Appendix 4-2 Segment Route Comparison Matrices

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Segment	Route Option	General Route Description	Terrain Description	Segment Length [miles]	Significant Engineering Obstacles		idromo Wetl	No. of Major Road Road Rear feet) Crossings	No. of Railroad	Approx. Length i on New Workpad	Rating (0 = Lowest, 5 = Highest)	Permitti	Rating (0 = Lowest, 5 = Highest)	Affected Environment	Impacts	Rating (0 = Lowest, 5 = Highest)	Rating (0 = Lowest, 5 = Highest)	Engr 25.00%	Permits 25.00%	Socio-Eco	n ROW
Fairbanks Exits (all end at common location along Parks Highway outside of Fairbanks)	3		in the Tanana Flats. The subsurface probably consists of thick, fine-grained soils, locally thick deposits of organics, over coarse-grained alluvial deposits.	24	Chens River Crossing	25	1	66072 0			1.0	This route has a large number of stream crossings and a very large amount of potentially impacted wetlands. However, overall permitting issues and concerns generally are not substantially different between the route options. A full martix of potential permits required for the project can be found in Appendix 4-1.	1.5	avian species present; no endangered species; Human:	on clearing vegetation; avoidance of known nesting areas; <u>Human</u> : Expansion of Related & Added value Business West of Fairbanks Area; Permitting Challenges Through DoD Land;	2.5	1.5		1.	6	
	ANGDA	Road). Route continues from Ester Dome Road due south approximately 5-miles before joining the Parks Hwy.	segment, the subsurface consists	23.9		8	0 1	13853.3 2	1		2.5	Stream crossings are above average and potentially impacted wethands are significant. Overall permitting issues and concerns are not substantially different between the route options. A full matrix of potential permits required for the project can be found in Appendix 4-1.		tundra, high shrub thicket and spruce-hardwood forest; one anadromous stream; moose, bear,	on clearing vegetation; avoidance of known nesting areas; <u>Human</u> : Expansion of Related & Added value Business West of Fairbanks Area; Permitting Challenges Through DoD Land;	2.5	1.5		2.	3	
	Alternate #	H		27.6		7	0 2	27342.8 0	1		3.5	Stream crossings are below average and potentially impacted wethands are slightly above average. Overall permitting issues and concorns are not substantially different between the route options. A full matrix of potential permits required for the project can be found in Appendix 4-1.	2.5	Physical: Continental climate; seismically active; permafrost present; wetlands present; Biological: Bog-muskeg, alpine tundra, high shrub thicket and spruce-hardwood forest; one anadromous stream; moose, bear, caribou, sheep, furbearing and avian species present; no endangered species; Human: FNSB, AK Fish & Game Dept, FNSB Area Community Councils, FNSB, AK Fish & Game Dept, FNSB Area Community Councils, FSB, AK Fish & Game Dept, FNSB, AK Fish & Game Community Councils, FNSB, AK Fish & Game Dept, FNSB	on clearing vegetation; avoidance of known nesting areas; <u>Human</u> : Expansion of Related & Added value Business West of Fairbanks Area; Permitting Challenges Through DoD Land;	2.5	4.0		3.	1	
	Alternate #	112		25.7		17	0 1	11513.1 0	1		3.0	Stream crossings are above average and potentially impacted wetlands are below average. And overall permitting issues and concerns are not substantially different between the route options. A full matrix of potential permits required for the project can be found in Appendix 4-1.	2.5	Physical: Continental climate; seasonically active permarkost present; wetlands present; Biological: Boognuskes, alpine tundra, high shrub thicket and spruce-hardwood forest; one anadromous stream; moose, bear, caribou, sheep, furbearing and avian species present; no endangered species; Human; FNSB, AK Fish & Game Dept; FNSB Area Community Councils, US Department of Defense; City of Morth Pole; University of Alassic, Fairbanks International Airport; FL Walmwright; Maska Railroad; Fairbanks Chamber of Commerce & Local Businesses	on clearing vegetation; avoidance of known nesting areas; <u>Human</u> : Expansion of Related & Added value Business West of Fairbanks Area; Permitting Challenges Through DoD Land;	2.5	2.5		2.	6	

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			<u> </u>					Engineering					Permitti	ina		Socio Economic		Right-of-Way		Weight	ina	
	Route			Segment	Significant Engineering		Crossings Anadromous	Wetland Areas	No. of Major	No. of Railroad	Approx.	Rating	remitu	Rating		Socio Economic	Rating	Rating	Engr	Permits S	Socio-Econ	ROW
Segment	Option	General Route Description	Terrain Description	Length [miles]	Obstacles	Total Number	Fish	(linear feet)	Road Crossings	Crossings	Workpad	Highest)	Permitting Analysis	Highest)	Affected Environment	Impacts	Highest)	Highest)	25.00%	25.00%	25.00%	25.00%
Ester to Nenana	Denail	continues south through the Bonanza Creek Experimental Forest. After approximately 20-miles the route deviates to the GVEA powerline to the east of the Parks and follows it into Nenana. The final leg into Nenana requires a crossing of the	throughout the floodplains (near Tanana at both FBX and Nenana). Silts overlying bedrock in the elevated portions between Ester and Nenana. Discontinuous permafrost exists for the entire	38.6	Tanana River Crossing	24	,	4639.2 Partial Wetlands	12	4	55%	3.5	Stream crossings are above average and potentially impacted wetlands are below average. Overlai permitting issues and concerns are not between the route options. A full matrix of potential permits required for the project can be found in Appendix 4-1.	2.5	active; permafrost present; wetlands present <u>Biological</u> : Bog-muskeg, alpine tundra, high shrub thicket and spruce-hardwood forest; two anadromous streams; moose, bear, caribou, sheep, furbearing and avian species reseat; no endangered species; Human;	selsmicity; <u>Biological</u> ; recreational & subsistence harvests of fish & game; Migratory Bird Act restrictions on clearing vegetation; avoidance of known nesting areas; <u>Humar</u> ; 1. Expansion of Related & Added Value Business in West of Fairbanks Area; 2. Construction Impacts & Power Use	3.0	2.0		2.8	•	
