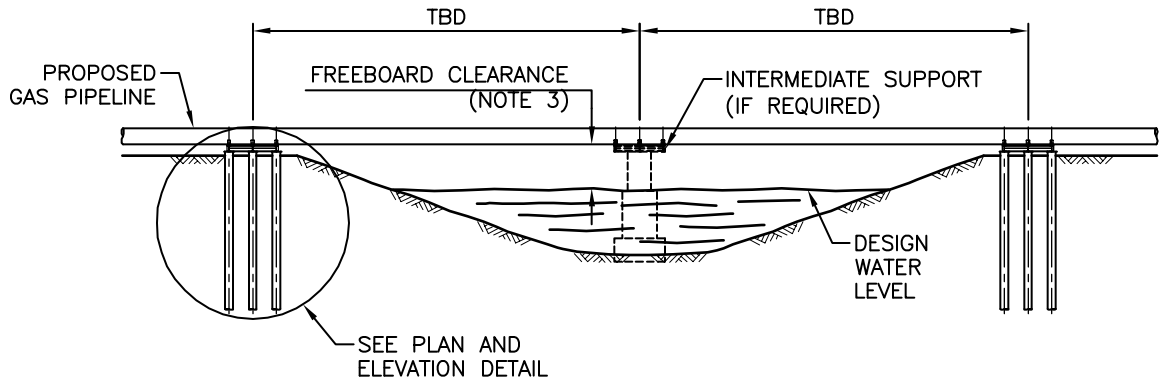
DRAFT 1 FERC APPLICATION NOT FOR CONSTRUCTION

Appendix 1E WB–02

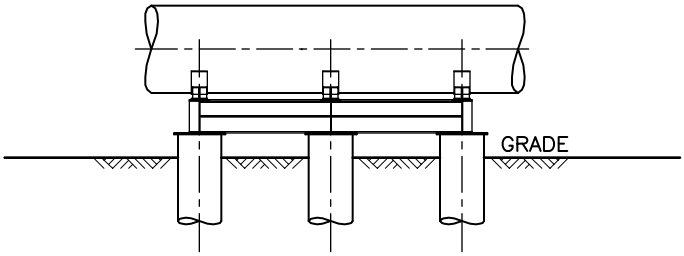
Alaska Pipeline Project

Waterbody Crossings – Major/Intermediate – HDD

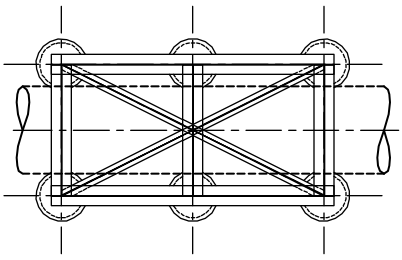
Rev. D



ELEVATION



ELEVATION



PLAN

NOTES:

1. CONCEPTUAL DESIGN FOR ILLUSTRATIVE PURPOSES ONLY.
2. EXPANSION LOOP(S) MAY BE REQUIRED.
3. FREEBOARD CLEARANCE WILL DEPEND ON SPECIFIC STREAM CHARACTERISTICS AND NAVIGABILITY.

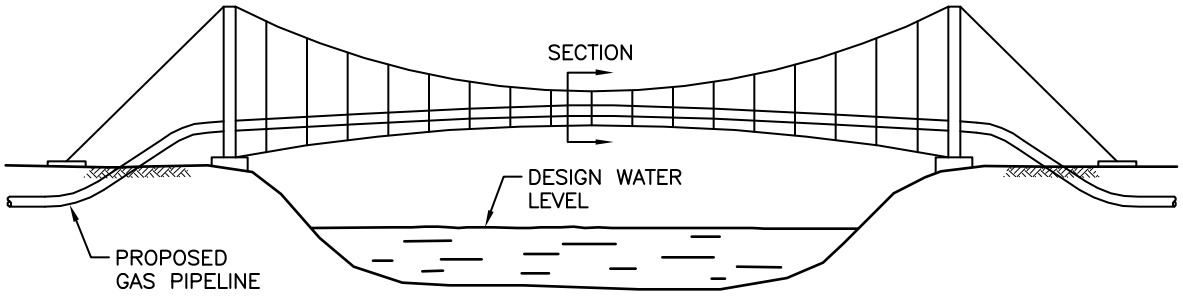
DRAFT 1 FERC APPLICATION NOT FOR CONSTRUCTION

Appendix 1E WB-03A

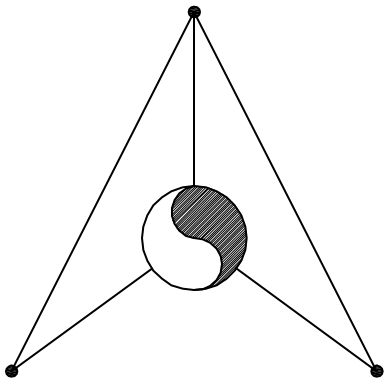
Alaska Pipeline Project

Waterbody Crossings - Major/Intermediate-Unsupported or Supported Span Bridge

Rev. E



ELEVATION



SECTION

NOTES:

1. CONCEPTUAL DESIGN FOR ILLUSTRATIVE PURPOSES ONLY.
2. EXPANSION LOOP(S) MAY BE REQUIRED.

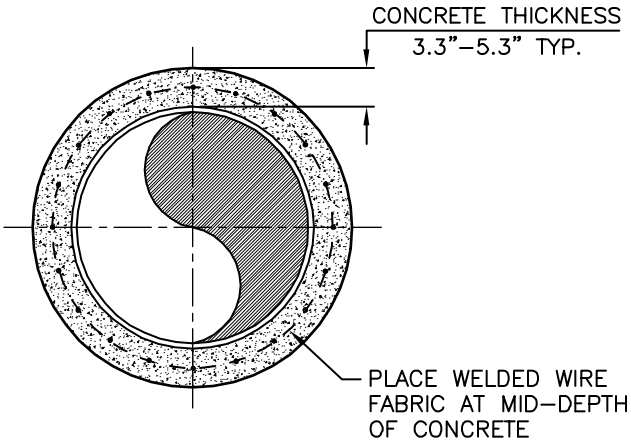
DRAFT 1 FERC APPLICATION NOT FOR CONSTRUCTION

Appendix 1E WB-03C

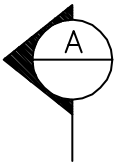
Alaska Pipeline Project

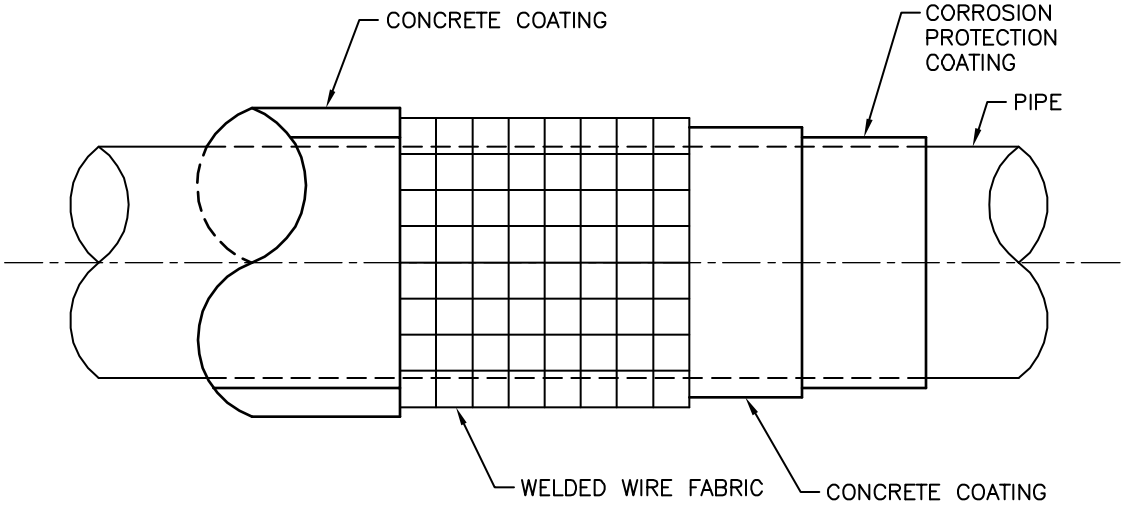
Waterbody Crossings – Major/Intermediate – Cable Supported Span

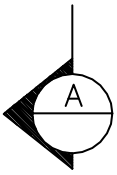
Rev. B



SECTION A







ELEVATION

DRAFT 1 FERC APPLICATION NOT FOR CONSTRUCTION

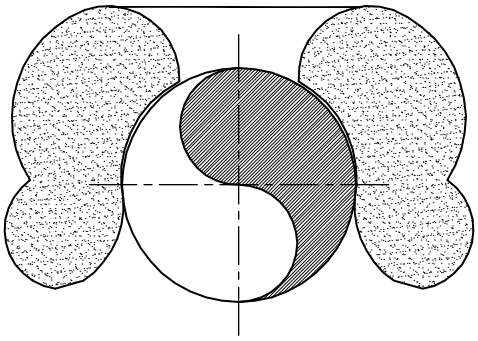
Appendix 1E BC–01

Alaska Pipeline Project

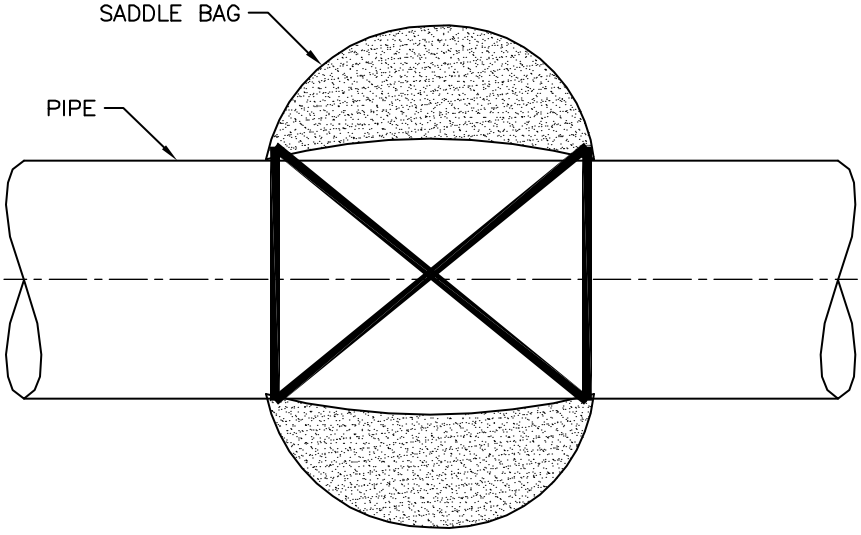
Buoyancy Control – Concrete Coating

Rev. C

DRAFT



SECTION



PLAN

NOTE:

1. BAGS FILLED WITH LOCALLY SOURCED OR IMPORTED GRANULAR SOIL.

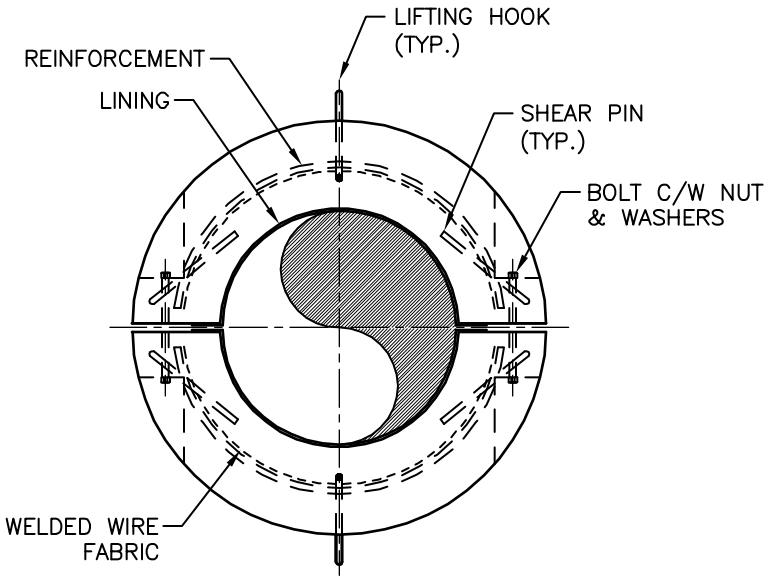
DRAFT 1 FERC APPLICATION NOT FOR CONSTRUCTION

Appendix 1E BC–02

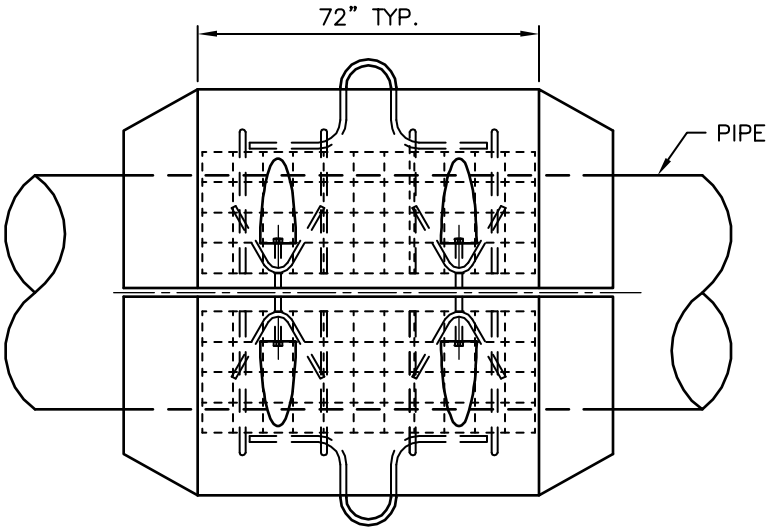
Alaska Pipeline Project

Buoyancy Control – Saddle Bags

Rev. D



SECTION



ELEVATION

DRAFT 1 FERC APPLICATION
NOT FOR CONSTRUCTION

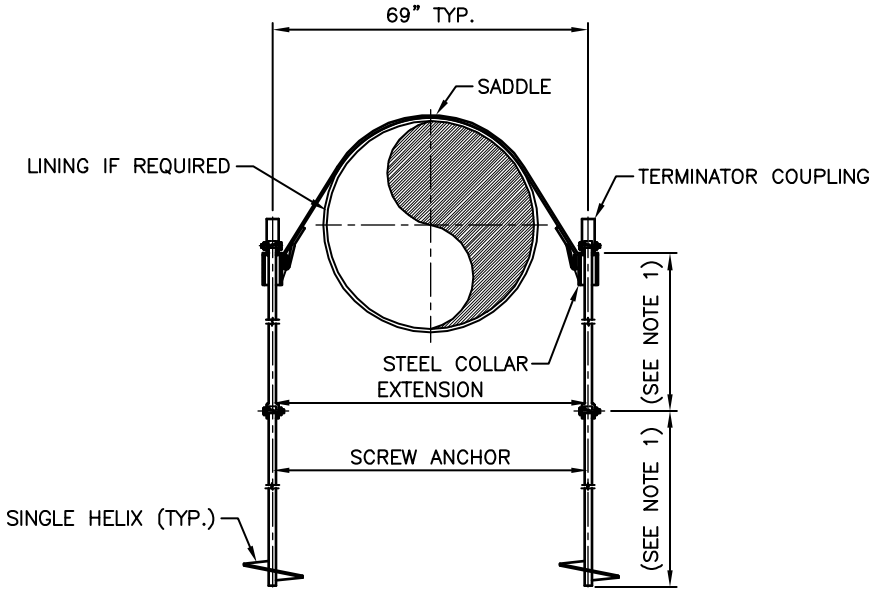
Appendix 1E BC–03

Alaska Pipeline Project

Buoyancy Control – Bolt–on River Weights

Rev. D

DRAFT



SECTION

NOTE:

1. EXTENSIONS WILL BE REQUIRED IF MINIMUM DEPTH (TBD) AND TORQUE (TBD) ARE NOT MET. IF BEDROCK ENCOUNTERED, ALTERNATE BUOYANCY CONTROL MEASURES WILL BE REQUIRED.

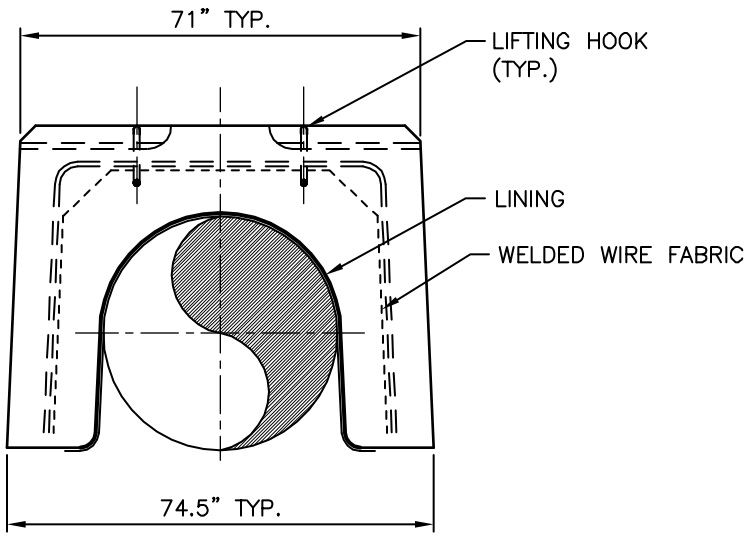
DRAFT 1 FERC APPLICATION NOT FOR CONSTRUCTION

Appendix 1E BC–04

Alaska Pipeline Project

Buoyancy Control – Screw Anchors

Rev. D



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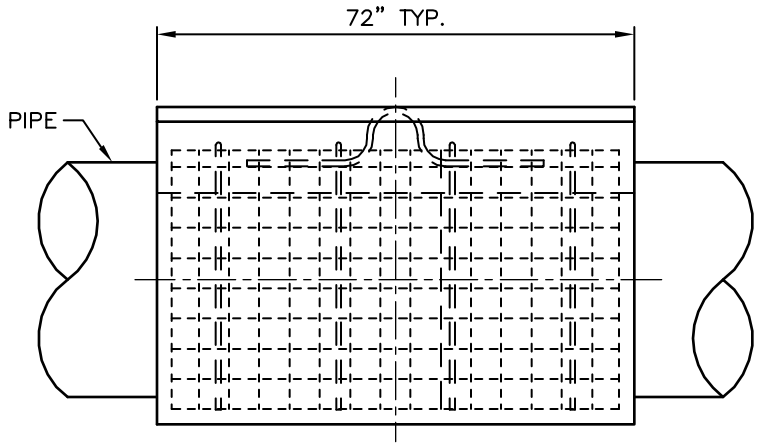


ELEVATION

DRAFT 1 FERC APPLICATION
NOT FOR CONSTRUCTION

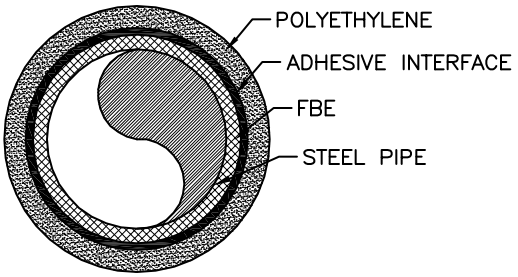
Appendix 1E BC–05

Alaska Pipeline Project

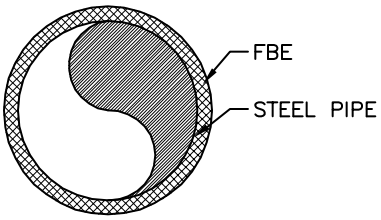
Buoyancy Control – Set–on Weights

Rev. C

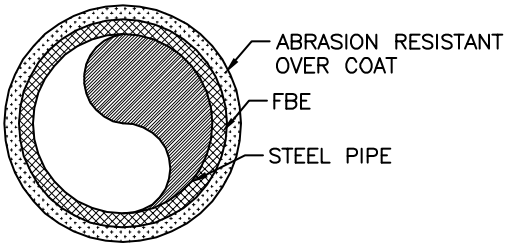
DRAFT



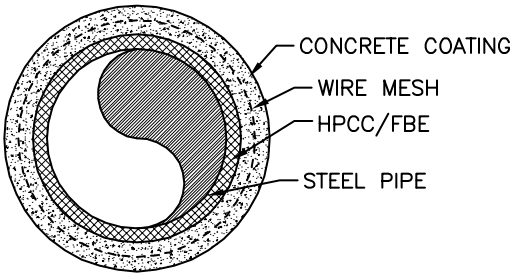
THREE–LAYER POLYETHYLENE (3LPE)



FUSION BONDED EPOXY (FBE)



ABRASION COATED FBE



CONCRETE ROCK PROTECTION

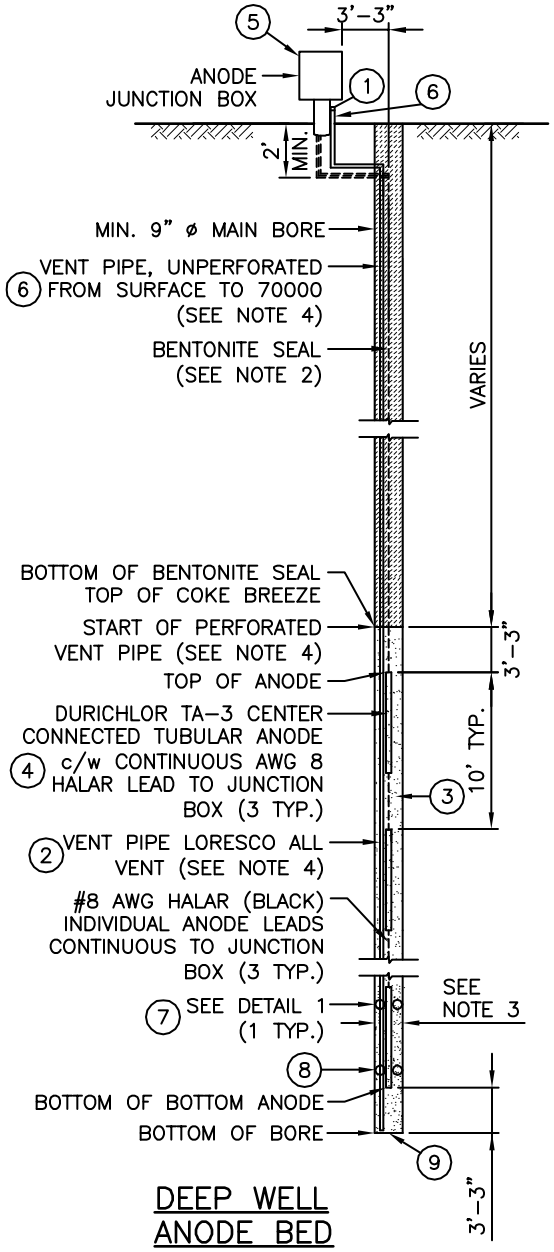
DRAFT 1 FERC APPLICATION NOT FOR CONSTRUCTION

Appendix 1E CC–01

Alaska Pipeline Project

Corrosion Control – Coatings

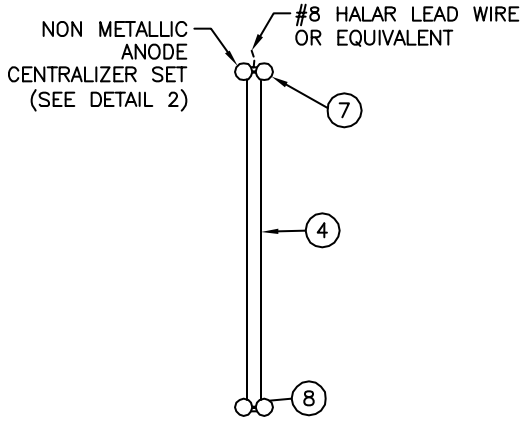
Rev. E



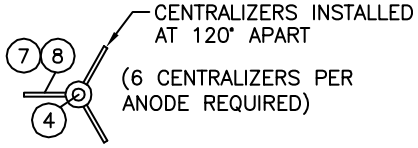
DEEP WELL ANODE BED

MATERIALS LIST

No.	DESCRIPTION	QTY
1	SCREENED CAP FOR 1" PVC VENT PIPE	1
2	1" DIAMETER CONTINUOUS VENT PIPE, PERFORATED (SEE NOTE 4)	39'-4"
3	CALCINED PETROLEUM COKE BREEZE	1100 lb
4	DURICHLOR TA-3, 2.6" x 7' (OR EQUIVALENT) CENTER CONNECTED TUBULAR SiFeCr ALLOY ANODE, c/w #8 AWG INDIVIDUAL HALAR LEAD WIRE CONTINUOUS TO JUNCTION BOX	4
5	4 CIRCUIT ANODE JUNCTION BOX	1
6	1" DIAMETER CONTINUOUS UNPERFORATED PVC VENT PIPE (SEE NOTE 4)	VARIES
7	ANODE CENTRALIZERS (TOP)	12
8	ANODE CENTRALIZERS (BOTTOM)	12
9	END CAP FOR 1" PVC VENT PIPE	1



DETAIL 1
ANODE DETAIL



DETAIL 2
ANODE CENTRALIZER

NOTES:

1. ALL DIMENSIONS IN INCHES AND FEET UNLESS OTHERWISE NOTED.
2. THE BENTONITE SEAL IS TO EXTEND FROM THE TOP OF THE COKE BREEZE COLUMN TO GROUND SURFACE.
3. THE DIAMETER OF THE MAIN BORE SHALL BE A MINIMUM OF 9".
4. VENT PIPE TO BE CONTINUOUS 1" ø PVC PIPE WITH ONLY THE PORTION WITHIN THE ACTIVE GROUNDBED TO BE PERFORATED.