	ANGDA	ANODA Route (2005) - The route travels south to Nenana within the Parks Hay ROW. The route would deviate SW from the Parks just not of Nenana and cross the Tannas River, then east and cross the Nenana River before rejaining the Parks Hay ROW just south of Nenana.	In northern portion of segment, subsurface consists of thick, re-transported, fine-grained soils over allival deposits and bedrock. South of Chatanika River are thick deposits of organics and lists with fine-grained colo		Tanana River Crossing, Nenana River Crossing	8	1	2666.5 (Partial Wetlands)	12	3	5%	3.5	Stream crossings are below average and potentially impacted wetlands are below average. Overall permitting statuses and concerns are not between the route options. A full matrix of potential permits required for the project can be found in Appendix 4-1.	3.5	caribou, sheep, furbearing and avian species present; no endangered species; <u>Human:</u> FNSB, Ester, Berg, Nenana, AK Fish & Game Dept., Forest Service, FNSB Area Community	; extreme cold, permafrost, wetlands and seismicity; <u>Biological:</u> recreational & subsistence harvests of fish & game; Migratory Bird Act restrictions on clearing	3.5	3.0		3.4		
	Parks Hwy	the Parks Highway leaving Fairbanks travels wast from town, passing through Eather before clinibing up into the hills southwest of town. The highway follows the gently rolling hills southwest of town. The highway follows the gently rolling hills sportionately 50-miles in a southwestern direction before reaching the banks of the Tanana River. The Parks then follows the bank of the Tanana parkers muttil just past the mouth of the Nenana River (on the opposite bank), then crosses over an old trussel bridge and alongside the western edge of Nenana.	overlying alluvial deposits and bedrock	40.1	Tanana River Crossing	4	1	0 (Partial Wetlands)	0	2	0%	3.5	Stream crossings are well below average and there seem to be no impacted wetlands. Overall permitting issues and concerns are not substantially different between the route options. A full matrix of potential permits required for the project can be found in Appendix 4-1.	3.5	Physical: Continental climate; seismically active, permandor present, without present selection production active, permanda present Biological; Bog-muskes, apine tundra, high shrub thicket and spruce-hardwood forest; one anadromous stream; moose, bear, caribou, sheep, turbearing and avian species present; no endangered species; Human: PRSB, Eater, Berg, Neanaa, AR Fish & Game Dept., Forest Service, FNSB Area Community Councils, Nenana Native Association	seismicity; Biological: recreational &	3.5	3.0		3.4		
	AEAI (GVE/ Northern 13 kV	8 goes immediately south, crosses the Tanana River and then follows it slightly inland from its south bank to near Nenana. Upon crossing the Tanana the route is located on Federally owned military land until it reaches the Wood River,	Solis primarily consist of fine-grained soils overlying allivalid elegosits and before throughout the floodplains (near Tanana at both RSX and Neana) silks overlying bedrock in the elevated portions between Ester and Neanan. Discontinuous perametrost exists for the entire segment, mostly thaw stable soils with some sections of unstable soils along elevated portions. mostly five soils soils section of unstable soils along elevated portions. mostly fivoran. South-desing slopes, lakes and stream crossings are unfrozen to sporadically frozen.	37.7	Tanana River Crossing	16	1	5319.2 (Partial Wetlands)	14	4	100%	3.5	Stream crossings are average and potentially impacted wetlands are below average. Overall permitting issues and concerns are not substantially different between the route options. A full matrix of potential permits required for the project can be found in Appendix 4-1.	3.0	one anadromous stream; moose, bear, caribou, sheep, furbearing and avian species	; extreme cold, permafrost, wetlands and seismicity; <u>Biological:</u> recreational & subsistence harvests of fish & game; Migratory Bird Act restrictions on clearing	2.0	2.0		2.6	i	
	Southern 230 kV (fror FBX to Nenana are	Maning the center of Fairhanks the northern interitor rose pose immediately south, crosses the Tananas River and then follows it slightly inland from its south bank to near Kenana. Upon crossing the Tananas the route is located on Federally owned military land until it reaches the Wood River, approximately half the distance to Nenana. Thereafter the loute traverses State lands.	Solis primarily consist of fine-grained solls overlying allivatil deposits and beforck throughout the floodplains (near Tanana at both RSX and Neana) silks overlying bedook in the elevated portions between Ester and Neanan. Discontinuous perametrost exists for the entire segment, mostly thaw stable soils with some sections of unstable soils along elevated portions. mostly fine-soils sould service of the soil and the soils with some sections of unstable soils along elevated portions. mostly finosen. South-facing slopes, lakes and stream crossings are unfrozen to sporadically frozen.	46		43	2	41428.7 (Partial Wetlands)	0	0	100%	1.0	Stream crossings are well above average and potential impacted wellands are above average. Overall permitting issues and concerns are not substantially different between the route options. A full matrix of potential permits required for the project can be found in Appendix 4-1.	2.0	Physical: Continental climate: selsmically active permarkot present, wetlands present biological; Bog-muskes, apine tundra, high shrub thicket and spruce-hardwood forest; one anadromous stream; moose, bear, carbou, sheep, turbearing and avian species present; no endangered species; Human: PNBB, AK Farls d. Game Dayt, PNBB Area Conductive Councils, US Department of Defense	; extreme cold, permafrost, wetlands and seismicity; <u>Biological</u> : recreational & subsistence harvests of fish & game; Migratory Bird Act restrictions on clearing	2.0	2.0		1.8		
	ARRC	the rational serves Pathanaka so the northwest and plans the collecterson Valley. The rational demolstons the Goldstreson Valley southwest until it enters the Minor Pitas (near the Tanana Rivery) which it follows until reploring the highway about 5-miles north of Hennas. The last sig into Nenhana including a crossing of the Tanana River just upstream of town and of the Tartis Highway Tanana Bridge.	Sole primarily consist of the quinest soils ventying allivated legosists and beforch throughout the floodplains. Discontinuous premaferal exists for the entire segment, mostly their states soils with some sections of unstable the states soils with some sections of unstable produced their soils of the section of unstable and records of the section of the section taking slopes, lakes and aream crossings are unfrozen to sporadically frozen.	38	Tanana River Crossing	14	1		,	0	0%	3.0	Stream crossings are well above everage and openitally independent of the stream of th	2.5	Ebigsial. Commental climate, sels-micrally sels-micrally expending present self-per	sthated, engineering issues related to extreme cold, permiroral, vesticands and saismicity: <u>Biological</u> recreational & subsistence harvasts of lish & general (fligatory Bird Act restrictions on clearing seglection; arothered showed management supplies that the second section of supplies that supplies the supplies that supplies the supplies that supplies the supplies that supplies the supplies that supplies the supplies that supplies the supplies that supplies the supplies that supplies the supplies that supplies the supplies supplies that supplies the supplies suppl	2.5	1.5		2.4		

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								Engineer	ing				Permitt	ng		Socio Economic		Right-of-way		Weight	ing	
Segment	Route Option	General Route Description	Terrain Description	Segment Length [miles]	Significant Engineering Obstacles	Stream (Total Number	Anadromou s Fish	Wetland Areas (linear feet)	No. of Major Road Crossings	No. of Railroad Crossings	Approx. Length on New Workpad	Rating (0 = Lowest, 5 = Highest)	Permitting Analysis	Rating (0 = Lowest, 5 = Highest)	Affected Environment	Potential Impacts	Rating (0 = Lowest, 5 = Highest)	Rating (0 = Lowest, 5 = Highest)	Engr 25.00%	Permits :	25.00%	25.00%
Nenana to Healy	Denali	Genali Pipaline Route (1982, MP 61-120): At Nenana, roust turns south following acombination of the Parts Hyad the GVEA ROW along the east side of the Nenana River. It skirs the east side of Clear Air Proce Base and then turns southwest across the Nenana River. It continues south southeast paralleling the Nenana River, the Alaska Railroad, and the Parks Highway to Healy. Most of the route follows the GVEA ROW, with some alignment along the Parks.	thick loess overlying relatively fine-grained alluvial deposits. Near the Nenana River Crossing, soils are assumed to consist of silts overlying sands and silty gravels (alluvial deposits). Permafrost between Nenana and Angeron is discontinuous, with they unstable	57.3	Nenana River Crossing, Denali Fault - Healy Creek Strand Crossing	26	5	34738.5 (Partial Wetlands)	12	2		3.5	Stream crossings are slightly above average and optentially impacted wetlands are above average. Overall permitting issues and concerns are not substantially different between the route options. A full martix of potential permits required for the project can be found in Appendix 4-1.	2.5	permafrost present; wetlands present; <u>Biological</u> : Bog- muskeg, alpine tundra, high shrub thicket and spruce- hardwood forest; anadromous streams; moose, bear, caribou, sheep, furbearing and avian species present; no endangered species present; <u>Human</u> : Deserting Borough; Alaska RR & Other Related Business; Anderson; Clear EMW Station (USAF); Mining Industry	recreational & subsistence harvests of fish & game; caribou concentration area, Migratory Bird Act restrictions on clearing vegetation; avoidance of known nesting areas; <u>Human:</u> 1. Permitting Challenges Through DoP property; 2. Energy Use & Consumption	3.0	2.0		2.8	3	