DRAFT 1 FERC APPLICATION NOT FOR CONSTRUCTION

Appendix 1E CC-02

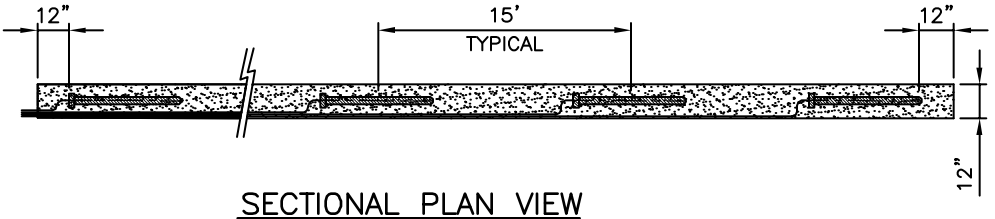
Alaska Pipeline Project

Cathodic Protection – Typical Deep Vertical Anode Bed

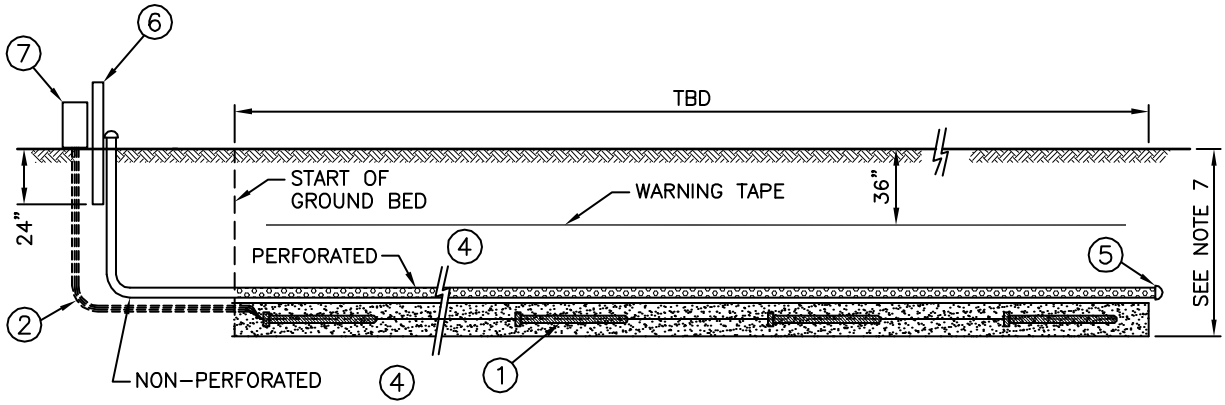
Rev. E

DRAFT

MATERIAL LIST		
No.	DESCRIPTION	QTY
1	2" x 60" SiFeCr. ANODES	TO SUIT
2	#8 HMWPE (BLACK) ANODE LEADS	TO SUIT
3	55 lb BAGS OF CALCINED PETROLEUM COKE BREEZE	TO SUIT
4	4.5" WEEPING TILE	TO SUIT
5	4.5" CAP FOR WEEPING TILE	2
6	4.5" x 4.5" x 5' TREATED CEDAR POST	1
7	B2 WIRING PEDESTAL	1



SECTIONAL PLAN VIEW



SECTIONAL ELEVATION VIEW

GENERAL INSTALLATION PROCEDURE:

1. EXCAVATE A TRENCH.
2. POUR A 4" BED OF COKE BREEZE EVENLY ALONG THE TRENCH AND TAMP TO COMPACT.
3. PLACE ANODES AT THE NOTED SPACING IN THE CENTRE OF THE COKE BREEZE BED.
4. POUR COKE BREEZE BACKFILL OVER THE ANODES TO ACHIEVE A TRENCH COVER 4" ABOVE THE ANODES AND TAMP TO COMPACT.
5. PLACE THE WEEPING TILE SYSTEM IN THE TRENCH ABOVE THE COKE BREEZE.
6. LAY WARNING TAPE AS SHOWN.
7. BURIAL DEPTH WILL VARY WITH GROUND CONDITIONS.

DRAFT 1 FERC APPLICATION NOT FOR CONSTRUCTION

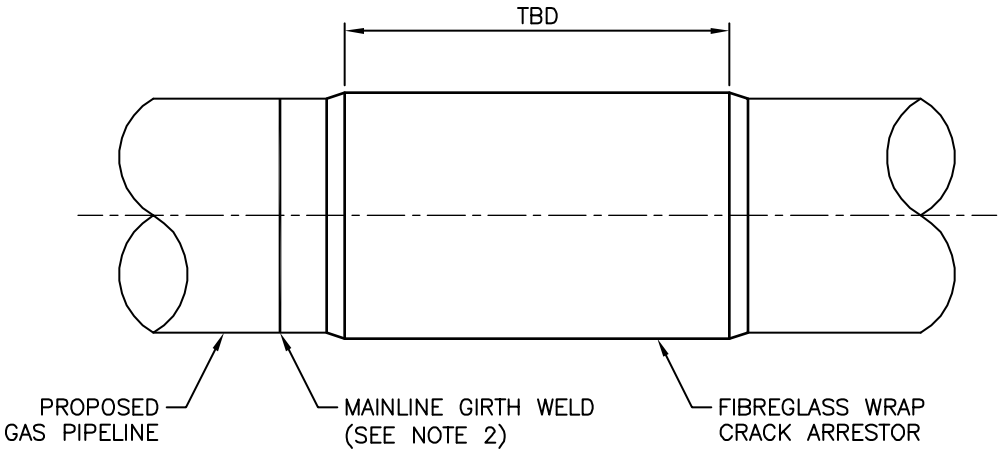
Appendix 1E CC-03

Alaska Pipeline Project

Cathodic Protection – Typical Horizontal Anode Bed

Rev. D

DRAFT



NOTES:

1. FIBREGLASS WRAP CRACK ARRESTORS INSTALLED ON TOP OF EXTERNAL COATING AT THE COATING MILL OR OTHER SUITABLE LOCATIONS.
2. CRACK ARRESTORS SHALL BE INSTALLED AT PIPE ENDS WITH SUFFICIENT CLEARANCE NOT TO INTERFERE WITH THE WELDING OR NDE PROCESS.
3. CRACK ARRESTOR SIZE AND SPACING ARE TBD.

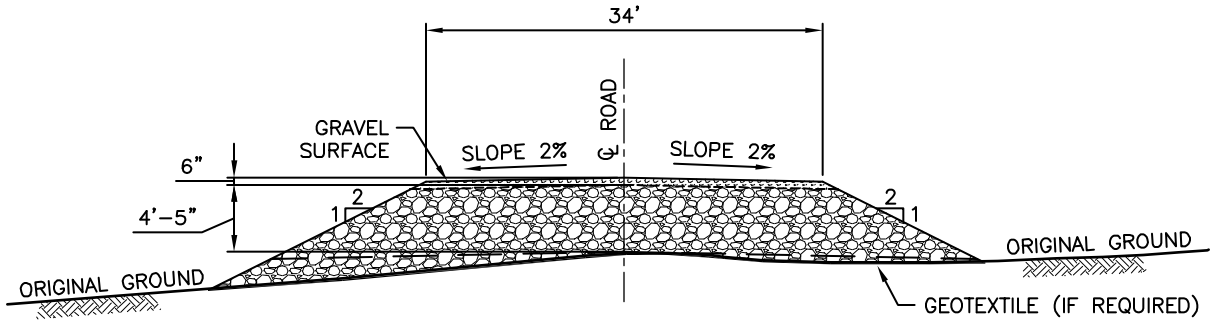
DRAFT 1 FERC APPLICATION NOT FOR CONSTRUCTION

Appendix 1E FC–01

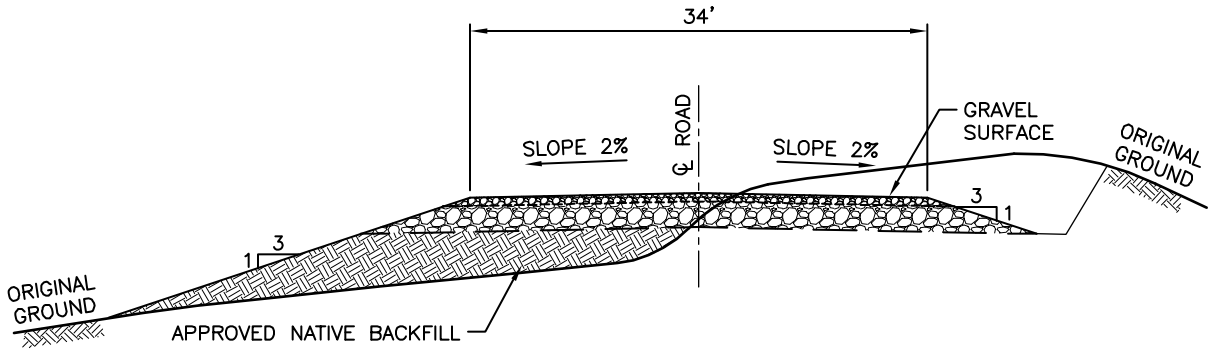
Alaska Pipeline Project

Fracture Control – Typical Fracture Control Method

Rev. D



TYPICAL CROSS – SECTION ALL WEATHER ROAD FOR PERMAFROST AREA



TYPICAL CROSS–SECTION ALL WEATHER ROAD FOR NON–PERMAFROST AREA

DESIGN STANDARDS
CLASS III ALL WEATHER ROAD

1. MAXIMUM GRADE : SUSTAINED – 6%
   PITCH – 8%
2. MAXIMUM RIGHT–OF–WAY WIDTH TBD.
3. TYPICAL SUBGRADE HEIGHT ON PERMAFROST : 5', NON PERMAFROST : 2'.
4. DESIGN SPEED TBD.

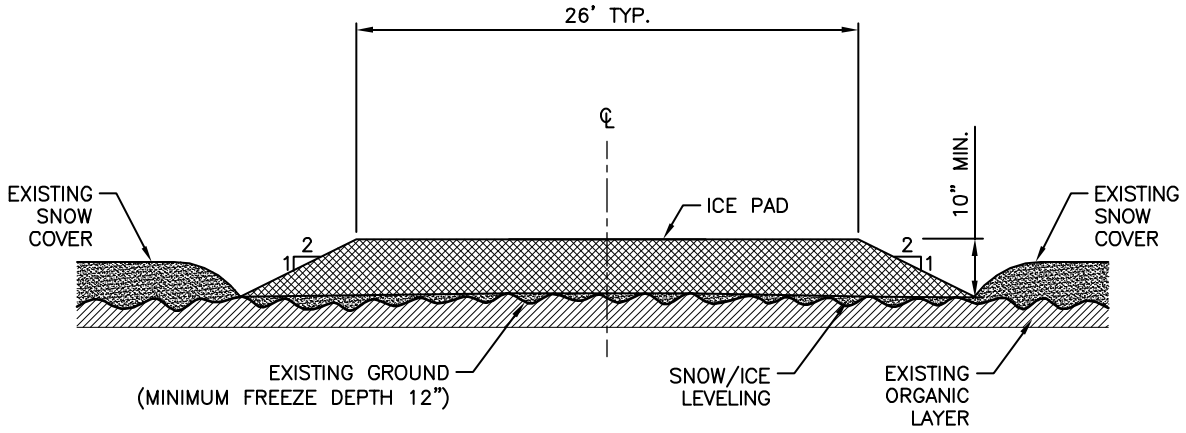
DRAFT 1 FERC APPLICATION NOT FOR CONSTRUCTION

Appendix 1E ACC–01

Alaska Pipeline Project

Access Roads – Typical Permanent Road Sections

Rev. D



SECTION

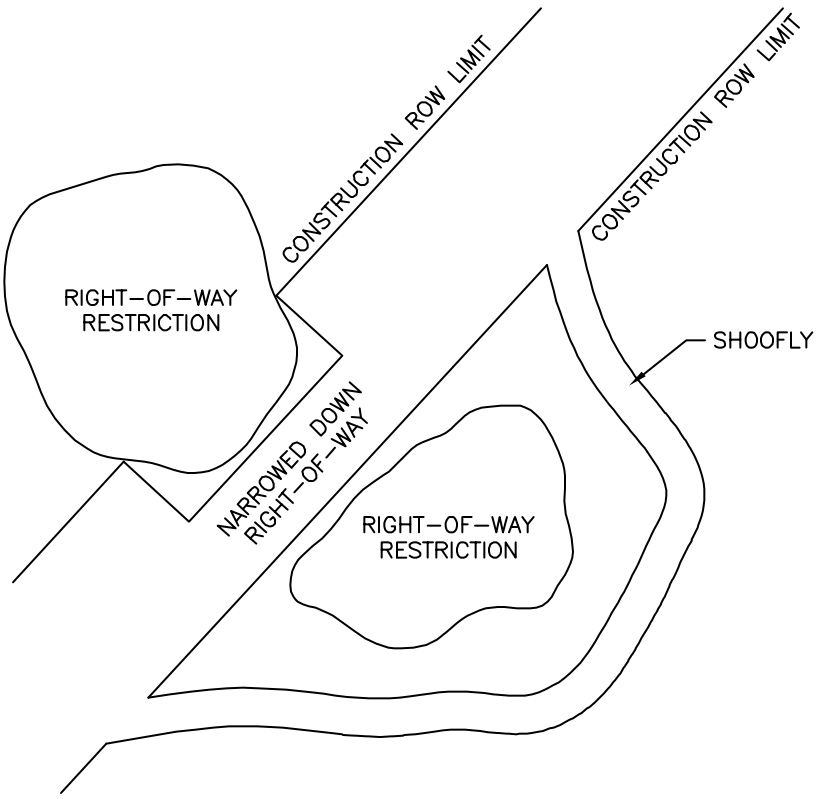
DRAFT 1 FERC APPLICATION NOT FOR CONSTRUCTION

Appendix 1E ACC–03

Alaska Pipeline Project

Access Roads – Typical Temporary Snow/Ice Road Section

Rev. D



PLAN

DRAFT 1 FERC APPLICATION
NOT FOR CONSTRUCTION

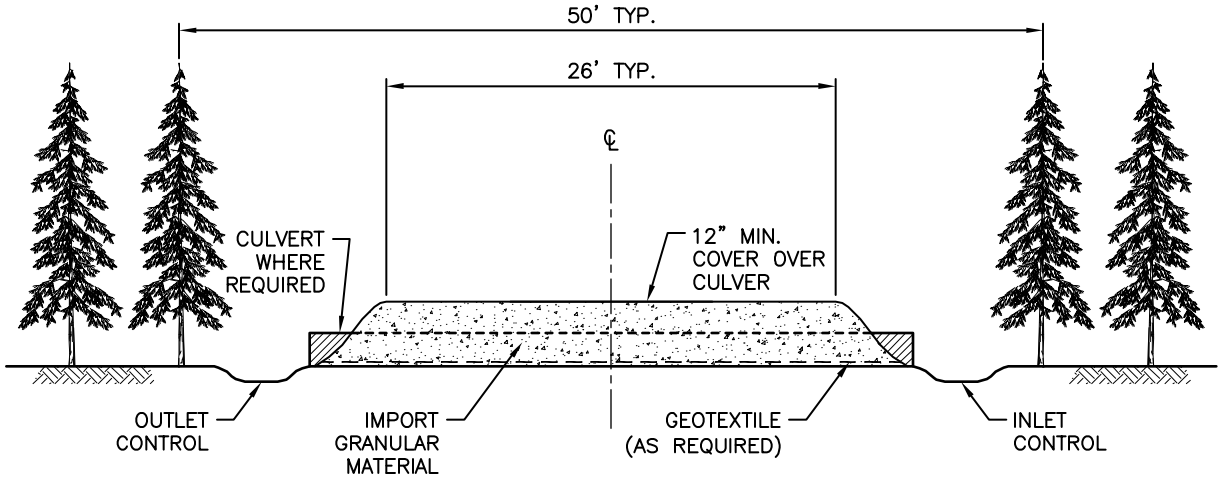
Appendix 1E ACC–05

Alaska Pipeline Project

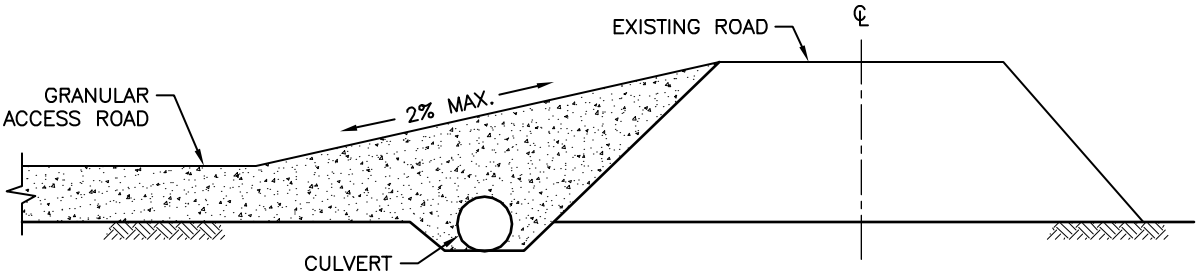
Access Roads – Typical Temporary Shoofly Road Plan/Section

Rev. D

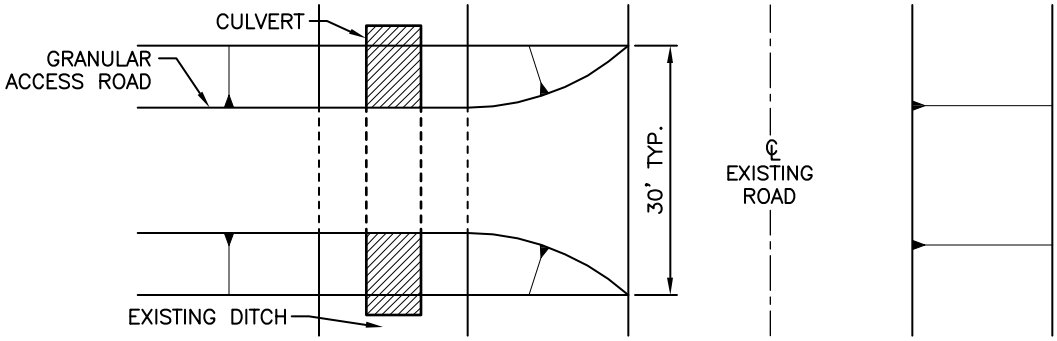
DRAFT



SECTION



PROFILE – EXISTING ROAD RAMP



PLAN – EXISTING ROAD PLAN

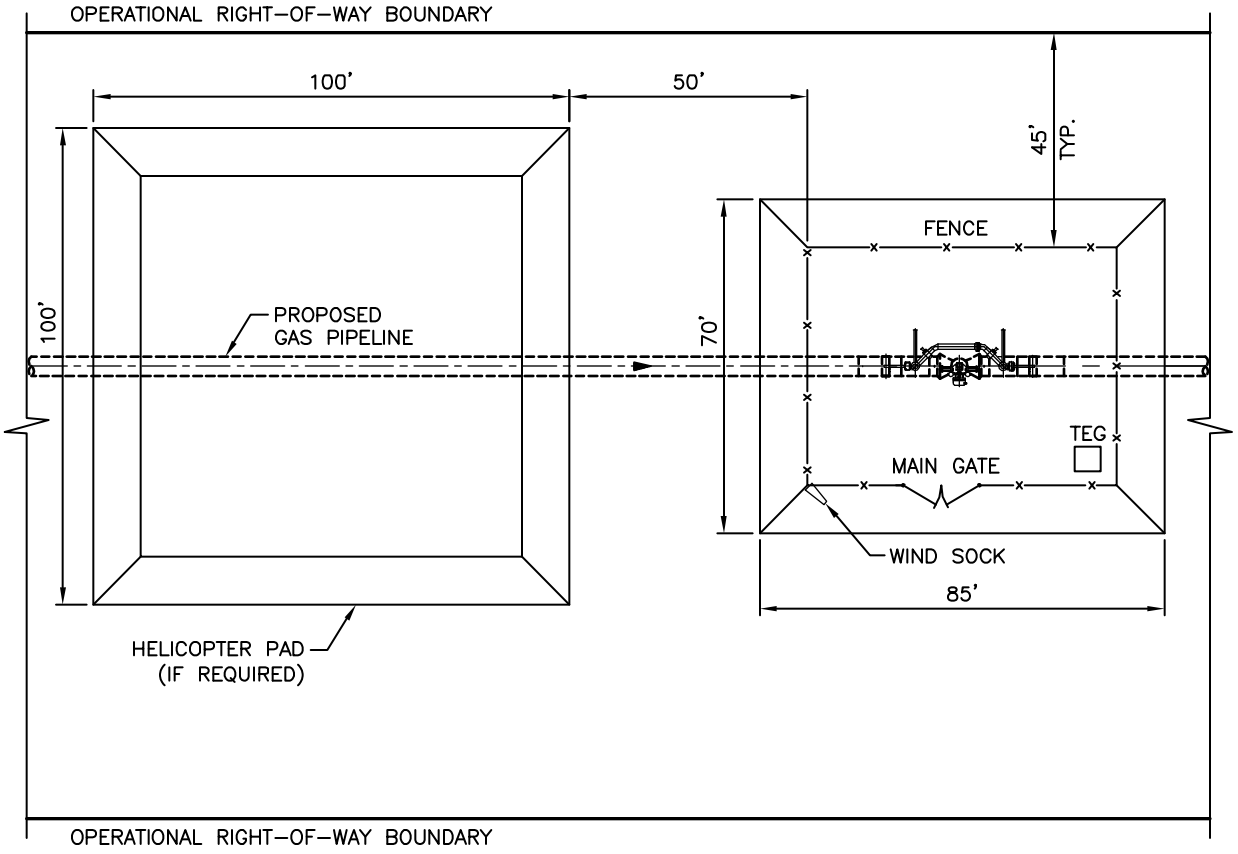
DRAFT 1 FERC APPLICATION NOT FOR CONSTRUCTION

Appendix 1E ACC–06

Alaska Pipeline Project

Access Roads – Typical Temporary Granular Road Off Highway

Rev. C



PLAN

NOTES:

1. A HELICOPTER PAD WILL BE PROVIDED FOR REMOTE BLOCK VALVE LOCATIONS WITH NO ACCESS.
2. TEG UNIT WILL BE PROVIDED FOR CATHODIC PROTECTION WHERE CONVENTIONAL POWER IS NOT AVAILABLE.

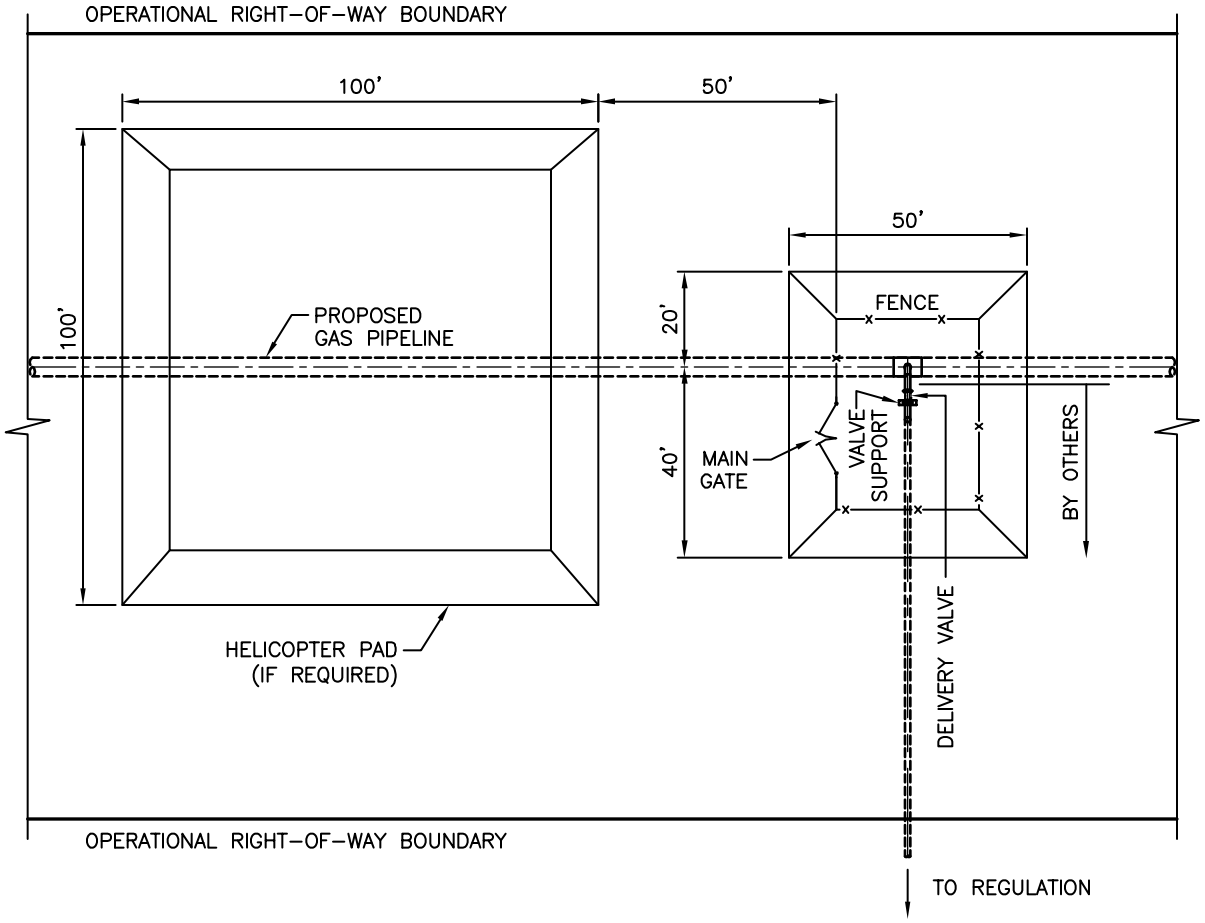
DRAFT 1 FERC APPLICATION NOT FOR CONSTRUCTION

Appendix 1E FAC–05

Alaska Pipeline Project

Pipeline Facilities – Typical Mainline Block Valve Plot Plan

Rev. E



PLAN

NOTE:

1. A HELICOPTER PAD WILL BE PROVIDED FOR REMOTE DELIVERY POINT TAKE-OFFS WITH NO ACCESS.

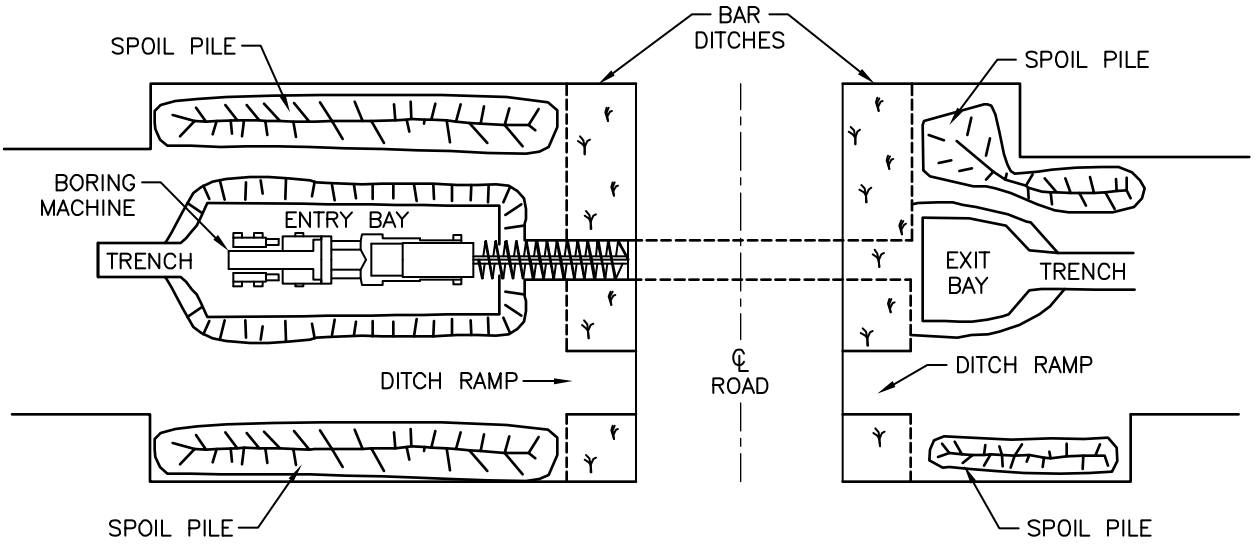
DRAFT 1 FERC APPLICATION NOT FOR CONSTRUCTION

Appendix 1E FAC-08A

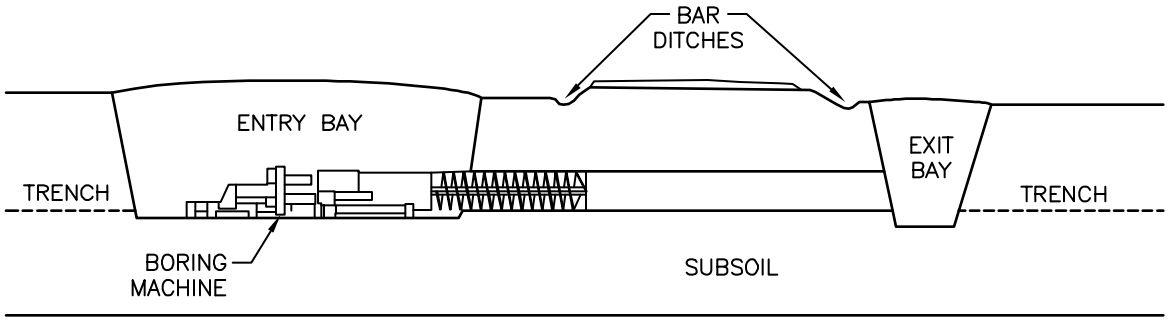
Alaska Pipeline Project

Pipeline Facilities – Typical Tee and Valve Gas Delivery Point Plot Plan

Rev. D



PLAN VIEW



PROFILE

NOTES:

1. ACQUIRE AND MARK ADDITIONAL TEMPORARY WORKSPACE.
2. EXCAVATE ENTRY AND EXIT BAYS.
3. AFTER COMPLETION OF PIPE TIE–INS, BACKFILL AND COMPACT IN LIFTS TO MINIMIZE SUBSIDENCE AND THE NEED FOR A CROWN OVER THE EXCAVATION.
4. REMOVE DITCH RAMPS.
5. FOR UNSTABLE SOIL, PROVIDE SHORING AS REQUIRED.

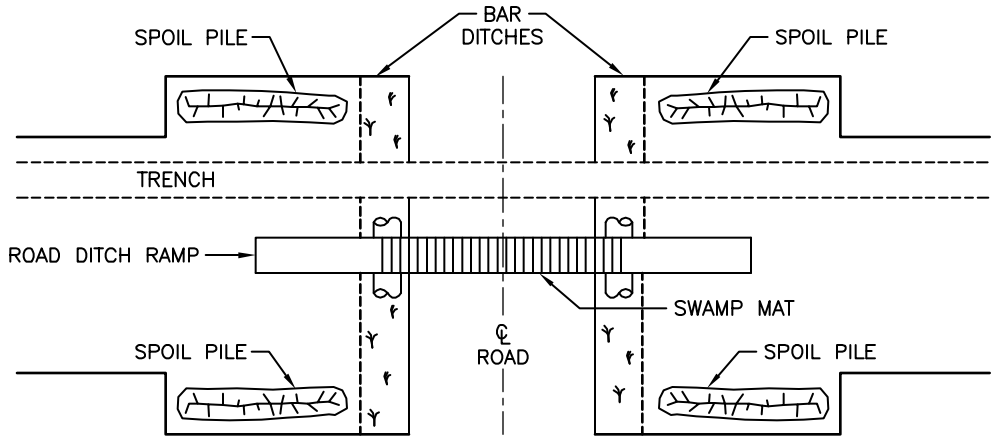
DRAFT 1 FERC APPLICATION NOT FOR CONSTRUCTION

Appendix 1E CONST–02

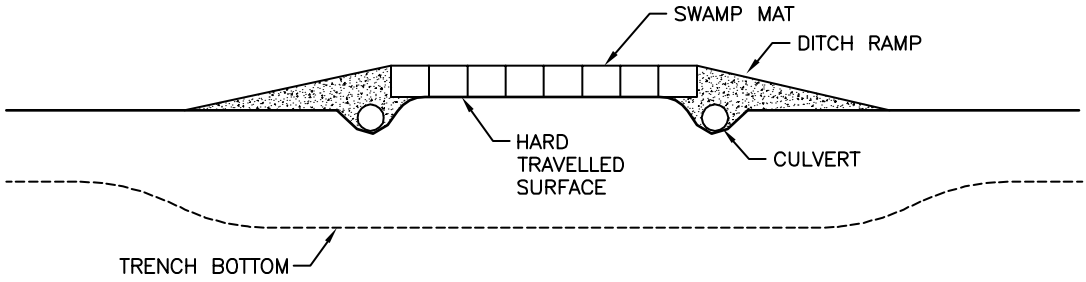
Alaska Pipeline Project

Construction Typicals – Horizontal Boring/Drilling Roads

Rev. D



PLAN VIEW



PROFILE

NOTES:

1. SWAMP MATS MAY BE REQIRED ACROSS ROAD TO PROTECT HARD TRAVELLED SURFACE FROM EQUIPMENT, DURING INSTALLATION.
2. OPEN–CUT ROAD CROSSING TO BE CARRIED OUT AS QUICKLY AS PRACTICAL.
3. PROPER SIGNAGE AND ROAD CLOSURE REQUIRED BEFORE COMMENCING TRENCHING.
4. TRENCH SPOIL TO BE REPLACED IN 6" LIFTS AND COMPACTED TO 95% OF THE MAXIMUM PROCTOR DRY DENSITY.
5. ORIGINAL HARD TRAVELLED SURFACE TO BE RESTORED TO ORIGINAL CONDITION FOLLOWING COMPLETION OF CROSSING INSTALLATION.

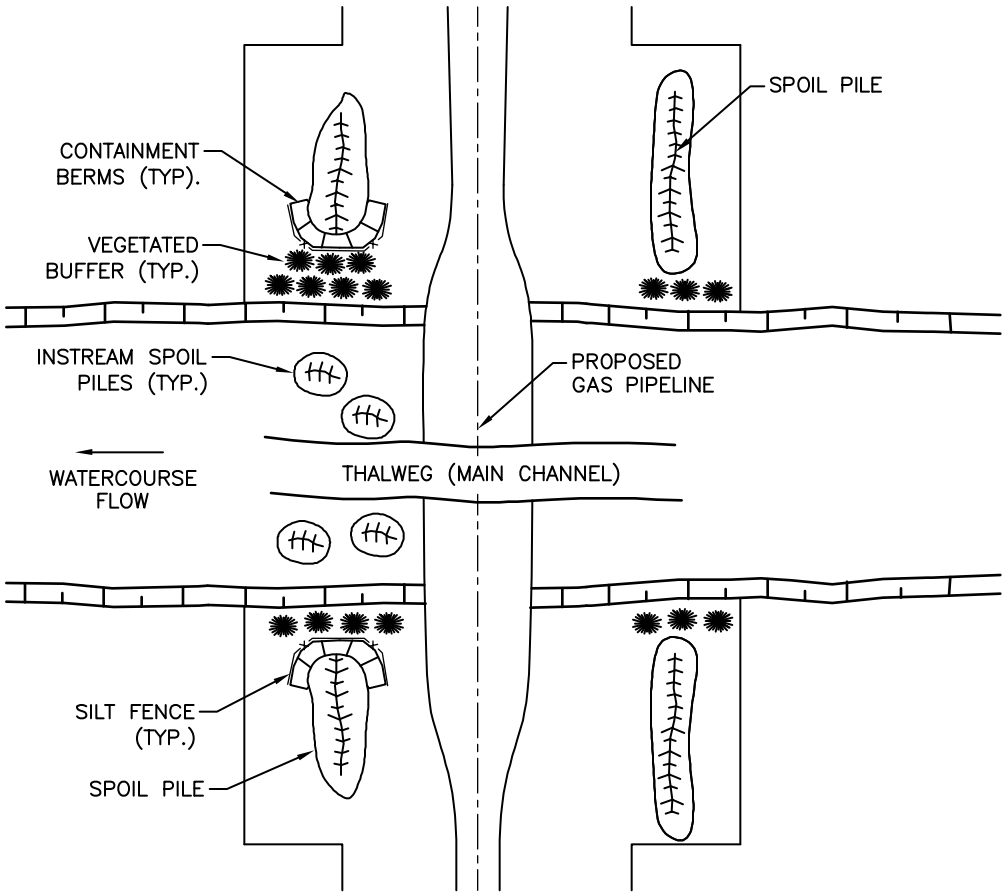
DRAFT 1 FERC APPLICATION
NOT FOR CONSTRUCTION

Appendix 1E CONST–03

Alaska Pipeline Project

Construction Typicals – Open–Cut Roads

Rev. F



PLAN VIEW

NOTES:

1. CLEAR VEGETATION FROM EXCAVATION AND MATERIALS STORAGE AREAS, LEAVING A VEGETATED BUFFER BACK FROM THE BANK ON THE STORAGE AND WORK SIDES OF THE ROW. CLEAR VEGETATION FROM THE WORK SIDE ONLY IF A VEHICLE CROSSING IS REQUIRED.
2. GRUB ROOTS, AND SALVAGE SPOIL MATERIAL FROM GRADED AND EXCAVATED AREAS AND STORE SEPARATELY OUT OF THE WAY OF CROSSING ACTIVITIES.
3. CONSTRUCT SPOIL CONTAINMENT BERMS AND INSTALL SEDIMENT CONTROL FEATURES (e.g. SILT FENCE, STRAW BALES) DOWNSLOPE OF PROPOSED SPOIL STORAGE AREAS.
4. THE INSTREAM PIPE SECTION SHALL BE CONSTRUCTED AND TESTED PRIOR TO INSTREAM ACTIVITY.
5. ANY EQUIPMENT WORKING INSTREAM MUST BE CLEAN, IN GOOD WORKING CONDITION AND CONTAIN ENVIRONMENTALLY FRIENDLY HYDRAULIC AND LUBRICATING FLUIDS.
6. EXCAVATE BELLHOLE THROUGH WATERCOURSE AND STOCKPILE SPOIL INSTREAM, IN DISCRETE PILES ADJACENT TO THE EXCAVATION DOWNSTREAM OF THE CROSSING. SPOIL SHOULD NOT BE STOCKPILED IN THE MAIN CHANNEL (THALWEG). THE INSTREAM SPOIL PILES MUST NOT BLOCK MORE THAN 2/3 OF THE CHANNEL WIDTH.
7. EXCAVATE SAGS ON BOTH SIDES OF WATERCOURSE AND STOCKPILE WET SPOIL BEHIND THE SPOIL CONTAINMENT BERMS. INSTALL PIPE SECTION, BACKFILL EXCAVATION AND STABILIZE WATERCOURSE BED AND BANKS.

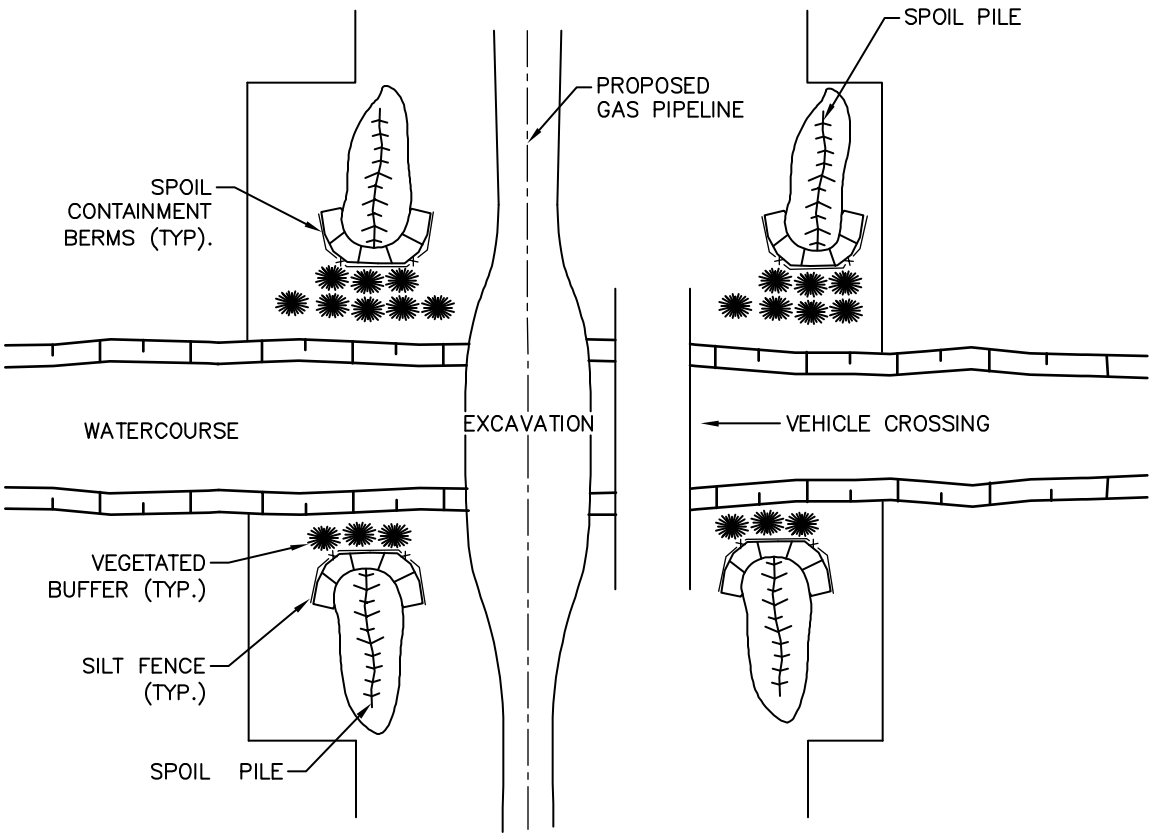
DRAFT 1 FERC APPLICATION NOT FOR CONSTRUCTION

Appendix 1E CONST–04

Alaska Pipeline Project

Construction Typicals – Waterbodies – Major/Intermediate Open–Cut

Rev. F



PLAN VIEW

NOTES:

1. CLEAR VEGETATION FROM WORK SPACE AND MATERIAL STORAGE AREAS, LEAVING A VEGETATED BUFFER BACK FROM THE BANK ON THE STORAGE SIDE OF THE ROW.
2. GRUB ROOTS, SALVAGE SPOIL MATERIAL FROM GRADED AND EXCAVATED AREAS AND STORE THEM SEPARATELY OUT OF THE WAY OF CROSSING ACTIVITIES.
3. CONSTRUCT SPOIL CONTAINMENT BERMS AND INSTALL SEDIMENT CONTROL FEATURE (e.g. SILT FENCE, STRAW BALES) DOWNSLOPE OF PROPOSED SPOIL STORAGE AREAS.
4. THE INSTREAM PIPE SECTION SHALL BE CONSTRUCTED AND TESTED PRIOR TO INSTREAM ACTIVITY.
5. TO REDUCE THE NEED FOR EQUIPMENT WORKING INSTREAM, LOCATE BACKHOES ON BOTH BANKS OF THE WATERCOURSE DURING EXCAVATION.
6. EXCAVATE THE CROSSING AND STORE WET SPOIL BEHIND THE SPOIL CONTAINMENT BERMS. INSTALL PIPE SECTION, BACKFILL EXCAVATION AND STABILIZE WATERCOURSE BED AND BANKS.