		ANGDA Route (2005): After departing Nenana the route joins the Alaska Railroad ROW. Route crosses the Railroad Roy. Bloom of the Roy	d in the northern part of the route are fine-grained with locally thick deposits of organics over coarse-grained alluvial deposits. Soils in southern portion are thin r deposits of silts over coarse-grained alluvial deposits. Discontinuous to sporadic permafrost through most of	56.2	Nenana River Crossing, Denali Fault - Healy Creek Strand Crossing	24	4	38230.0 (Partial Wetlands)	3	2		3.5	Stream crossings are average and potentially impacted wetlands are above average. Overall permitting issues and concerns are not substantially different between the route options. A full matrix of potential permits required for the project can be found in Appendix 4-1.	2.5	permafrost present; wetlands present; <u>Biological</u> : Bog- muskeg, alpine tundra, high shrub thicket and spruce- hardwood forest; anadromous streams; moose, bear, caribou, sheep, furbearing and avian species present; no endangered species present; <u>Human</u> : Denail	recreational & subsistence harvests of fish & game; caribou concentration area, Migratory Bird Act restrictions on clearing vegetation; avoidance of known nesting areas; <u>Human</u> : 1. Permitting Challenges Through DoD Property; 2. Energy Use & Consumption	3.5	2.5		3.0)	
	Parks Hwy	The Parks Highway leaves known to the south puralising the Herman River, failnoad and Oyde ROWs. About halfway to Healy the Parks crosses over to the west side of Nenana and continues into Healy.	searly level floodplain and cross-slopes less than 5 sercent throughout routs. Soils consist of moderately thick loss overlying relatively fine-grained attivist deposits. Near the Nenana River Crossing, soils are assumed to consist of sits overlying sends and sitly gravels (allivaid deposits). Pear margarets between Nenana and Anderson is discontinuous, with they—unstable soils, then spondic permatrosi is expected with thew-stable soils between Anderson and Healy.	57.1	Nenana River Crossing, Denail Fault - Healy Creek Strand Crossing	18	3	5877.0 (Partial Wetlands)	۰	1		3.5	Stream crossings are below average and potentially impacted weltands are well below average. Overall permitting issues and concerns are not substantially different between the route options. A full matrix of potential permits required for the project can be found in Appendix 4-1.	3.0	caribou, sheep, furbearing and avian species present;	recreational & subsistence harvests of fish & game; caribou concentration area, Migratory Bird Act restrictions on clearing vegetation; avoidance of known nesting areas; <u>Human:</u> 1. Permitting Challenges Through DoD Property; 2. Energy Use & Consumption	3.0	3.0		3.1		
	AEAI (GVEA)	The northern intertile (230V) heads south from Nenan continuing along its remote path off to the east of the highway. The intertile maintains its distance to the east of the highway exentually loggling in to the eastern back of the Nenana River just north of Healy, then following the eastern bank of the river for the last few miles into Healy. Nearly all of the route in this segment is not accessible by road.	consists of silts overlying bedrock in the elevated portions with silt overlying alluvial deposits in the		Denali Fault - Healy Creek Strand Crossing	23	3	36008.0 (Partial Wetlands)	19	4		3.5	Steam crossings are average and potentially impacted wetlands are above average. Overall permitting issues and concerns are not substantially different between the route options. A full matrix of potential permits required for the project can be found in Appendix 4-1.	2.5	Physical: Certiferental climate; selamically active: permatrios present; wilendar present; Blobingial Bo- prunkto, parent; Walnuts present; Blobingial Bo- prunkto, gaine tundra, high shrub thicket and spruce- hardwood forest; anddromous streams; moose, bear, caribou, sheep, furbearing and avian species present; no endangered species present; Human: Blail Lake Air Force Range (USAF); Sled Road; Rex Dome Mine;	caribou concentration area, Migratory Bird Act restrictions on clearing vegetation; avoidance of known	3.0	2.0		2.8		
	Southern 230 kV (from Nenana area	The northern intertie (230kV) heads south from Nenana continuing along its remote path off to the east of the continuing along its remote path off to the cast of the continuing the continuing the path of the highway, eventually logging in to the eastern bank of the Nenana River just north of Healy, then following the eastern bank of the river for the last few miles into Healy. Nearly all of the route in this segment is not accessible by road.	alluvial deposits. The southern portion of the route	50.8	Denall Fault - Healy Creek Strand Crossing	26	0	11354.3 (Partial Wetlands)	0	0		1.0	Stream crossings are slightly above sverage and potentially above average and potentially average. Overall per mitting issues and concerns are not substantially different between the route options. A full matrix op potential permits required for the project can be found in Appendix 4-1.	2.5	permafrost present; wetlands present; <u>Biological</u> : Bog- muskeg, alpine tundra, high shrub thicket and spruce- hardwood forest; anadromous streams; moose, bear, caribou, sheep, furbearing and avian species present; no endangered species present; <u>Human</u> : <u>Blair Lake Air</u> Force Range (USAF): Sled Road: Rex Dome Mine:	caribou concentration area, Migratory Bird Act	2.0	2.0		1.9		