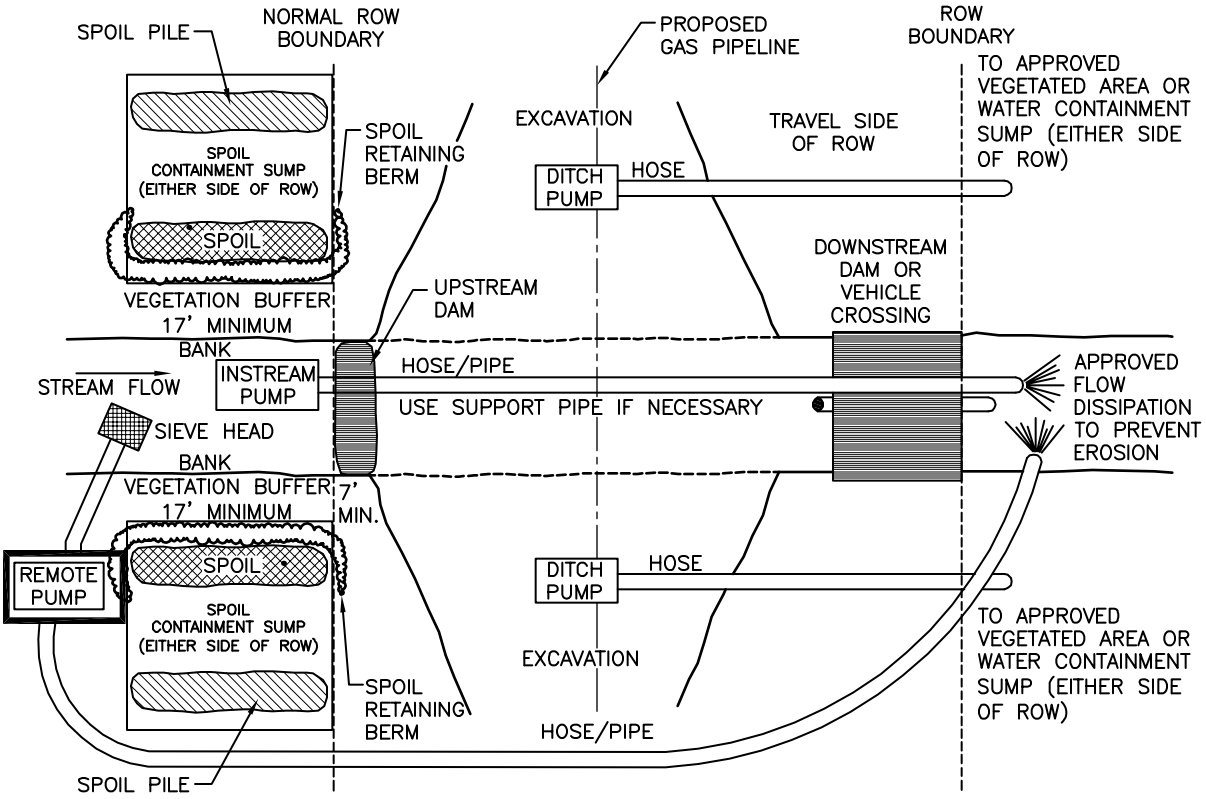
DRAFT 1 FERC APPLICATION NOT FOR CONSTRUCTION

Appendix 1E CONST–05

Alaska Pipeline Project

Construction Typicals – Waterbodies – Minor Open–Cut

Rev. F



DAM AND PUMP BY INSTREAM PUMPING ACROSS EXCAVATION OR BY REMOTE PUMPING AROUND EXCAVATION

NOTES:

1. INSTALL THE VEHICLE CROSSING ON THE WORK SIDE EDGE OF THE ROW TO ALLOW FOR A WIDE EXCAVATION.
2. STOCKPILE ALL REQUIRED MATERIALS AND EQUIPMENT ON THE SITE PRIOR TO BEGINNING INSTREAM WORK.
3. PERFORM THE BANK GRADE AND PREPARE SPOIL CONTAINMENT SUMPS AS CIRCUMSTANCES DICTATE.
4. COMPLETE WELDING, COATING, AND WEIGHTING OF THE RIVER PIPE SECTION.
5. BEGIN THE OPERATION IN THE EARLY MORNING TO ALLOW FOR SAME DAY INSTALLATION IF POSSIBLE.
6. INSTALL PUMPS AND CHECK OPERATION TO EQUALIZE FLOW.
7. CONSTRUCT THE SPOIL SIDE DAM USING SPECIFIED DAMMING TECHNIQUES. DAM SHOULD BE CONSTRUCTED ON THE SPOIL SIDE EDGE OF THE ROW TO ALLOW FOR A WIDE EXCAVATION.
8. PLUG THE VEHICLE CROSSING CULVERT OR CONSTRUCT THE DOWNSTREAM DAM USING SPECIFIED DAMMING TECHNIQUES. WHERE A BRIDGE IS USED THE DAM SHOULD BE CONSTRUCTED AS CLOSE TO THE SPOIL SIDE OF THE BRIDGE AS POSSIBLE TO ALLOW FOR A WIDE EXCAVATION.
9. EXCAVATE TRENCH AS RAPIDLY AS POSSIBLE AND INSTALL PIPE.
10. BACKFILL THE STREAM CHANNEL FIRST PUSHING THE SILTED WATER BACK INTO THE BANK EXCAVATIONS. PUMP OR DRAIN THE BANK EXCAVATIONS WHILE PROGRESSIVELY BACKFILLING FROM THE STREAM CHANNEL OUTWARD. CONSTRUCT WATER CONTAINMENT SUMPS IF NECESSARY.
11. STABILIZE BED AND BANKS OF THE STREAM CHANNEL, REMOVE THE DOWNSTREAM DAM OR VEHICLE CROSSING PLUG, REMOVE UPSTREAM DAM OR VEHICLE CROSSING PLUG AND REMOVE BYPASS PUMPS.

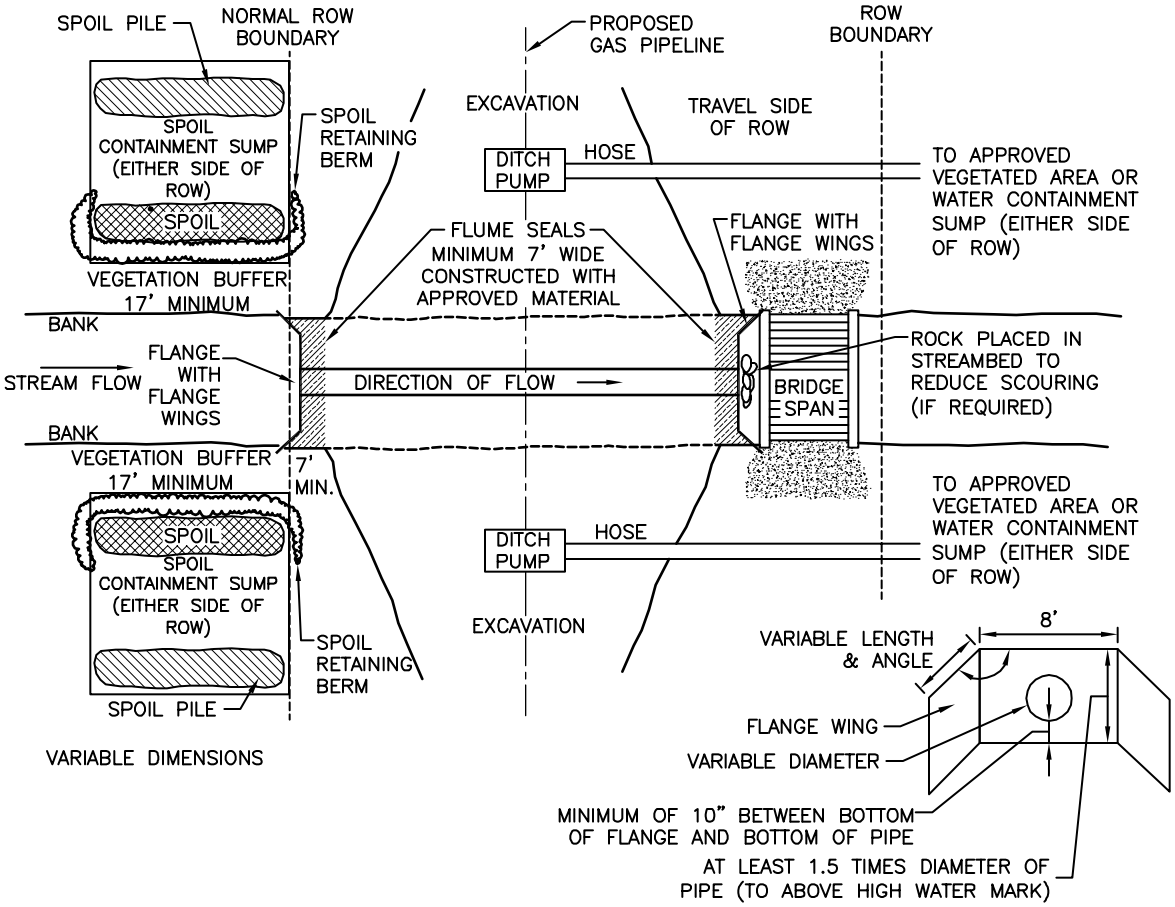
DRAFT 1 FERC APPLICATION NOT FOR CONSTRUCTION

Appendix 1E CONST–06

Alaska Pipeline Project

Construction Typicals – Waterbodies – Isolated Open-Cut – Dam and Pump

Rev. F



FRONT VIEW OF FLUME FACE (UPSTREAM)

NOTES:

1. INSTALL THE VEHICLE CROSSING ON THE WORK SIDE EDGE OF THE RoW TO ALLOW FOR A WIDE EXCAVATION.
2. GRADE THE BANKS OF THE WATER CROSSING AND PREPARE THE SPOIL CONTAINMENT AREAS.
3. CONSTRUCT THE FLUME WITH CORRECT FLANGES AND FLANGE WINGS, AS PER THE SPECIFICATIONS.
4. STOCKPILE ALL REQUIRED MATERIALS PRIOR TO BEGINNING INSTREAM WORK.
5. COMPLETE CONSTRUCTION OF PIPE SECTION.
6. INSTALL THE FLUME IN THE STREAM CHANNEL USING SEALING TECHNIQUES. DEWATER THE AREA BETWEEN THE FLANGE WINGS.
7. BEGINNING IN THE EARLY MORNING, EXCAVATE THE TRENCH AS QUICKLY AS POSSIBLE PLACING SPOIL OUT OF THE STREAM CHANNEL. CREATE SPOIL CONTAINMENT SUMPS IF NECESSARY TO KEEP SPOIL FROM FLOWING BACK INTO THE STREAM CHANNEL.
8. PUMP EXCAVATION AS REQUIRED TO PREVENT DOWNSTREAM FLOW OF SILTED WATER. DIRECT THE PUMPED WATER INTO VEGETATED AREAS WELL BACK FROM THE WATER COURSE. CONSTRUCT WATER CONTAINMENT SUMPS.
9. INSTALL PIPE.
10. BACKFILL THE STREAM CHANNEL FIRST, SQUEEZING THE SILTED WATER INTO THE BANK EXCAVATIONS. PUMP OR DRAIN THE BANK EXCAVATIONS WHILE PROGRESSIVELY BACKFILLING FROM THE STREAM CHANNEL OUTWARD AND COMPLETE BACKFILL.
11. STABILIZE THE BED AND BANKS OF THE STREAM CHANNEL, REMOVE THE DOWNSTREAM SEAL MATERIALS, REMOVE UPSTREAM SEAL MATERIALS AND REMOVE THE FLUME.

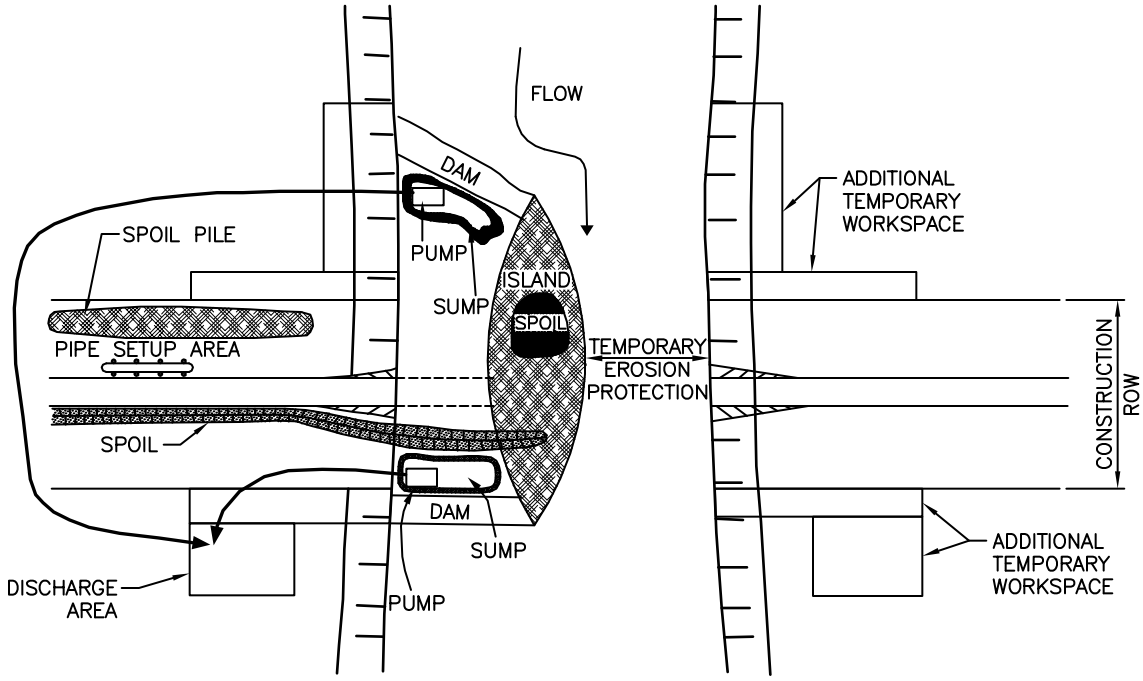
DRAFT 1 FERC APPLICATION NOT FOR CONSTRUCTION

Appendix 1E CONST–07

Alaska Pipeline Project

Construction Typicals – Waterbodies – Isolated Open–Cut – Dam and Flume

Rev. F



PLAN VIEW

NOTES:

1. IF THERE IS A HIGH VELOCITY STREAMFLOW, INSTALL DEFLECTION BARRIER (e.g., MEDIAN BARRIERS) TO PERMIT CONSTRUCTION OF DAM OUTSIDE FULL STREAMFLOW.
2. CONSTRUCT DAM FROM LOCAL MATERIALS, SANDBAGS, AQUADAMS, SHEET PILING, MEDIAN BARRIERS, GRAVEL OR OTHER APPROPRIATE MATERIAL TO EXTEND OVER HALFWAY ACROSS THE WATERCOURSE.
3. INSTALL IMPERMEABLE BARRIER WITHIN DAM.
4. INSTALL RIPRAP ON UPSTREAM SIDE TO PROTECT THE DAM FROM EROSION IF DAM IS CONSTRUCTED OF LOOSE MATERIAL.
5. SPOIL STORAGE SHALL BE ABOVE THE HIGH WATER MARK OR PROTECTED BY EROSION CONTROL MEASURES TO ENSURE THAT, WHEN THE WATER LEVEL RISES AFTER ALL FLOW HAS BEEN CHANNELIZED INTO ONE CHANNEL, SPOIL IS NOT WASHED AWAY.
6. INSTALL SUMPS TO COLLECT SEEPAGE AND THEN PUMP TO DEWATERING AREA.
7. ENSURE DISCHARGE AREA CAN HANDLE THE VOLUME OF WATER AND SILT PUMPED TO SHORE.
8. COMPLETE TRENCHING, LOWERING IN AND BACKFILLING.
9. REMOVE DAM, STABILIZE BANK.
10. REPEAT PROCESS FOR OTHER CHANNEL.
11. TEMPORARY DIVERSION ALSO MAY BE MADE THROUGH ABANDONED CHANNELS AS LONG AS STEPS ARE TAKEN TO MINIMIZE A FLUSH OF SEDIMENT ONCE THE WATERCOURSE IS REDIRECTED THROUGH THE "NEW" CHANNEL.
12. TEMPORARY DIVERSION THROUGH A CHANNEL EXCAVATED INTO A FLOOD PLAIN IS POSSIBLE IF LINED OR PASSED THROUGH A FLEXIBLE CONDUIT TO PREVENT EXCESSIVE EROSION ALONG THE "NEW" CHANNEL.

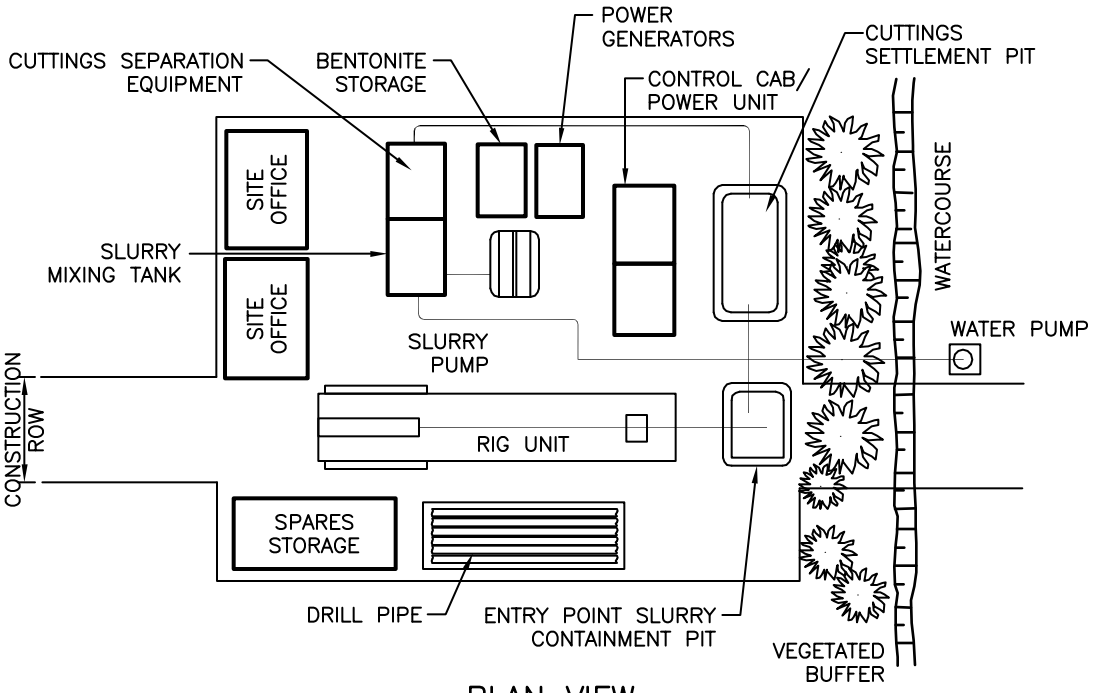
DRAFT 1 FERC APPLICATION NOT FOR CONSTRUCTION

Appendix 1E CONST–08

Alaska Pipeline Project

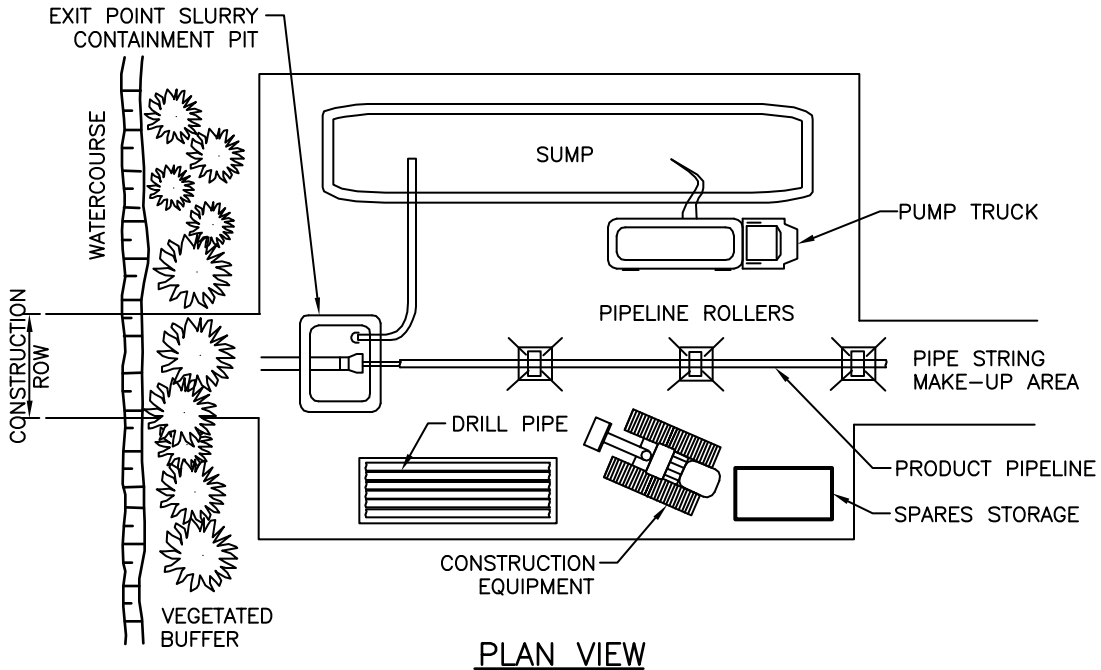
Construction Typicals – Waterbodies – Isolated Open–Cut – Dam and Divert

Rev. F



PLAN VIEW

TYPICAL ENTRY/RIG SIDE LAYOUT



PLAN VIEW

TYPICAL EXIT/PIPE SIDE LAYOUT

DRAFT 1 FERC APPLICATION NOT FOR CONSTRUCTION

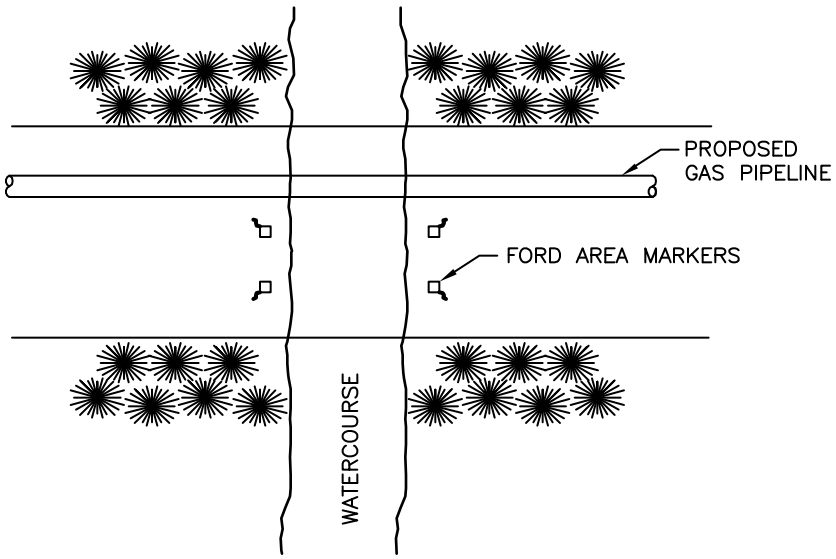
Appendix 1E CONST–09

Alaska Pipeline Project

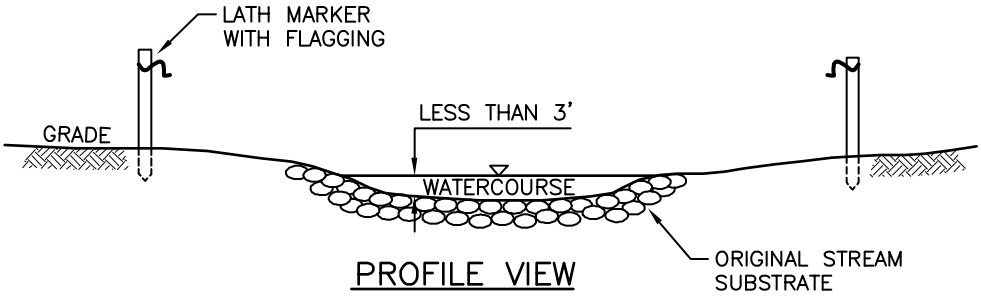
Construction Typicals – Waterbodies – Horizontal Directional Drill

Rev. C

DRAFT



PLAN VIEW



PROFILE VIEW

NOTES:

1. USE FORDS TO PROVIDE VEHICULAR ACCESS ACROSS RELATIVELY SHALLOW AND NARROW WATERCOURSES WITH GRANULAR BEDS AND STABLE BANKS. WHERE WATER DEPTH, STREAMBED COMPOSITION OR BANK SLOPES COULD POSE TRAFFICABILITY PROBLEMS FOR RUBBER TIRED VEHICLES, LIMIT FORD TRAFFIC TO VEHICLES AND EQUIPMENT WITH TRACKS.
2. DO NOT USE FORD DURING FISH SPAWNING, INCUBATION OR MIGRATION PERIODS.
3. MINIMIZE GRADING IN PROXIMITY TO WATERCOURSE. GRADE AND GRUB ONLY ALONG THE TRENCHLINE AND AN AREA IMMEDIATELY ADJACENT TO THE TRENCHLINE. PULL DIRT AND DEBRIS AWAY FROM WATERCOURSE, IF BANKS REQUIRE SLOPING.
4. MINIMIZE USE OF FORD.
5. STABILIZE BANKS AND APPROACHES WITH GRANULAR BLANKET UNDERLAIN BY A GEOTEXTILE, IF WARRANTED.
6. MARK BOUNDARIES OF FORD ON BOTH SIDES OF CROSSING TO CONFINE ALL VEHICLE TRAFFIC TO FORD.
7. RESTORE AND STABILIZE BEDS AND BANKS TO ORIGINAL CONTOUR WHEN FORD IS NOT LONGER NEEDED. GRANULAR BLANKET NEED NOT BE REMOVED IF IT IS NOT A BARRIER TO FISH DURING LOW FLOW CONDITIONS.

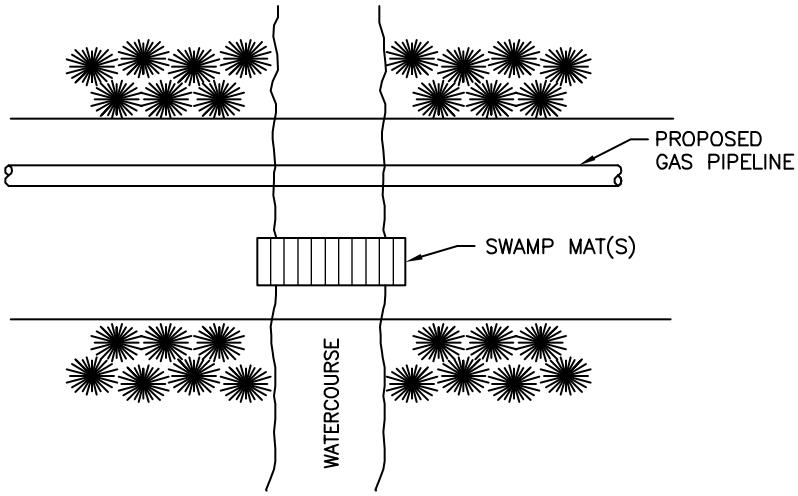
DRAFT 1 FERC APPLICATION
NOT FOR CONSTRUCTION

Appendix 1E CONST–11

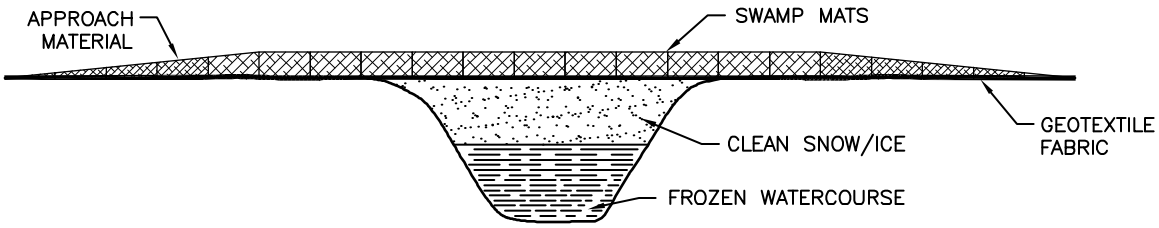
Alaska Pipeline Project

Construction Typicals – Equipment Crossing – Ford

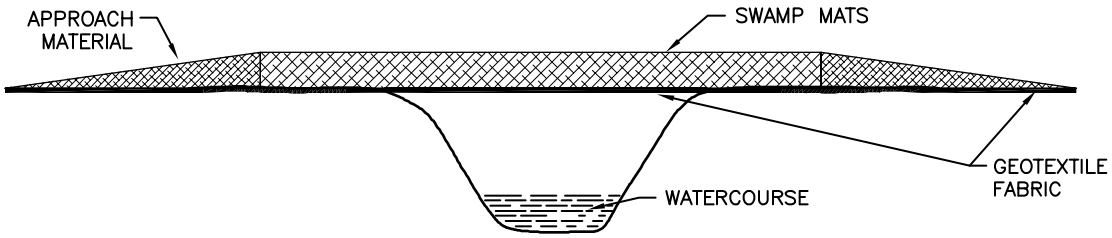
Rev. D



PLAN VIEW



PROFILE 1



PROFILE 2

NOTES:

1. USE SWAMP MATS TO PROVIDE VEHICULAR ACCESS ACROSS WATERCOURSES IN BOTH FROZEN AND UN–FROZEN CONDITIONS.
2. FOR WATERCOURSES FROZEN TO THE BOTTOM, GEOTEXTILE FABRIC IS PLACED OVER EXISTING SNOW/ICE SURFACE PRIOR TO PLACEMENT OF THE SWAMP MATS. ALTERNATIVELY, CLEAN SNOW OR ICE CAN BE USED TO FILL THE CHANNEL PRIOR TO PLACEMENT OF THE GEOTEXTILE FABRIC AND SWAMP MATS (PROFILE 1).
3. FOR NARROW WATERCOURSES WITH STABLE BANKS, GEOTEXTILE FABRIC IS DRAPED ACROSS THE CHANNEL PRIOR TO PLACEMENT OF THE SWAMP MATS (PROFILE 2).

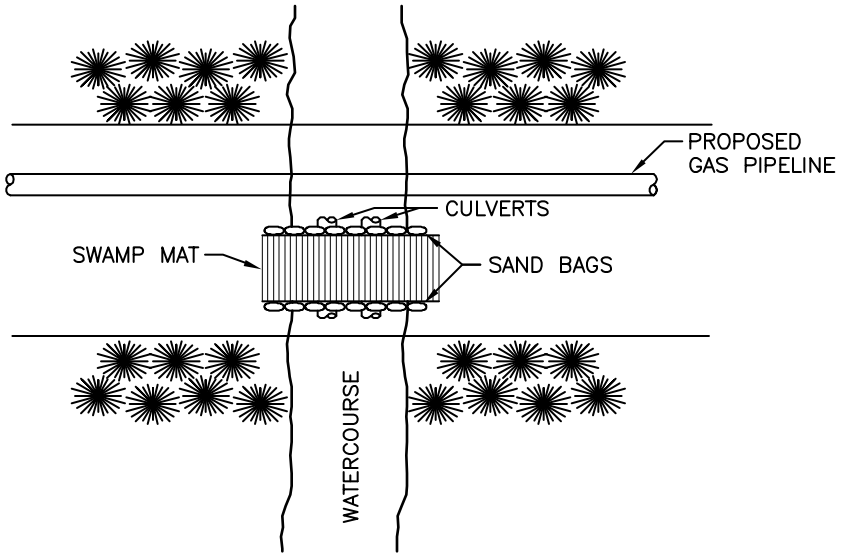
DRAFT 1 FERC APPLICATION NOT FOR CONSTRUCTION

Appendix 1E CONST–12

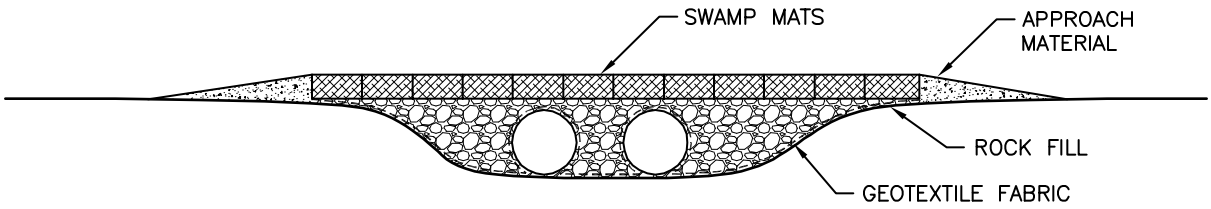
Alaska Pipeline Project

Construction Typicals – Equipment Crossing – Mat Bridge

Rev. C



PLAN VIEW



PROFILE VIEW

NOTES:

1. TO PROTECT THE STREAM BED, A GEOTEXTILE LINER SHALL BE LAID DOWN ON THE BED AND BANKS AFTER INSTALLING THE CULVERT BUT BEFORE PLACING ANY RAMP MATERIAL. GEOTEXTILE SHALL BE WIDE ENOUGH TO FOLD BACK INTO THE EDGE OF THE RAMP AT THE UPSTREAM AND DOWNSTREAM ENDS OF THE RAMP AND PREVENT ANY FILL FROM FALLING INTO THE STREAM. THE SIDES OF THE RAMP SHALL BE ARMOURED TO PROTECT IT FROM EROSION DURING HIGH STREAMFLOWS.
2. CULVERTS SHALL BE INSTALLED AS REQUESTED AND BE OF SUFFICIENT SIZE AND NUMBER TO HANDLE A ONE IN TWENTY YEAR STREAM FLOW. CULVERTS SHALL ALSO BE OF SUFFICIENT WALL THICKNESS AND GRADE TO HANDLE HEAVY LOADS.
3. RAMPS SHALL BE OF SUFFICIENT DEPTH TO PREVENT COLLAPSE OF THE CULVERT.
4. RAMPS SHALL BE CONSTRUCTED FROM COMPANY APPROVED LOCAL MINERAL SUBSOIL FREE OF ORGANICS OR OTHER DELETERIOUS MATERIAL.

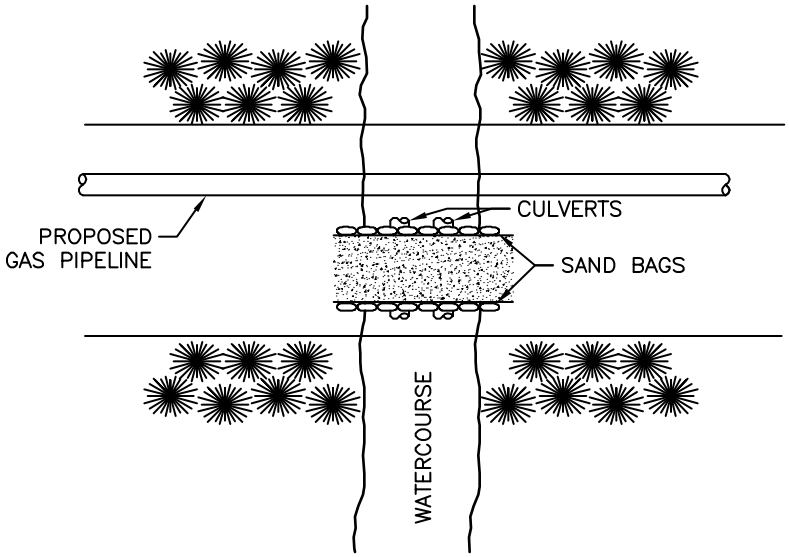
DRAFT 1 FERC APPLICATION
NOT FOR CONSTRUCTION

Appendix 1E CONST–13

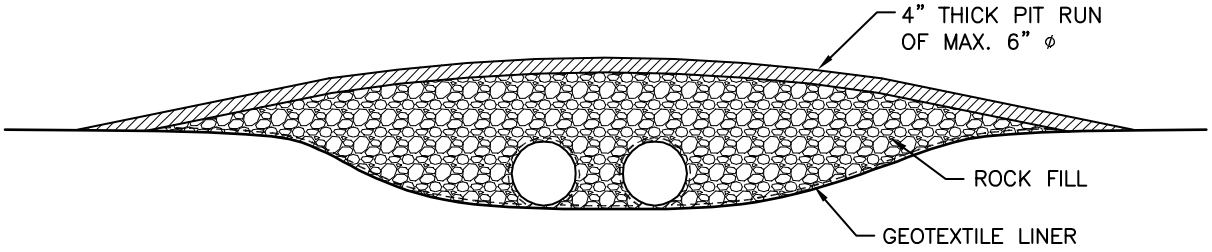
Alaska Pipeline Project

Construction Typicals – Equipment Crossing – Mat Rock/Culvert Bridge

Rev. D



PLAN VIEW



PROFILE VIEW

NOTES:

1. TO PROTECT THE STREAM BED, A GEOTEXTILE LINER SHALL BE LAID DOWN ON THE BED AND BANKS AFTER INSTALLING THE CULVERT BUT BEFORE PLACING ANY RAMP MATERIAL. GEOTEXTILE SHALL BE WIDE ENOUGH TO FOLD BACK INTO THE EDGE OF THE RAMP AT THE UPSTREAM AND DOWNSTREAM ENDS OF THE RAMP AND PREVENT ANY FILL FROM FALLING INTO THE STREAM. THE SIDES OF THE RAMP SHALL BE ARMOURED TO PROTECT IT FROM EROSION DURING HIGH STREAMFLOWS.
2. CULVERTS SHALL BE INSTALLED AS REQUESTED AND BE OF SUFFICIENT SIZE AND NUMBER TO HANDLE A ONE IN TWENTY YEAR STREAM FLOW. CULVERTS SHALL ALSO BE OF SUFFICIENT WALL THICKNESS AND GRADE TO HANDLE HEAVY LOADS.
3. RAMPS SHALL BE OF SUFFICIENT DEPTH TO PREVENT COLLAPSE OF THE CULVERT.
4. RAMPS SHALL BE CONSTRUCTED FROM APPROVED LOCAL MINERAL SUBSOIL FREE OF ORGANICS OR OTHER DELETERIOUS MATERIAL.
5. TOP COURSE OF 1" ROAD CRUSH MAY BE ADDED IF REQUIRED.

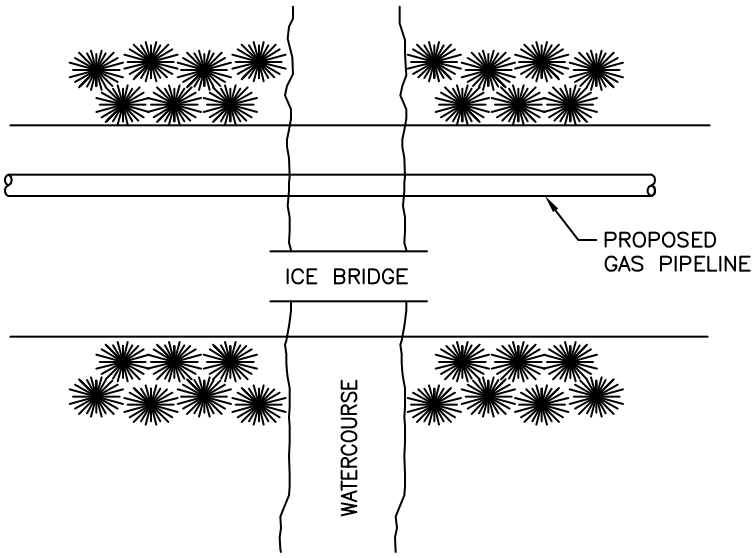
DRAFT 1 FERC APPLICATION
NOT FOR CONSTRUCTION

Appendix 1E CONST–14

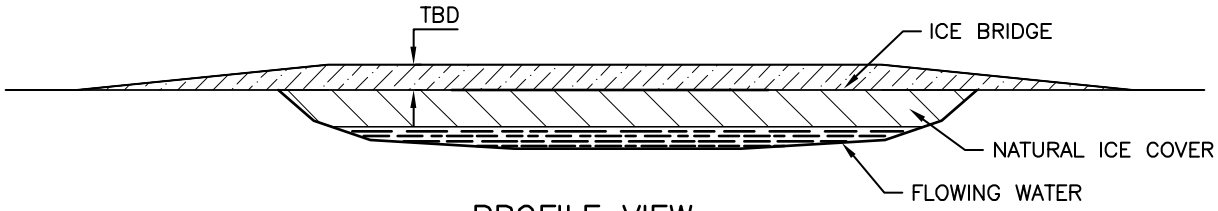
Alaska Pipeline Project

Construction Typicals – Equipment Crossing – Rock/Culvert Bridge

Rev. D



PLAN VIEW



PROFILE VIEW

NOTES:

1. USE ICE BRIDGES TO PROVIDE VEHICULAR ACCESS ACROSS FLOWING WATERCOURSES WITH SIGNIFICANT NATURAL ICE COVER.
2. WATER FROM WATERCOURSES (OR HAULED TO SITE, IF NECCESSARY) IS PUMPED ONTO THE PROPOSED ICE BRIDGE TO INCREASE THE LOAD–BEARING CAPACITY FOR HEAVY EQUIPMENT USE.
3. MONITOR ICE BRIDGE INTEGRITY DURING CONSTRUCTION ACTIVITIES, FLOOD AS REQUIRED TO MAINTAIN LOAD–BEARING CAPACITY.
4. PRIOR TO SPRING BREAK–UP AND TO MINIMIZE ICE JAMS AND POTENTIAL FLOODING, THE ICE BRIDGE IS CLEANED OF DEBRIS AND NOTCHED AT SEVERAL LOCATIONS.