	ARRC	The salined generally follows a similar route as the highway though its Neinana crossing occurs closer to Healy.	learly level floodpials and cross-stopes less than 8 percent throughout rosts. Solic sounies of moderately thick lesses overlying relatively fire-grained attivat deposits. Near the Nearash Ever Crossing, solic are assumed to consist of silks overlying sends and silly gravels (glivilar deposits). Permitartes tetween Nearas and Anderson is discontinuous, with thaw-unstable soils, then sporadic permafers is expected with thaw- stable soils between Anderson and Healy.	55.2	Nenana River Crossing, Denail Fault - Healy Creek Strand Crossing	20	7		2	0		3.0	Steam creatings are average and potentially impacted und potentially impacted understands are unknown. Overall permitting jasses and concerns are not substantially different between the route options. A full matrix of potential permits required for the project can be found in Appendix 4-1.	3.0	Dynated, Continental climate, seramenthy serior, percentary special services, the continent percentage of the percentage price tunder, high struct blacket and spruce, and services of the continent percentage of the cardious prices in audicomus sitesses, moose, bear, cardious, these, furbaceing and wins species present; no endangered appeals present; Human; Denail Borough, Alaska RR & Other Related Business; Anderson; Clear ESW Station ((1987), Blinding Industry (Placer Dome, Liberty Ball, Usibelli); Healy	Project segmenting issues native for extreme code percentages, were and extensively. Belonging secretarion & subsistence harvests of this & games, carbon concentration sees, Mayardo, Bid Act restrictions on clearing segestation, evolutions of known needing raises, Human, 1- Permitting Challenges Through BoD Property, 2: Energy Use & Consumption for Area Mining Projects: 3. BoomBloot Impacts on Transportation-Related Business	3.0	1.5		2.6		

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							E	ngineering					Permitti	ng		Socio Economic		Right-of-Way		Weighti	ng	
Segment	Route Option	General Route Description	Terrain Description	Segment Length [miles]	Significant Engineering Obstacles	Stream	Crossings Anadromous Fish	Wetland Areas	No. of Major Road Crossings	No. of Railroad Crossings	Approx. Length on New Workpad	Rating (0 = Lowest, 5 = Highest)	Permitting Analysis	Rating (0 = Lowest, 5 = Highest)	Affected Environment	Potential Impacts	Rating (0 = Lowest, 5 = Highest)	Rating (0 = Lowest, 5 = Highest)	Engr 25.00% 2	Permits S	ocio-Econ	ROW 25.00%
Healy to Cantwell		southeast, leaving the ROW of the Parks Highway and Alaska Railroad, and crosses the Nenana River at Healy. It follows the AEAI powerline route through the bottom of the Moody Creek	relatively loess-free. Much of route crosses steep,	42.7	Nenana River Crossing (X2), Moody Creek Alternate, Denall Patell - Dy Chi Strand, Moody Cit Strand (Cd), Mines Crit Strand (Cd), Mines Crit Strand (Cd), Mines Crit Strand (Cd), Mines Crit (X2) Fault Crossings	į	0	75205.5	0	1		1.5	Stream crossings and potentially impacted wetlands are significan. Overall permitting issues and standard permitting issues and standard different between the route options. A full matrix of potential permits required for the project can be found in Appendix 4-1.	2.0	forest; anadromous streams; moose, bear, caribou, sheep, furbearing and avian species present; no endangered species present; <u>Human</u> ; leeworm Gulch; McKinley Park; Denali National Park & Preserve; Tourism Industry (Transportation & Lodging	permatrost, wetlands and seismicity; Biological; recreational & subsistence harvests of fish & game; caribou winter concentration area, avoidance of sheep lambing area; spring brown bear concentration area, Migratory Bird Act restrictions on clearing vegetation; avoidance of known nesting areas; Fuman: Historical & archeological property protection; Impacts to transportation and power for tourism industry; Poundation and evideore factors in Healty and	2.5	2.5		2.1	1	
		AMGGA Route (2005): Route follows the Parks Highway ROW through the Neman Caryon and the Denail Park commercial tourist facilities. Route crosses the deeply incised Neman Row Caryon at the north end and continues along the east side of the Neman R	bedrock and man-made fill through the Nenana River Canyon with alluvial material over bedrock	44.7	Nenana River Crossing (X2), Nenana Canyon, Denail Fault Dry Cris Strand, Hines Cris Strand (3), McKinley Strand (x2) Fault Crossings	-	0	60914.5	0	1		1.5	Stram crossings are slightly shove average and potentially impacted wetlands are well shove average. Overall permitting issues and concerns are not substantially different between the route options. A full matrix of potential permits required for the project can be found in Appendix 4-1.	2.0	forest; anadromous streams; moose, bear, caribou, sheep, furbearing and avian species present; no endangered species present; <u>Human;</u> loeworm Gulch; McKinley Park; Denali National Park & Preserve; Tourism Industry (Transportation & Lodging	permafrost, wetlands and seismicity; <u>Billogical</u> : recreational & subsistence harvests of fish & game; caribou winter concentration area, avoidance of sheep lambing area; spring brown bear concentration area, Migratory Bird Act restrictions on clearing vegetation; avoidance of known nesting areas; <u>Fiumar</u> : Historical & archeological property protection; impacts to transportation and power for tourism industry; <u>Population and workforce factors in Healy and the State of the State o</u>	2.5	2.5		2.1		