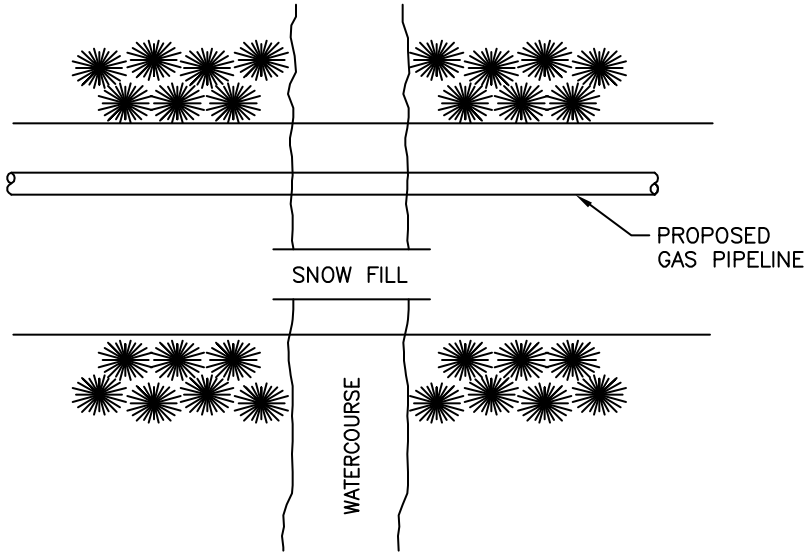
DRAFT 1 FERC APPLICATION NOT FOR CONSTRUCTION

Appendix 1E CONST–15

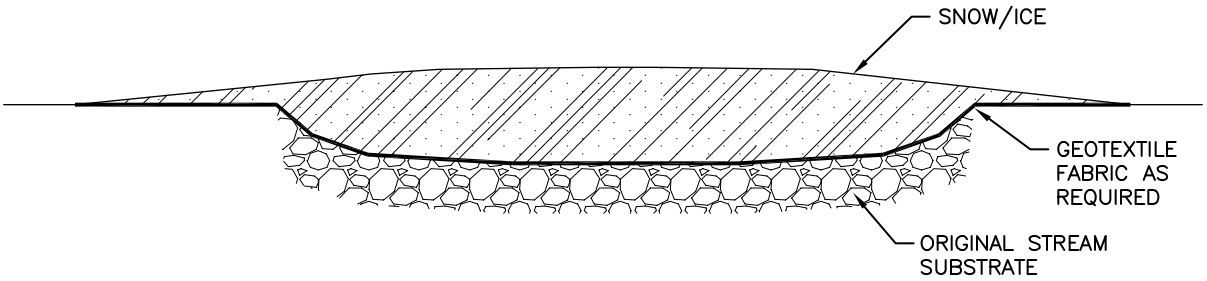
Alaska Pipeline Project

Construction Typicals – Equipment Crossing – Ice Bridge

Rev. C



PLAN VIEW



PROFILE VIEW

NOTES:

1. USE SNOW FILLS TO PROVIDE VEHICULAR ACCESS ACROSS WATERCOURSES WITH LITTLE OR NO FLOW.
2. CLEAN SNOW FROM ADJACENT AREAS IS PUSHED ONTO THE CROSSING LOCATION TO PROVIDE A LEVEL SURFACE FOR EQUIPMENT. IF THE SUPPLY OF CLEAN SNOW IS INADEQUATE, SNOW CAN BE PROVIDED BY SNOWMAKING MACHINES OR HAULED FROM NEARBY AREAS, SUCH AS LAKES.
3. PRIOR TO SPRING BREAK–UP AND TO MINIMIZE POTENTIAL FLOODING, THE SNOW FILL IS CLEARED OF DEBRIS AND V–NOTCHED.

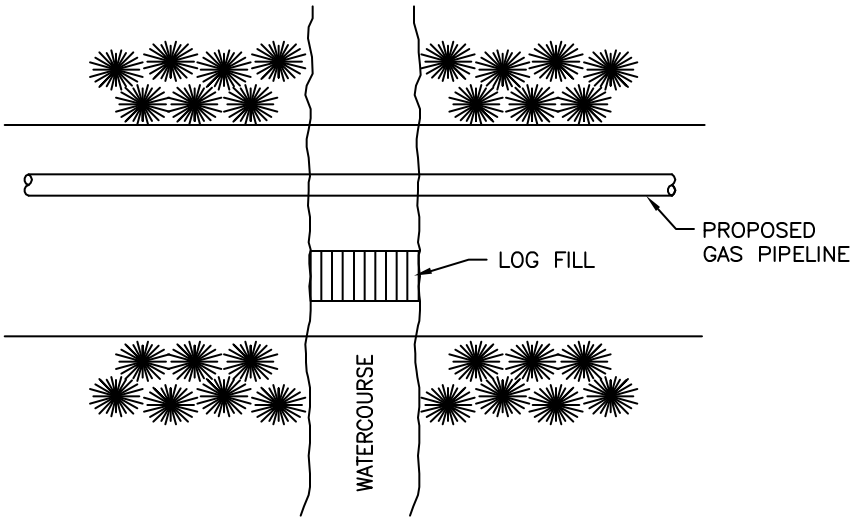
DRAFT 1 FERC APPLICATION NOT FOR CONSTRUCTION

Appendix 1E CONST–16

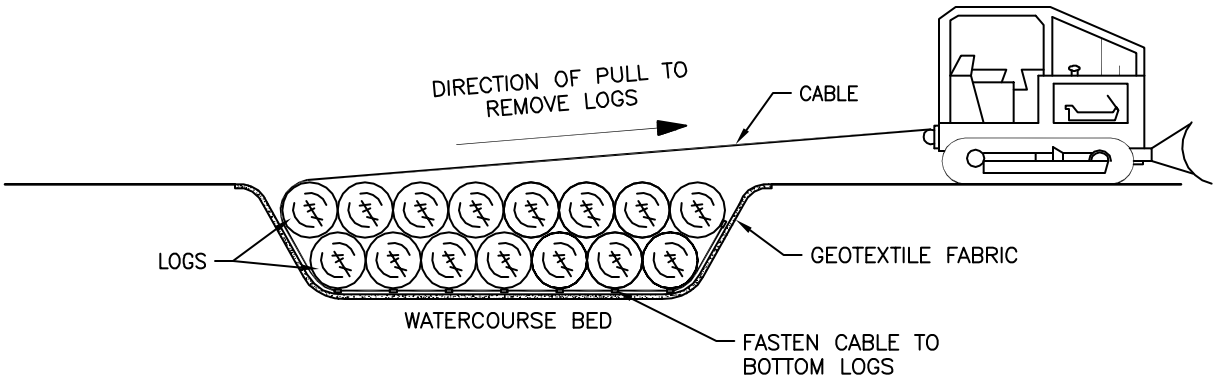
Alaska Pipeline Project

Construction Typicals – Equipment Crossing – Clean Snow Fill

Rev. D



PLAN VIEW



PROFILE

NOTES:

1. USE LOG FILL TO PROVIDE VEHICULAR ACCESS ACROSS SMALL WATERCOURSES WITH LITTLE OR NO FLOW.
2. THE LOGS ARE BUNDLED WITH CABLE TO FACILITATE EASY REMOVAL AND PLACED ONTO GEOTEXTILE FABRIC IN THE CHANNEL. THE GEOTEXTILE FABRIC IS THEN WRAPPED AROUND THE LOG FILL.
3. APPROVED MATERIAL (e.g. SWAMP MAT, SNOW, SOIL) IS PLACED OVER THE LOG FILL TO PROVIDE A STABLE DRIVING SURFACE.
4. REMOVE CROSSING AT COMPLETION OF CONSTRUCTION OR PRIOR TO SPRING BREAK–UP.
5. ENSURE WATERCOURSE IS CLEARED OF DEBRIS OR SOIL THAT MAY HAVE BEEN DEPOSITED DURING CONSTRUCTION ACTIVITIES.

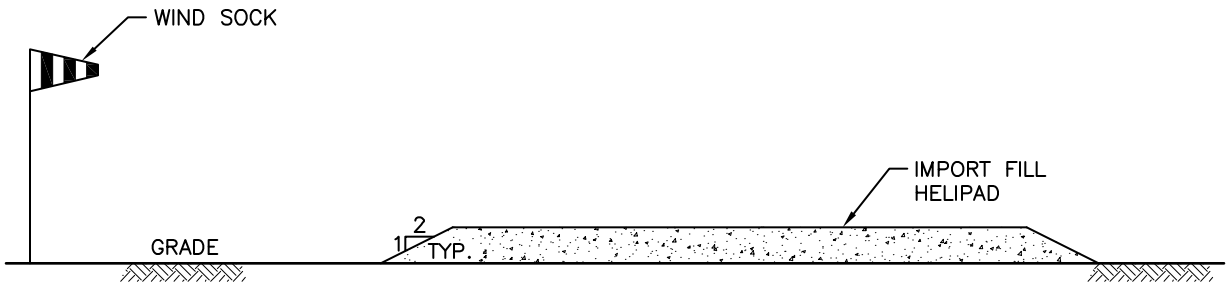
DRAFT 1 FERC APPLICATION
NOT FOR CONSTRUCTION

Appendix 1E CONST–17

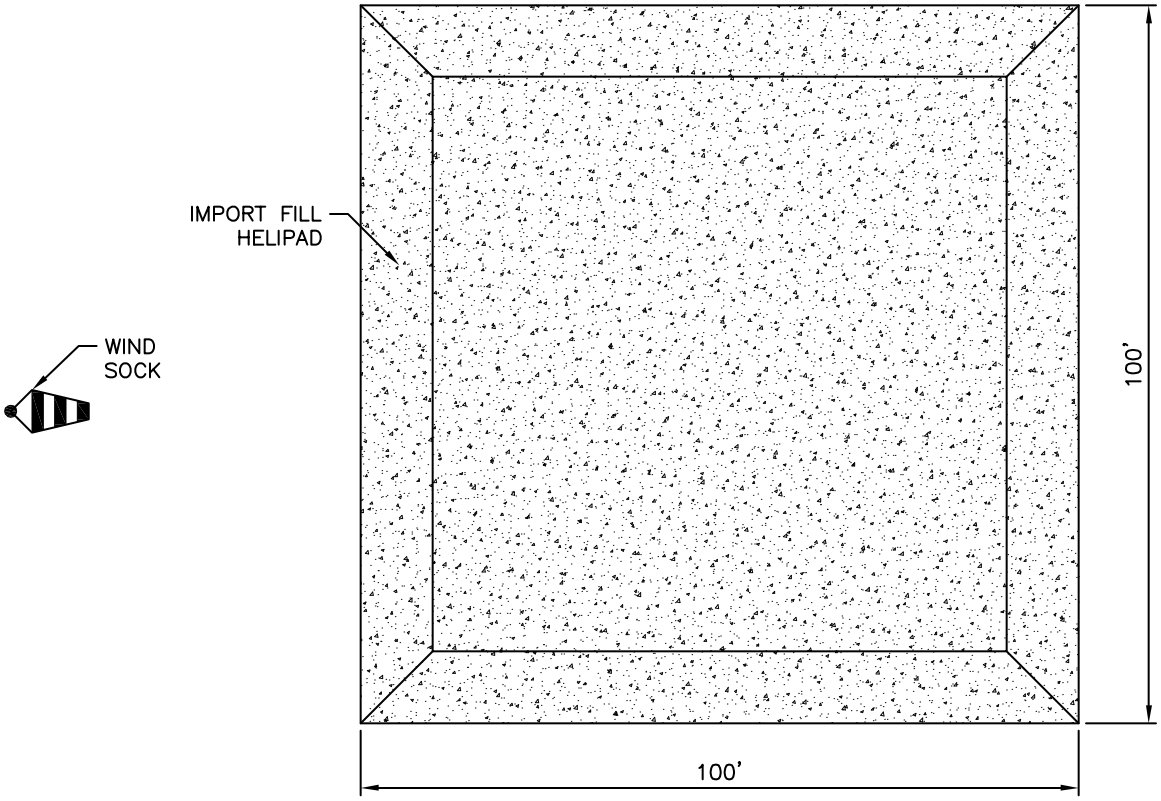
Alaska Pipeline Project

Construction Typicals – Equipment Crossing – Log Fill

Rev. D



PROFILE



PLAN

NOTE:

1. HELIPAD THICKNESS WILL DEPEND ON LOCAL GROUND CONDITIONS.

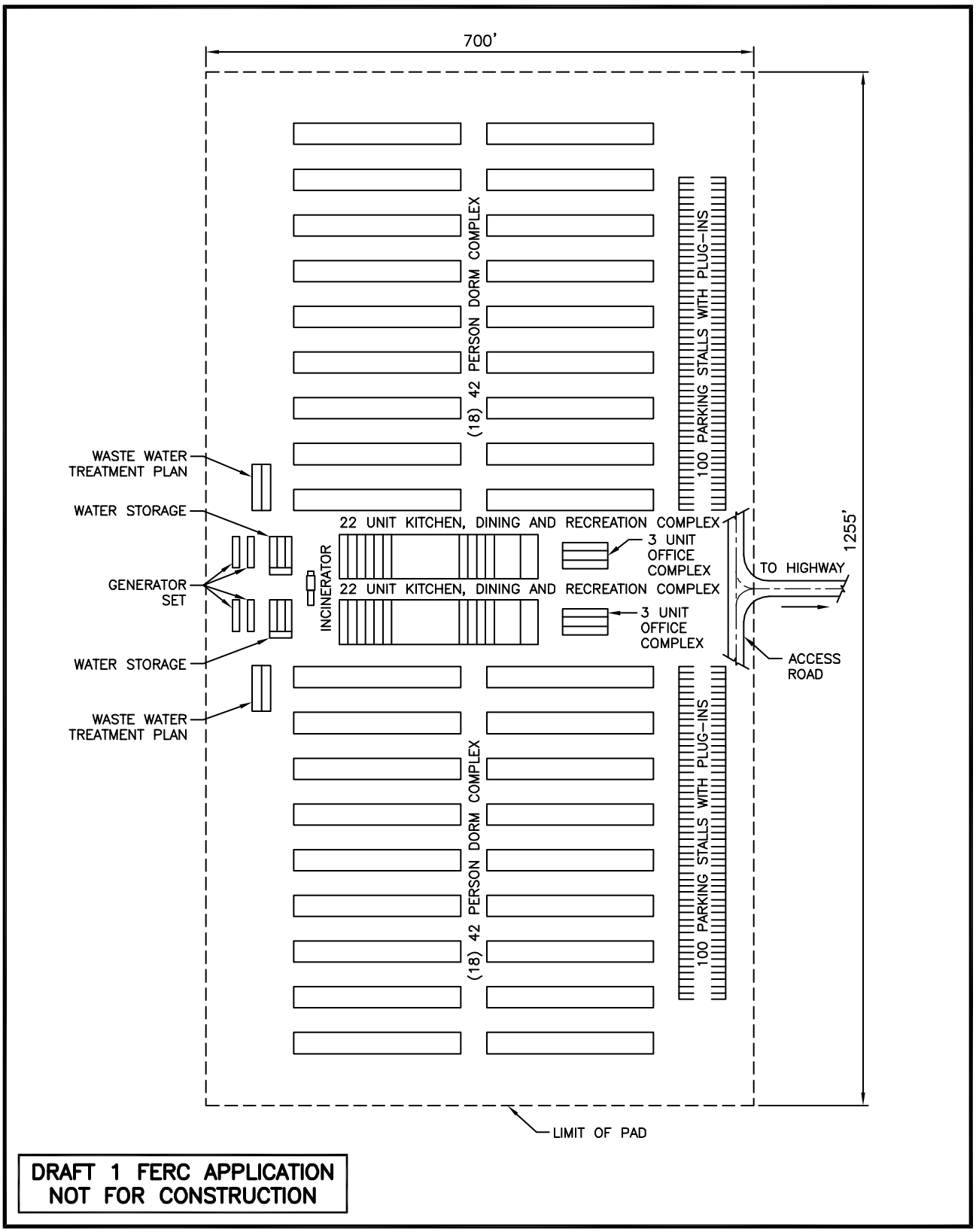
DRAFT 1 FERC APPLICATION NOT FOR CONSTRUCTION

Appendix 1E CONST–20

Alaska Pipeline Project

Construction Typicals – Helipads

Rev. F



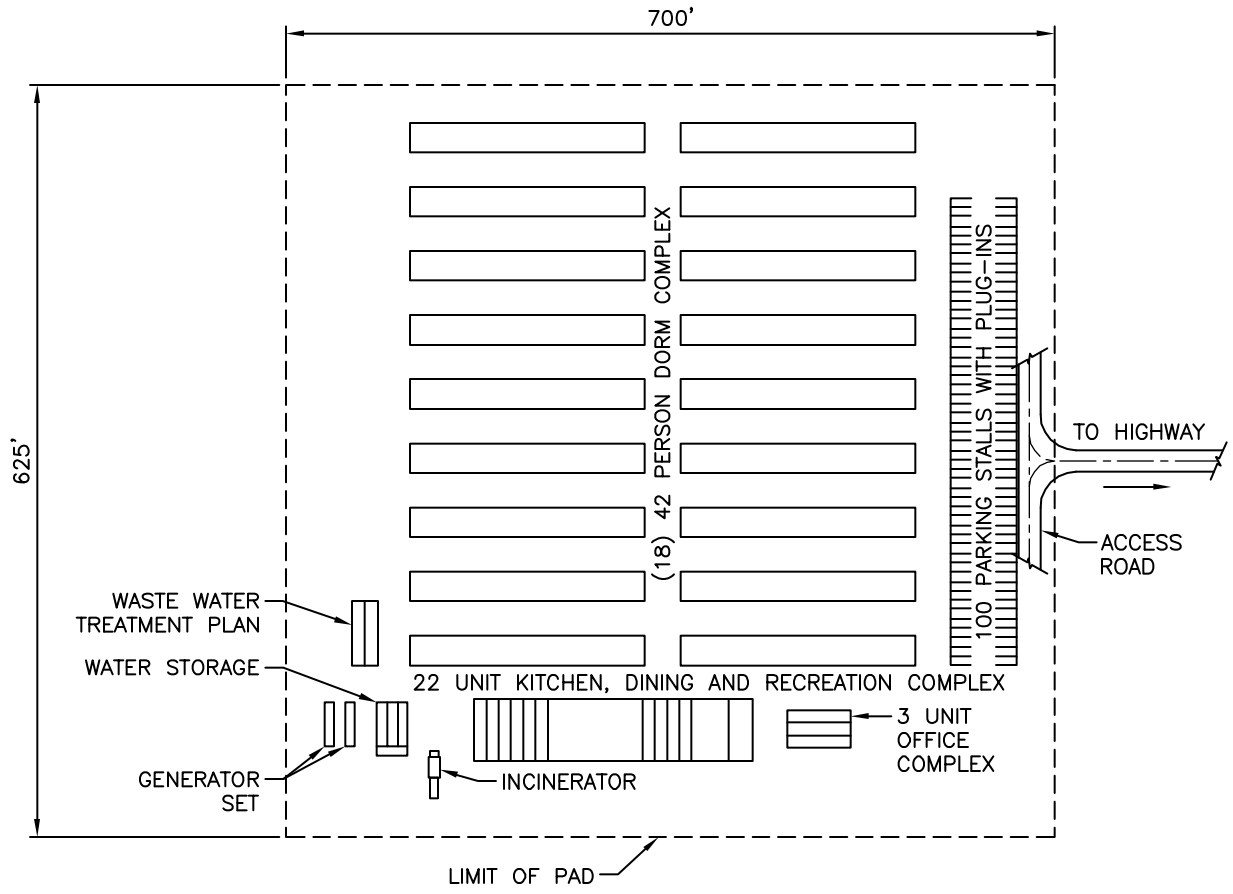
Appendix 1E CONST–22A

Alaska Pipeline Project

Construction Typicals – 1500 Person Camp – 20 Acres

Rev. C

DRAFT



DRAFT 1 FERC APPLICATION NOT FOR CONSTRUCTION

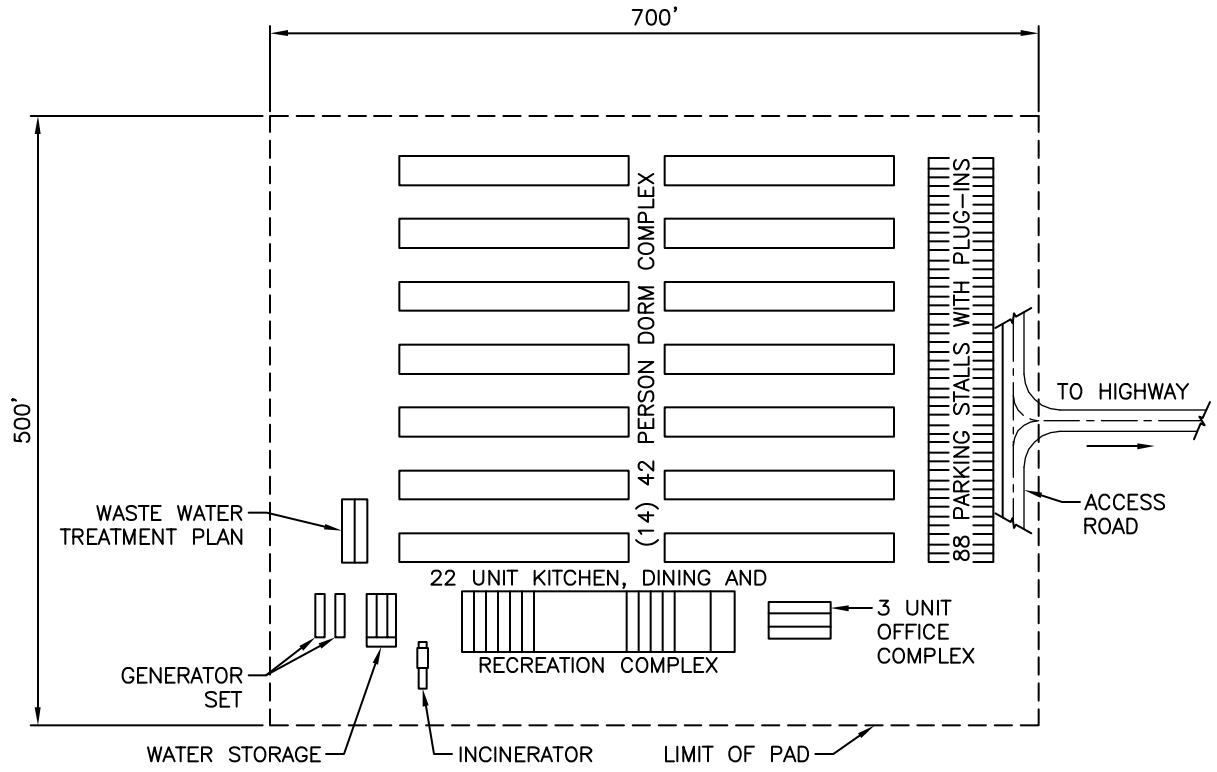
Appendix 1E CONST–22B

Alaska Pipeline Project

Construction Typicals – 750 Person Camp – 10 Acres

Rev. C

DRAFT



DRAFT 1 FERC APPLICATION NOT FOR CONSTRUCTION

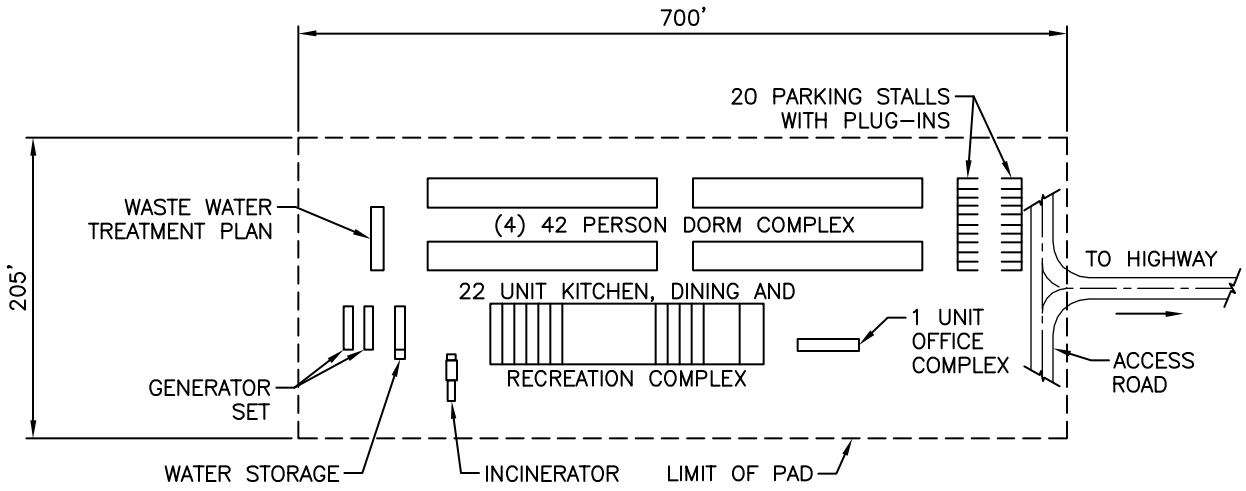
Appendix 1E CONST–22C

Alaska Pipeline Project

Construction Typicals – 500 Person Camp – 8 Acres

Rev. C

DRAFT



DRAFT 1 FERC APPLICATION
NOT FOR CONSTRUCTION

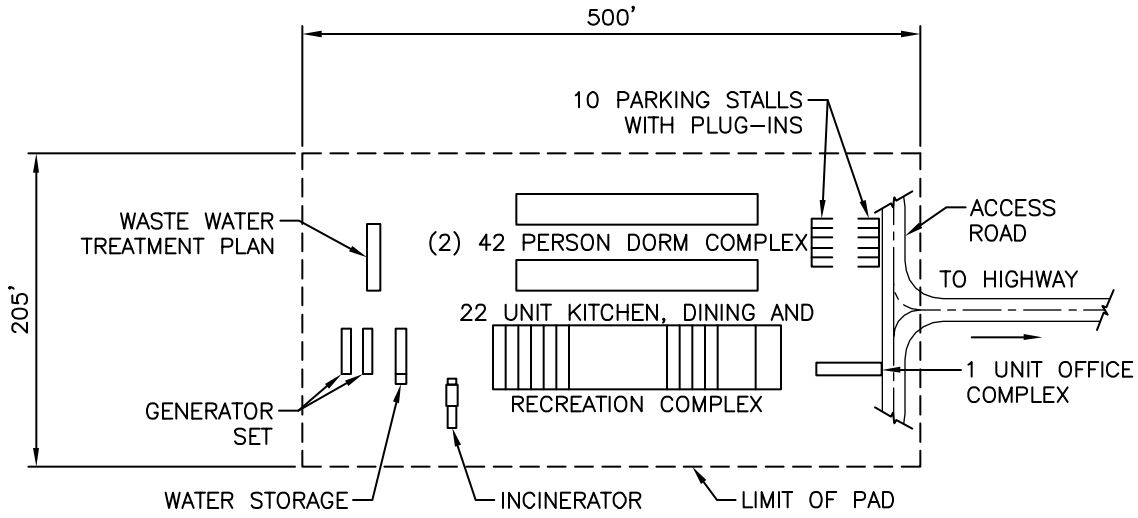
Appendix 1E CONST-22D

Alaska Pipeline Project

Construction Typicals – 150 Person Camp – 3 Acres

Rev. C

DRAFT



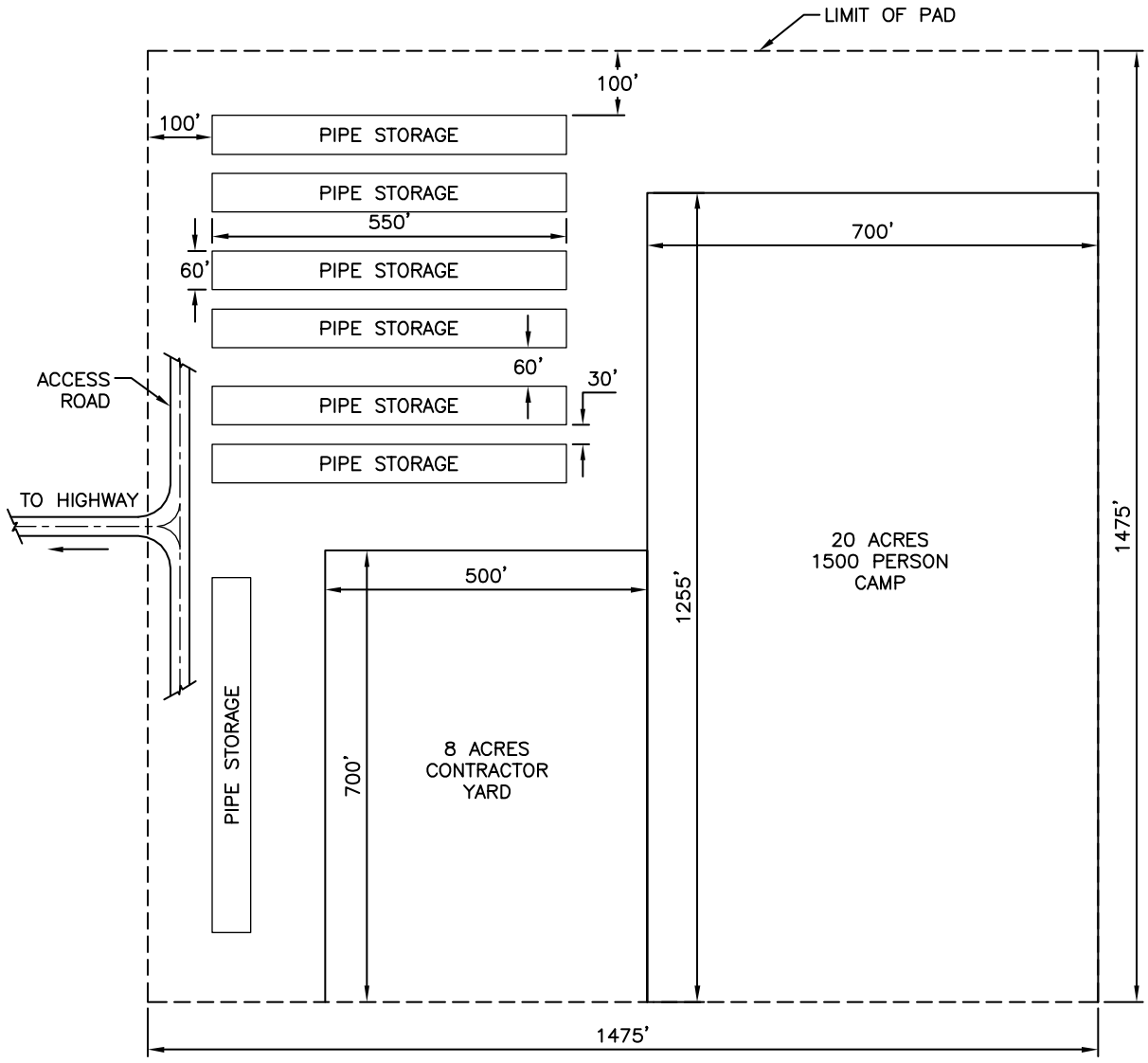
DRAFT 1 FERC APPLICATION
NOT FOR CONSTRUCTION

Appendix 1E CONST-22E

Alaska Pipeline Project

Construction Typicals – 50 Person Camp – 2 Acres

Rev. C



50 ACRES TOTAL

DRAFT 1 FERC APPLICATION NOT FOR CONSTRUCTION

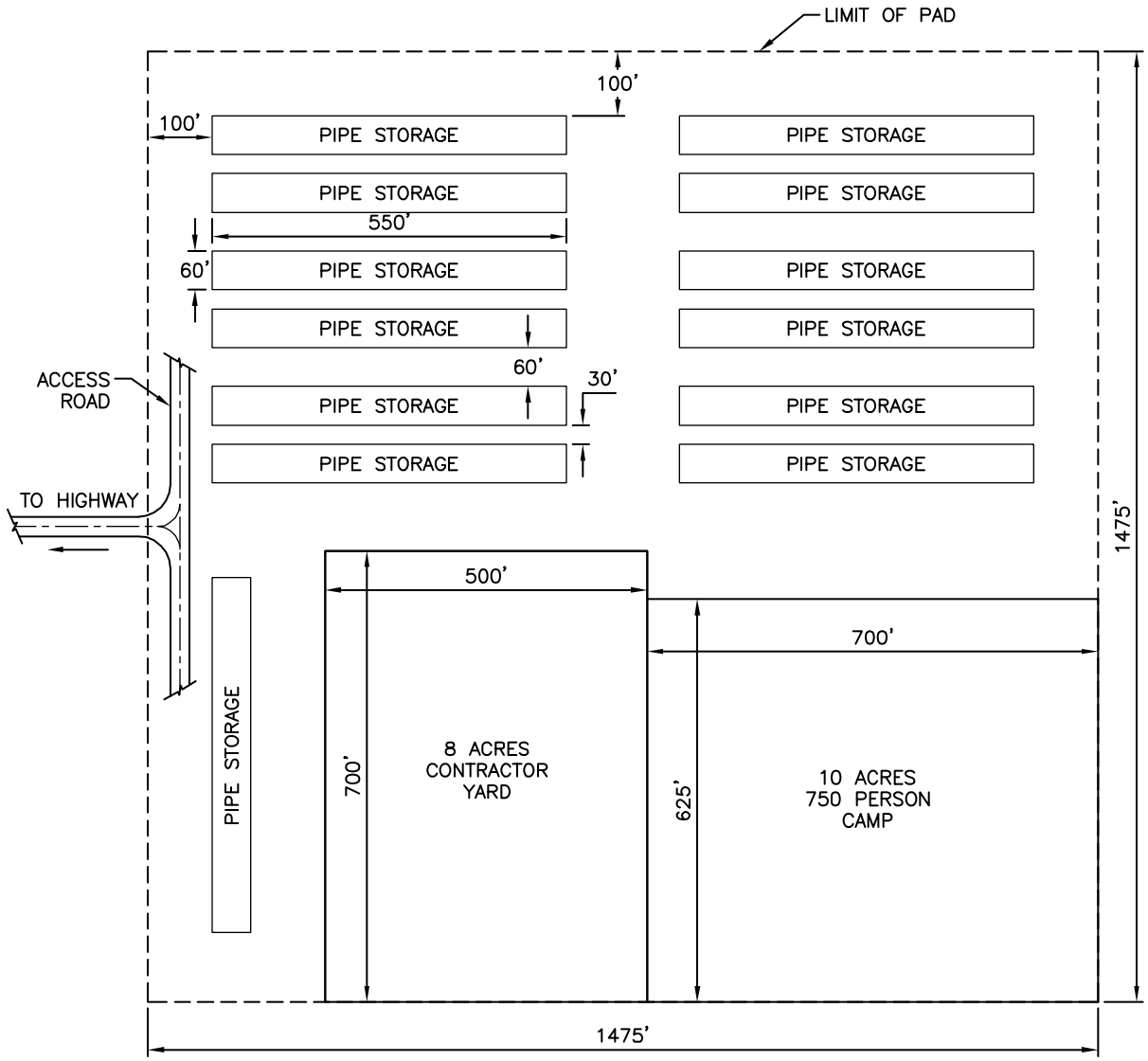
Appendix 1E CONST–23A

Alaska Pipeline Project

Construction Typicals – Pipe Storage/Camp/Contractor Yard – Option 1

Rev. C

DRAFT



50 ACRES TOTAL

DRAFT 1 FERC APPLICATION NOT FOR CONSTRUCTION

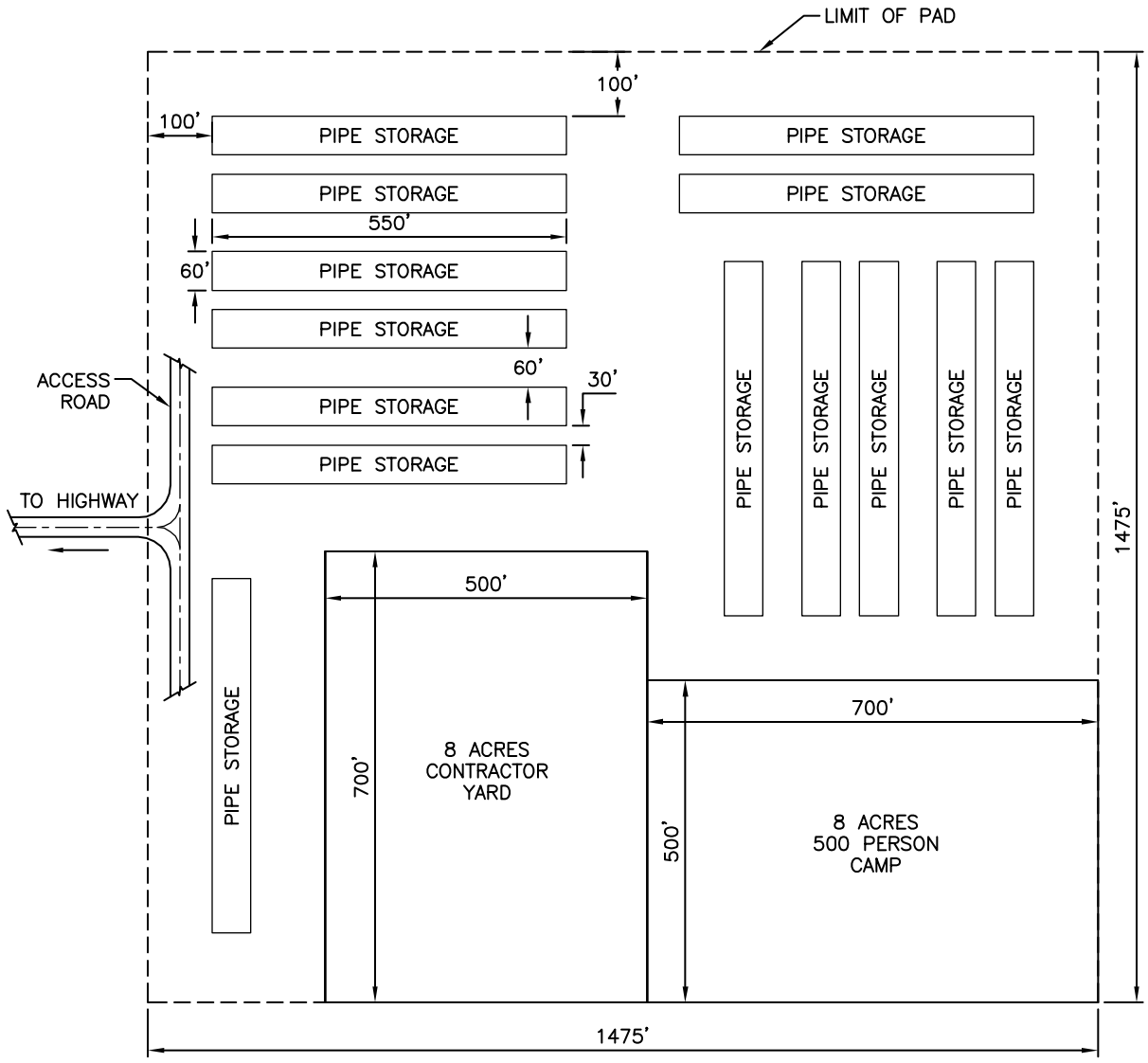
Appendix 1E CONST–23B

Alaska Pipeline Project

Construction Typicals – Pipe Storage/Camp/Contractor Yard – Option 2

Rev. C

DRAFT



50 ACRES TOTAL

DRAFT 1 FERC APPLICATION NOT FOR CONSTRUCTION

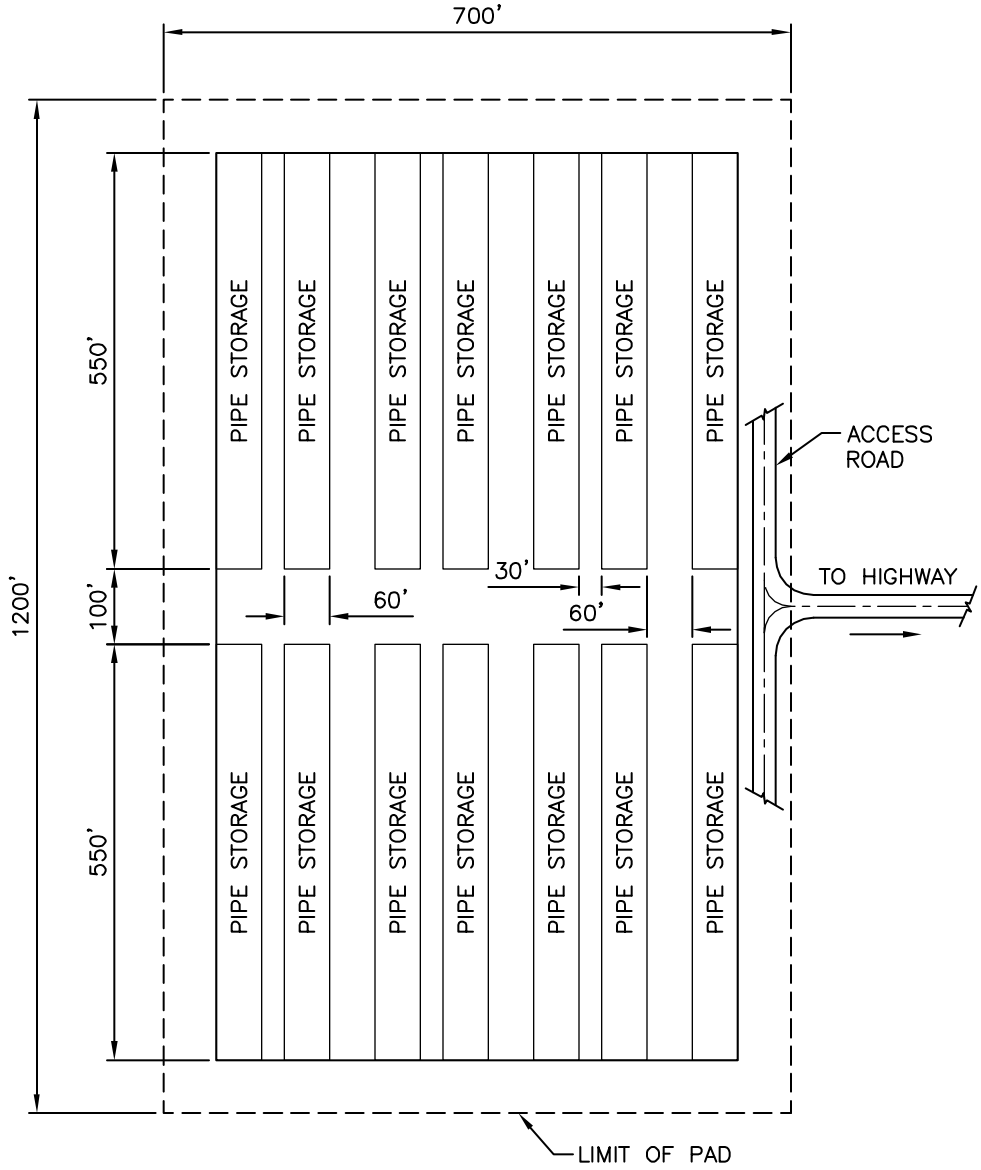
Appendix 1E CONST–23C

Alaska Pipeline Project

Construction Typicals – Pipe Storage/Camp/Contractor Yard – Option 3

Rev. C

DRAFT



DRAFT 1 FERC APPLICATION NOT FOR CONSTRUCTION

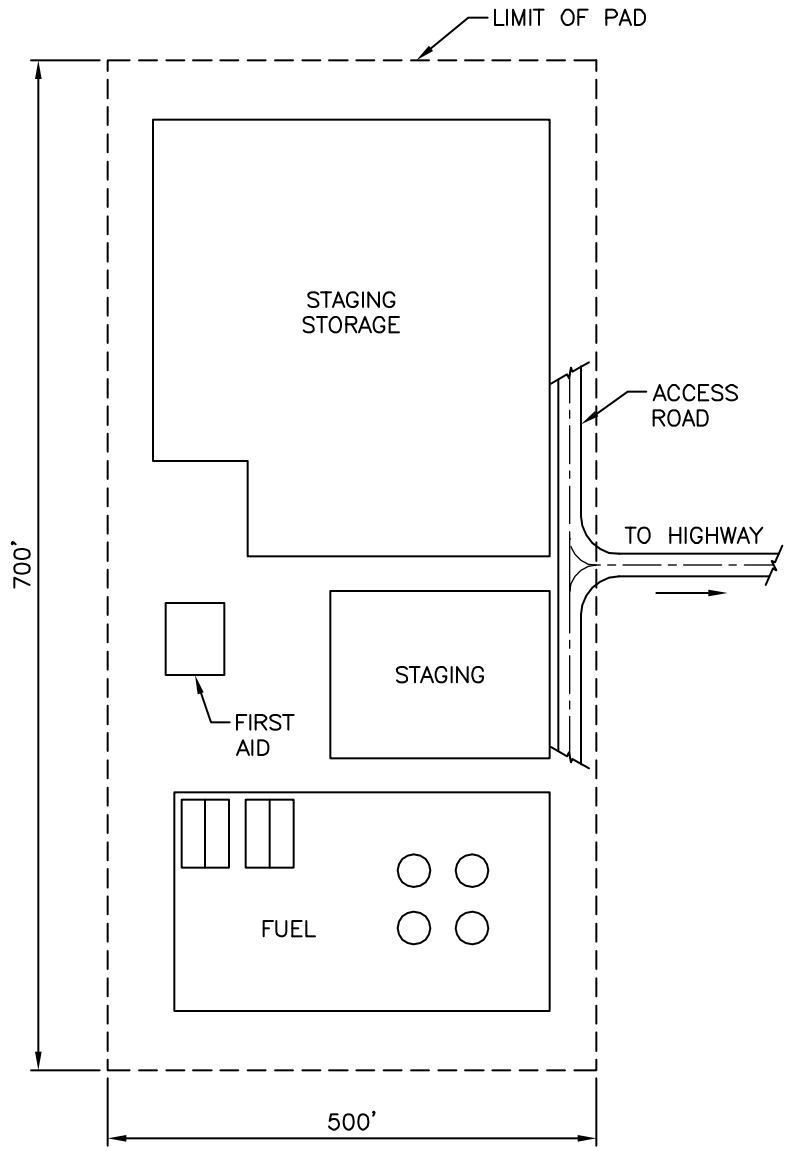
Appendix 1E CONST–23D

Alaska Pipeline Project

Construction Typicals – Stand Alone Pipe Storage Yard – 20 Acres

Rev. B

DRAFT



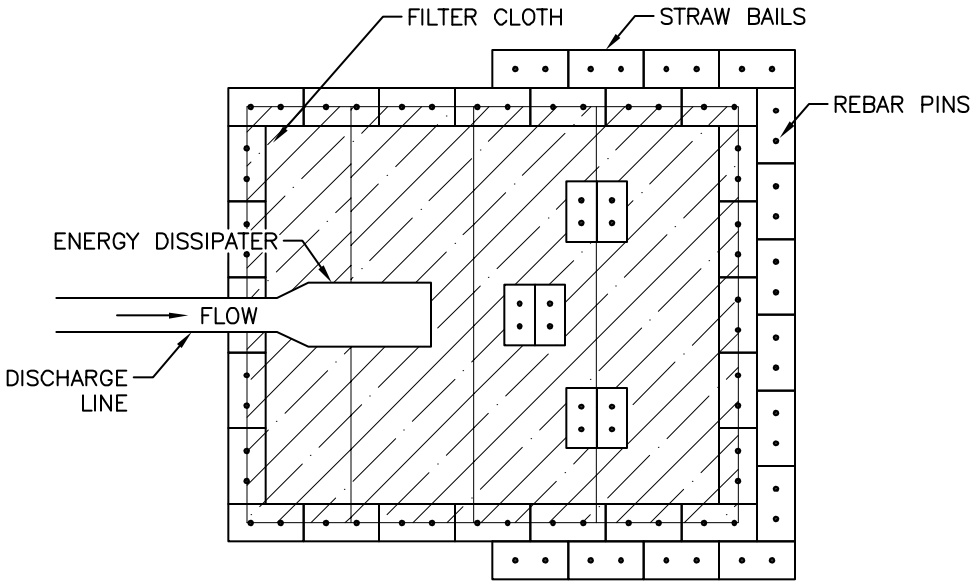
DRAFT 1 FERC APPLICATION
NOT FOR CONSTRUCTION

Appendix 1E CONST–24

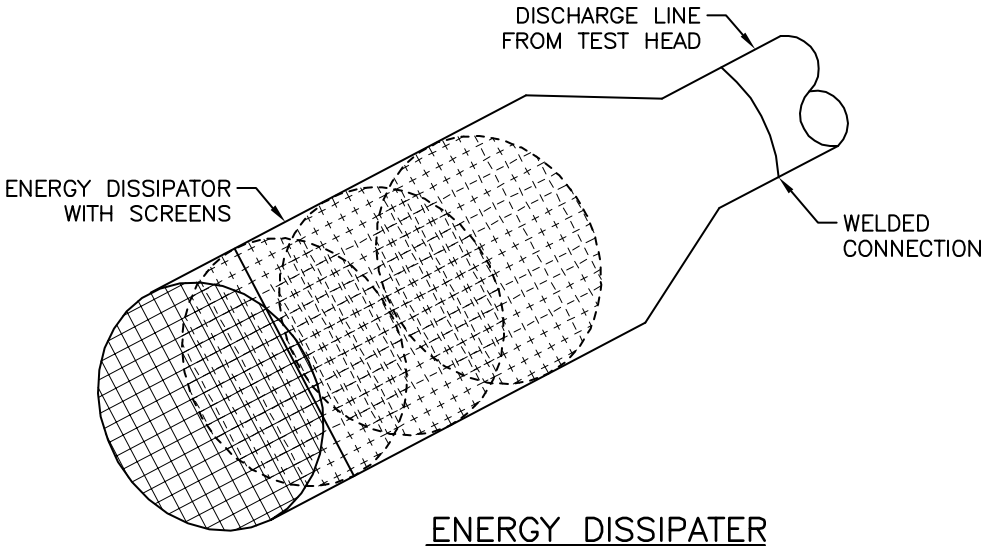
Alaska Pipeline Project

Construction Typicals – Stand Alone Contractor Yard – 8 Acres

Rev. C



PLAN



ENERGY DISSIPATER

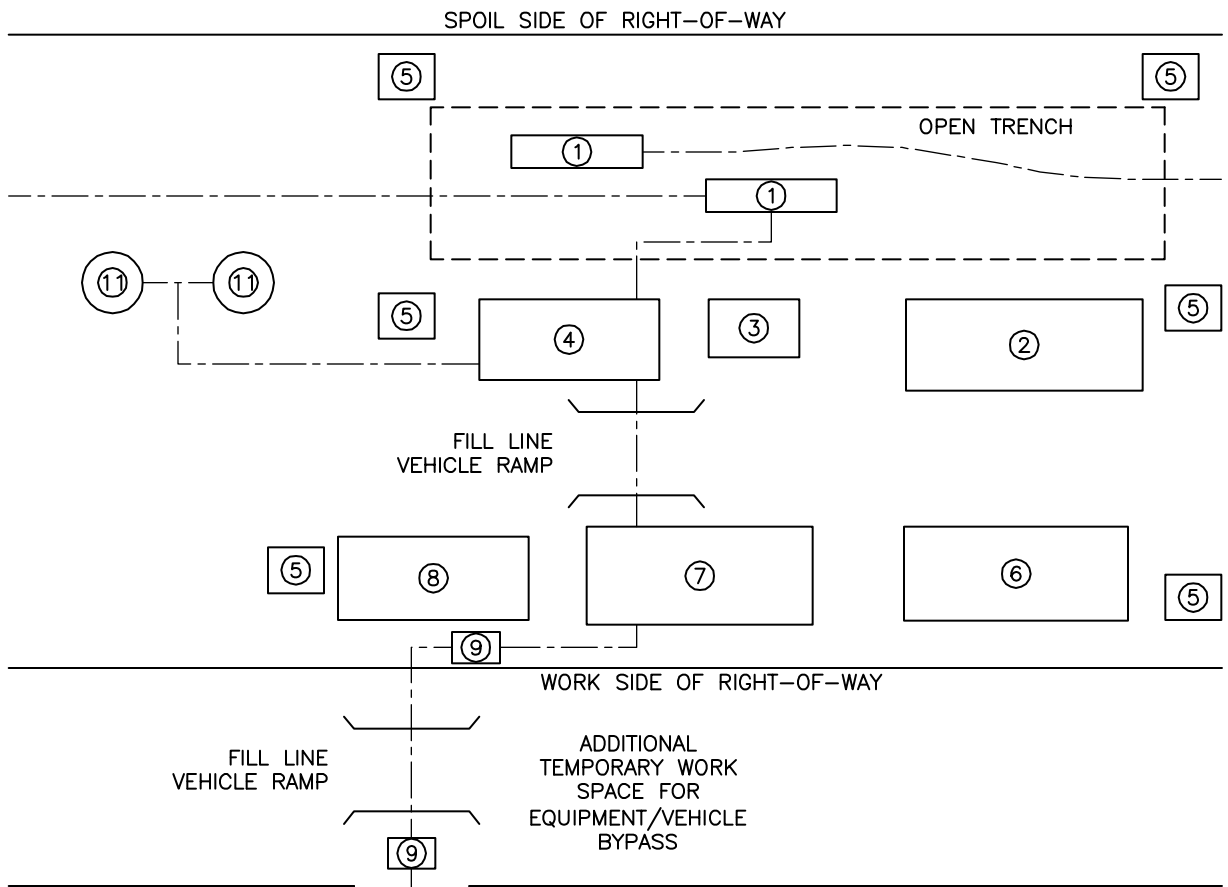
DRAFT 1 FERC APPLICATION NOT FOR CONSTRUCTION

Appendix 1E CONST–33

Alaska Pipeline Project

Construction Typicals – Typical Water Discharge Site

Rev. C



NOTE:

1. FOR WINTER TESTING OPEN TRENCH, FILL LINE AND PUMPS MAY BE HOARDED AND HEATED.

LEGEND:

1. TEST HEAD
2. TEST SHACK
3. SQEEZE PUMP
4. FILL PUMP
5. LIGHT STANDS
6. MECHANICAL TRAILER
7. BOILER TRAILER (WINTER – IF REQUIRED)
8. FUEL TRAILER
9. BOOSTER PUMPS
10. WATER INTAKE
11. FREEZE DEPRESSANT TANKS (WINTER – IF REQUIRED)

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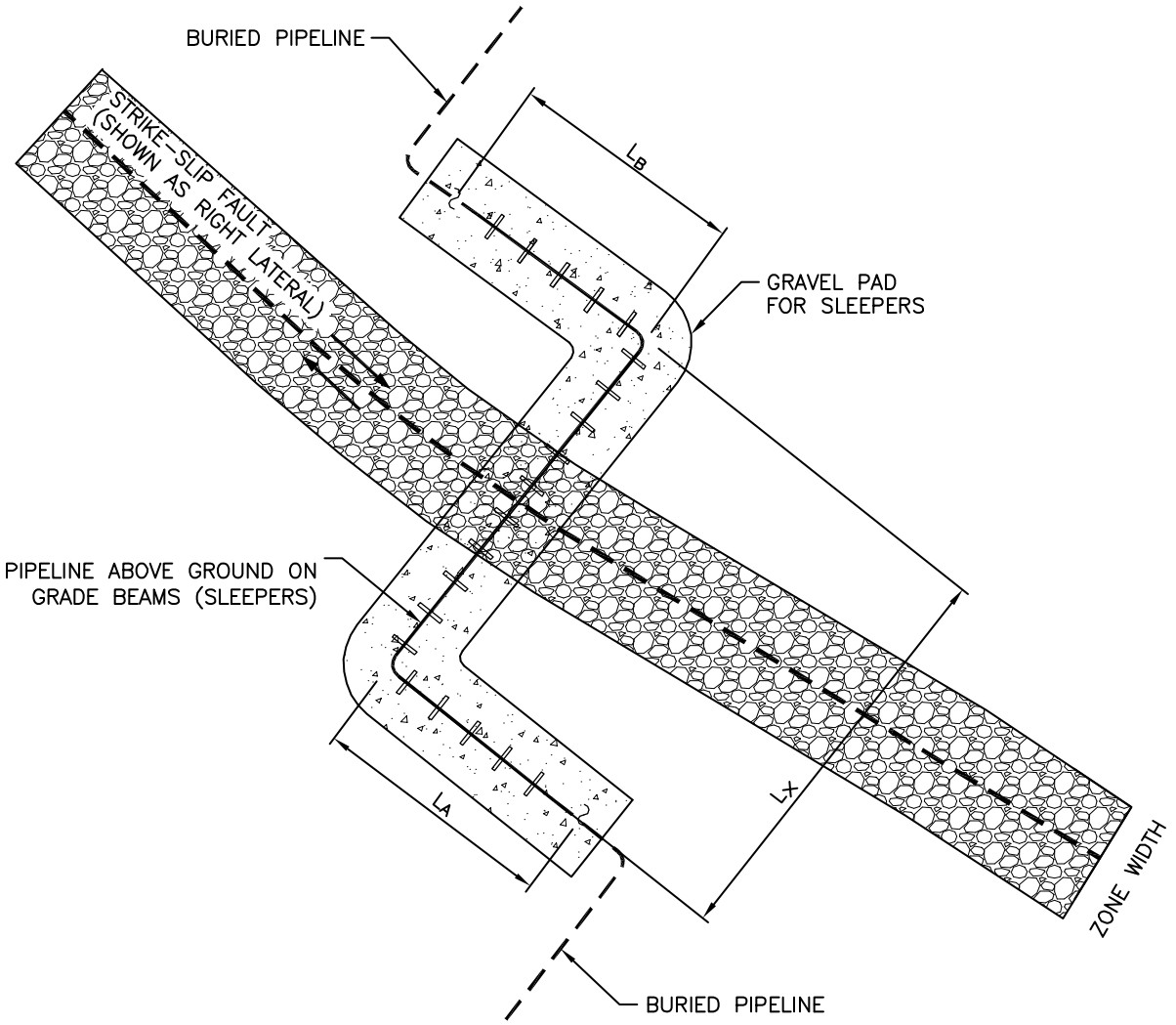
Appendix 1E CONST–34

Alaska Pipeline Project

Construction Typicals – Hydrostatic Test Point

Rev. D

DRAFT



NOTES:

1. "ZEE" CONFIGURATION MAY BE OPPOSITE HAND.
2. DESIGN PARAMETERS TO BE DETERMINED ON A SITE SPECIFIC BASIS INCLUDE:
   - TRANSITION LEGS, L_A AND L_B
   - CROSSING LEG, L_X
   - SLEEPER SPACING
   - SLEEPER BEAM LENGTH
   - PIPE SHOE LENGTH
   - TYPE AND THICKNESS OF GRANULAR PAD TO SUPPORT SLEEPERS

DRAFT 1 FERC APPLICATION
NOT FOR CONSTRUCTION

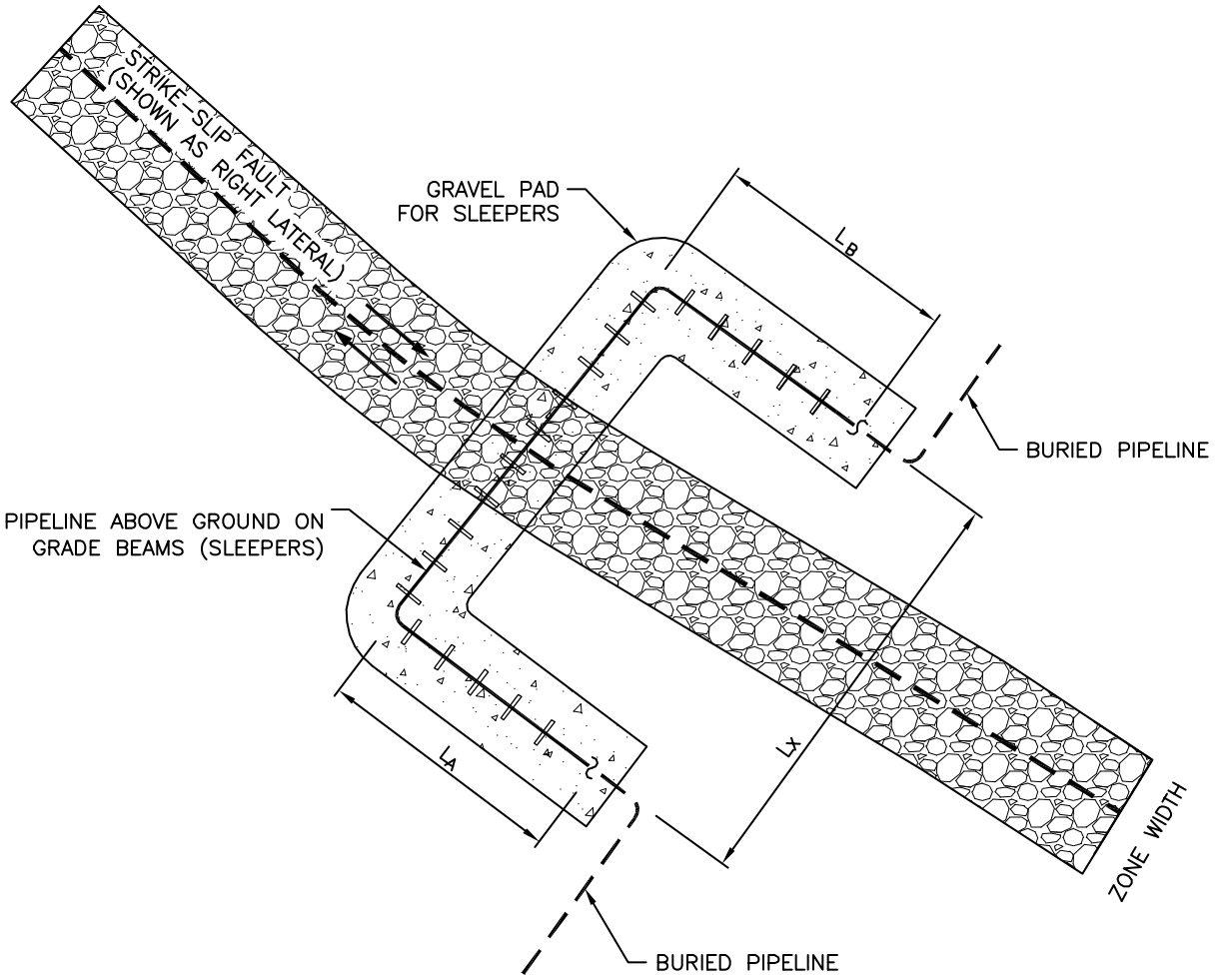
Appendix 1E FAULT–01

Alaska Pipeline Project

Conceptual "Zee" Fault Crossing Design – Strike–Slip Faults

Rev. C

DRAFT



NOTES:

1. "U" CONFIGURATION MAY BE OPPOSITE HAND.
2. DESIGN PARAMETERS TO BE DETERMINED ON A SITE SPECIFIC BASIS INCLUDE:
   - TRANSITION LEGS, L_A AND L_B
   - CROSSING LEG, L_x
   - SLEEPER SPACING
   - SLEEPER BEAM LENGTH
   - PIPE SHOE LENGTH
   - TYPE AND THICKNESS OF GRANULAR PAD TO SUPPORT SLEEPERS

DRAFT 1 FERC APPLICATION
NOT FOR CONSTRUCTION

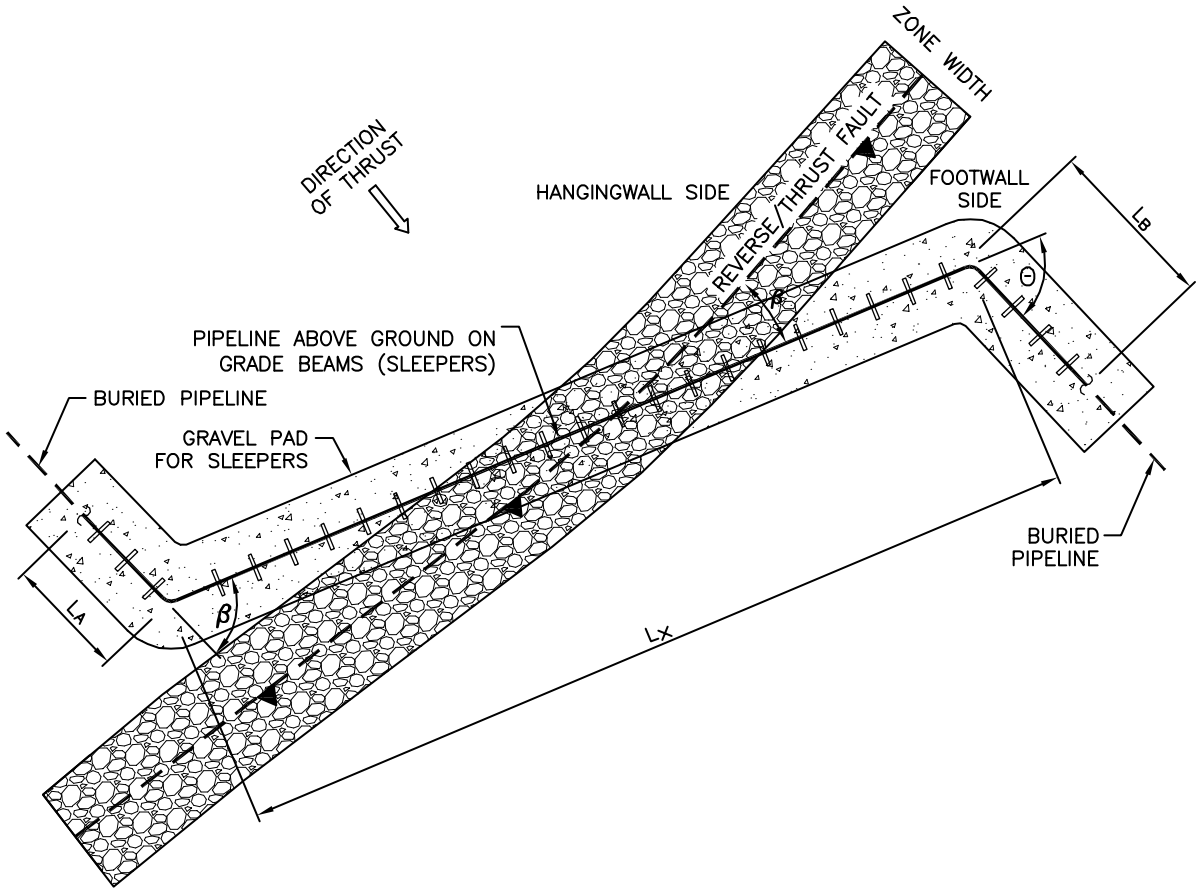
Appendix 1E FAULT–02

Alaska Pipeline Project

Conceptual "U" Fault Crossing Design – Strike–Slip Faults

Rev. C

DRAFT



NOTES:

1. "ZEE" CONFIGURATION MAY BE OPPOSITE HAND.
2. DESIGN PARAMETERS TO BE DETERMINED ON A SITE SPECIFIC BASIS INCLUDE:
   - TRANSITION LEGS, L_A AND L_B
   - CROSSING LEG, L_X
   - SLEEPER SPACING
   - SLEEPER BEAM LENGTH
   - PIPE SHOE LENGTH
   - TYPE AND THICKNESS OF GRANULAR PAD TO SUPPORT SLEEPERS
   - INTERSECTION ANGLE, β
   - BEND ANGLE, Θ

DRAFT 1 FERC APPLICATION NOT FOR CONSTRUCTION

Appendix 1E FAULT–03

Alaska Pipeline Project

Conceptual "Zee" Fault Crossing Design – Reverse or Thrust Faults

Rev. C