	Parks Hwy	South of Healy the Parks Highway enters the Nenana River Campon and crosses the Remana River one. This crossing of the Nenana is one of the most difficult crossings in this corridor as the terrain in this area is generally bedrock, eliminating the possi	Salis in the northern portion of segment are mostly before he and man-made fill through the Nennan River Canyon with allovid material over bedrock and man-call fill through receive the solic consist of all deposits over glacial till and coarse-gra	39	Menana River Crossing (KZ), Menana Canyon, Denal Fauth- Dry Gris Strand, Hines Oft Strand (x2), McKinley Strand (x2) Fault Crossings		0	18674	0	3		3.5	Stream crossings are sevrage and potentially impacted wetlands are well below severage. Overall permitting issues and concerns are not substantially different between bushatantially different between matrix of potential permits required for the project can be found in Appendix 4-1.	3.5	Physical: Costinents Climate: Denais fault: permaforest present; westland present. Biological: Bog-muskeg, alighie tundra, high shrub hicket and spruce-hardwood forest; anadromous streams; moose, bear, caribou, sheep, Lurbearing and spruse present; beardwood readingned species present; beardwood condengered species present	Practical engineering issues related to extreme codi, permafrost, welfands and estimicity. Biological: recreational & subsistence harvests of flish & game, carrbou winter concentration ones, volcinace of sheep Burning para- spring brown bear concentration area, Migratory Bird Act restrictions on clearing vegetation: sealchare of howest particulation of the properties of the properties of properties of the properties of the properties of properties of the properties of the properties of properties of the properties of properties of the properties of properties of the properties of properties of properties properties of properties prope	2.5	4.0		3.4		
	AEAI	The governitive crosses the Neuron Piter in Neury and travels up the Meory. Crede crisings to this societies. This is a department from the alignment that both the railroad and highway follow (passing through Nenana Carryon, aka Glitter Guich). The powerline tr	Cook-abops arraps from 15 percent to 46 percent with dask of colling hist cower Commett. Softs are relatively loses free. Butch of route crosses steep, mournainous terral waves course soils are thin and overtile weathered bedrock. Finer-grained soils	42.2	Nenana River Crossing (X2), Nenana Canyon, Denali Fault- Dry Crk Strand, Hines Crk Strand (x3), McKinley Strand (x2) Fault Crossings		0	64022.2 (Partial Wetlands)	0	0		1.5	Stream crossings are average and potentially impacted wetlands are above average. Overall permitting issues and concerns are not substantially different between the route options. A full matrix of potential permits required for the project can be found in Appendix 4-1.	2.0	forest; anadromous streams; moose, bear, caribou, sheep, furbearing and avian species present; no endangered species present; <u>Human</u> ; loeworm Gulch; McKinley Park; Denali National Park & Preserve; Tourism Industry (Transportation & Lording	permafrost, wetlands and seismicity; <u>Biological</u> : recreational & subsistence harvests of fish & game; caribou winter concentration area, avoidance of sheep lambing area; spring brown bear concentration area, Migratory Bird Act restrictions on clearing vegetation; avoidance of known nesting areas; <u>Human</u> : Historical & archeological property protection; impacts to transportation and power for tourism industry; Population and owlorfocre factors in Healy and	2.5	3.0		2.3		
	ARRC	The nativoid follows the same cargon as the highway south from Healy and past the entrance to the histonial park. Because the railroad was built prior to the road, it assults follows the bester roads of the two. However, for most of the carryon the railroad.	Solls in the continum portion of segment are mobily abortick and manufacili filthrough the Nomana Morer Carpyon with alluvial material over bedrock Rose Carpyon with alluvial material over bedrock Rose Moreas Carbon. After Moreas Cores, the solls consist of sill deposits over glocial till and core size of the solls consist of sill deposits over glocial till and core size gray.	39.6	Neman River Crossing (EZ). Promain Carryon, Denal Fault- Dry Crk Zerand, Hones CA. Strand (x3), Michings Art and (c2) Fault Crossings	19	0			•		2.5	Internal crossings are below severage and potentially energies delicities are substances. Very substances are substances. Very substances are some substances are substance	1.5	Physical Continental climac, Denali fault, permatrost mercent, vestinals present; <u>Blodge</u> , Blogmussieg, Blogmussieg, slipine tundra, high shrub hicket and spruce-hardwood forest; anadremuss streams; moses, bear, caribou, sheep, Individualing and sins species present, no sheep, Individualing and sins species present, no sheep, Individualing and State of the State of the McClinialy Park, Denal stational Earth & Physicist, Good and State of State of State of State of Tourism Indiatry (Transportation & Lodjing companies); Cantwell; Caribou Concentration Areas	Dayside regimenting issues related to extreme cold, permittrest, welfacts and extensive; billion(e): recreational & subsistence harvests of fish & game, caribou, white concentration area, velocities or flowing billion and parting brown bear concentration area, liking skery likin Area seeking areas, times. The permitter, characters are seeking areas, times. The permitter, characters are seeking areas, times. The permitter, characters are power for tourism reductor, Population and worldforce factors in healy and Connectl. Recreational use disturbance mean creeks.	2.5	1.0		1.9		

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							Е	ngineering					Permitti	ing		Socio Economic		Right-of-Way		Weigh	ing	
Segment	Route Option	General Route Description	Terrain Description	Segment Length [miles]	Significant Engineering Obstacles	Stream (Crossings Anadromous Fish				d Approx. Length on New Workpad		Permitting Analysis	Rating (0 = Lowest, 5 = Highest)	Affected Environment	Potential Impacts	Rating (0 = Lowest, 5 = Highest)	Rating (0 = Lowest, 5 = Highest)	Engr 25.00%	Permits 25.00%	Socio-Econ 25.00%	ROW 25.00%
Cantwell to Hurricane Gulch	Denali	Denall Pipeline Route (1992, MP 161-155): Crosses the Jack River and proceeds acous from Cartreell, following the Parks and the Cartreell of the Parks (1992): Crosses the Cartreell of the Cartr	deposits in the river floodplains. Discontinuous to sporadic permafrost with mostly thaw unstable soils.	37.4	Hurricane Gulch	20	3	57172.7 (All Wetlands except approx. 1.5 miles)	2	2		3.5	Stream crossings are slightly above average and potentially impacted wettends are significant. Overall permitting issues and concerns are not assues and concerns are not the route options. A full market of potential permits required for the project can be found in Appendix 4-1.	2.5	hardwood forest; anadromous streams; moose, bear, caribou, sheep, furbearing and avian species present	permafrost, wetlands and seismicity; Biological: recreational & subsistence harvests of fish & game; caribou summer and winter concentration areas,	2.5	2.0		2.6		
	ANGDA	ANGOR Paure (2005, All 196-19); Route continues excult from Canwell strough Board Pass to Hurrano, Gollewing beat Canwell strough Board Pass to Hurrano, Gollewing beat Highway. About 11 miles from Hurricane, the route diverges to the east and crosses Honoliub Creek and Hurricane Gulch (similar to the Denall Pipeline Route).	glacial till over bedrock, and bedrock and alluvial deposits in the river floodplains. Discontinuous to	37.5	Hurricane Gulch	15		32202.7 (All Wetlands except approx. 1.5 miles)	4	1		4.0	Stream crossings are average and potentially impacted welfands are swerage. Overall permitting issues and concerns are not substantially different between the route options. A full matrix of potential permits required for potential permits required for the polyect can be found in Appendix 4-1.	3.5	Pariale Continental clines Chenii flush, pematro strateni welating present (tibiogiat) (Sephensking, sipher tundra, high shrub flukket and spruce- hardwood forest; anadromous treams, moose, bear caribos, sheep, furbearing and avian species present flumm; Med Subschool (Sephensking), Med Subschool (Sephensking), Summit; Summit, Mirror, & Edes Lakes Campgrounds: Bruced Pass; Durille Mine; Ferk Campground: Plumicad Pass; Durille Mine; Ferk Campground: Thurscane Gulda;	recreational & subsistence harvests of fish & game; caribou summer and winter concentration areas,	2.5	2.5		3.1		
	Parks Hwy	South of Canteett the Parks Highesy enters the northern end to the wide open Marauska Sushira Marty which is bordered to the west by Denalt National Park and on the east by the northern reaches of the Talketent Mountains. After crossing over Groad Pass the highway meanders somewhat tooledy along the valley crissronosing the railor of the marty of the parks of the training over Groad Pass the highway meanders somewhat tooled along the valley crissronosing the railor and and many streams that teed into the upper Challetta River. Eventually the highway that flows east to west and into the Chulitina in the area where the Chulitina is within a deep carryon. The highway crosses Hurricane Gulich on an impressive trussel style bridge.	glacial till over bedrock, and bedrock and alluvial deposits in the river floodplains. Discontinuous to	37.2	Hurricane Guich	13	4	5299.8 (All Wetlands except approx. 1.5 miles)	0	2		3.0	Stream crossings are sverage and potentially impacted wetlands are significantly below average. Overall permitting issues and concerns are not substantially different between the route potential permits required for the project can be found in Appendix 4-1.	3.0	present; wetlands present; <u>Biological</u> : Bog-muskeg, alpine tundra, high shrub thicket and spruce-	is Physical: engineering issues related to extreme cold, permations, utention and selemicity, Biological: recreational & subsistence harvests of fish & game; caribous summer and winter concentration areas, moose ruting and winter concentration areas, impose ruting and winter concentration area, properties of the properties of th	2.5	3.0		2.9		
	AEAI	The powerline follows the Max-Su Valley south in much the same manner as the biphway and rallowal flowerwr, the powerline generally hugs the eastern limits of the valley and is usually not visible from the highway as it is 1 to 2 miles east of the highway most of the time.	Soits consist of allies over glacialfluvial disposits, special till over betroics, and betroics and alluvial deposits in the river floodplains. Discontinuous to sporadic permafrost with mostly thaw unstable soits.	35.3	Hurricane Gulch	23	3	42650.2 (All Wetlands except approx. 1.5 miles)	2	2		2.0	Stream crossings are slightly shove average and potentially impacted wetlands are above average average. Overall permitting issues and concerns are not substantially different between the route options. A full required for the project can be found in Appendix 4-1.	2.5	present; wetlands present; <u>Biological</u> : Bog-muskeg, alpine tundra, high shrub thicket and spruce- hardwood forget; anadromous strange; moose hear	In Playsia, engineering Issues related to extreme cold, premarters, verticated and estimative, folialogical: excressional & subsistence harvests of fish & game; caribous summer and winter concentration areas, imose rutting and winter concentration areas, imose rutting and winter concentration area. If the properties of the prope	2.5	2.0		2.3		
	ARRC	the callocal follows a similar path that the high year follows from Cambello Functions. The need and railroad cross each other lock in this segment and generally cross all the same private and greated and partial partial states. More other than not the railroad in visible from that high lawy.	tions consist of this over glace/files(a deposits, placeful file over benock, and benoted and disvisal deposits in the river floodplates. Discontinuous to eposited permateron with mostly flow ventable seek.	38.2	Hurricane Gulich	•	•		2	0		2.0	Stream crossings are below warrage and perentially impacted wetlands are not a factor. Overall permitting issues and concerns are on substantially different between the rouse options. A full matrix of potential permits required for the project can be found in Appendix 4-1.	3.0	Packada (Centimental Contas), Cental fault, personal con- preserve, westernia pressal (Disciplanta), Biogranders, alpine tuncia, high should hildent and sproud- cial and should be a second to the should be a second contained, along, the change and white pressess present so entainpared species pressave. Hamps Mar Su domongo, Sammit, Sammit, Marco A, Sefera Lases Compagnication, Sammit, Marco A, Sefera Lases Compagnication, Sammit Allorova, Sefera Lases Compagnication, Sammit Allorova, Sefera Lases Compagnication, Sammit Sammit Allorova, Sefera Lases Compagnication, Sammit Sammi	Efficiently engineering souse network to enterior cold, permaterior, without an electricity (Indicated) excessional & subsistence harvests of flat & game, excessional & subsistence harvests of flat & game, the subsistence of the subsistence of flat & game, which will be a subsistence of flat & game, the subsistence of the subsistence of flat & game, the subsistence of precognition of the subsistence of precognition of the subsistence of precognition of the subsistence of subsistence of the subsistence of subsistence of the subsistence of subsistence of subsistenc	2.5	1.5		2.3		

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								Engineering					Permitt	ng		Socio Economic		Right-of-Way		Weight	ing	
Segment	Route Option	General Route Description	Terrain Description	Segment Length [miles]	Significant Engineering Obstacles	Stream C	crossings Anadromous Fish	Wetland Areas	No. of Major Road Crossings	No. of Railroad Crossings	Approx. Length on New Workpad	Rating	Permittign Analysis	Rating	Affected Environment	Potential Impacts	Rating (0 = Lowest, 5 = Highest)	Rating (0 = Lowest, 5 = Highest)	Engr 25.00%	Permits :	25.00%	ROV 25.00
urricane Gulch to Talkeetna Jctn	Denali	Denail Pipeline Route (1992, MP 195-272): Route turns southwest to the lower valley of the Chultran River at Hurrican Chultran River at Hurrican Chultran River and Hurrican Chultina River Valley and crosses the river approximately 40 miles from Hurricane. The route continues along the west side of the Chultran River And follows the Parks Highway to Talkeetina Spur Road John	glacialfluvial deposits, glacial till over bedrock, and bedrock and alluvial deposits in the river floodplains. Permafrost is discontinuous or	72	Chulina River Crossing. Susitna River Crossing	64	28	36749.2 (Partial Wetlands)	20	2	90%	4.0	Stream crossings are slightly above average and potentially impacted wethands are above average. Overall permitting issues and concerns are not substantially different between the route opinions. A full stream of the context opinions are concerned as the context opinions and the context opinions are required for the project can be found in Appendix 4-1.	2.5	Byers Lake Campground; Trapper Creek Mine; Troublesome	Physical: engineering issues related to extreme cold, permafrost, wettends and selsmicity; <u>Biological</u> : recreational a subsistence concernation and selsmicity; <u>Biological</u> : recreational a subsistence concernation area; <u>Miscraeling Concernation areas</u> , <u>Biological</u> rearing area; <u>Biock bear denning concernation areas</u> , <u>Biock and brown bar berry Concernation area</u> , <u>Biock and Brown Bar Bar Bar Bar Bar Bar Bar Bar Bar Bar</u>	2.5	2.5		2.9)	
	ANGDA	ANODA Route (2005, MP 198-255): The route turns southwest and follows east side of the Parks Highway through Hurricans Chulling River, where it crosses is the west side of the Parks Highway, crosses the Chulling River, where it crosses is the west side of the highway. The route continues along the east side of the highway. The route continues along the east side of the Parks Highway to just before Trapper Creek where it crossing the Sustina River on the way.	crossings occur. Soils consist of silts over glacialfluvial deposits, glacial till over bedrock, and bedrock and alluvial deposits in the river floodplains. Permafrost is discontinuous or sporadic with mostly thaw unstable soils. After the Chulitina River crossing, areas of permafrost are	71.8	Chulitas River Crossing, Susitas River Crossing	36	18	36868.8 (Partial Wetlands)	15	2	85%	4.0	Stream crossings are slightly above average and potentially impacted wetands are above average. Overall permitting issues and concerns are not substantially different between the route options. A full matrix of potential permits required for the project can be found in Appendix 4-1.	2.5	Byers Lake Campground; Trapper Creek Mine; Troublesome	Physical: engineering issues related to extreme cold, permafrost, wettends and seismicity. <u>Biological</u> : recreational & subsistence concernation services and selection of the concernation services. In concernation services, and supervice desired resisting, broading, rearing services. Make here deeming concernation areas, black and brown bear beny concernation areas, singlesty Bird Act restrictions on clearing vegetation; solidators of known nesting areas; <u>Himman</u> : elements of the concernation areas, singlesty Bird Act restrictions on clearing vegetation; solidators of known nesting areas; <u>Himman</u> : elements on sociocultural norms; Mitigation of impacts on tourism industry	3.0	3.0		3.1		
	Parks Hwy	South of furnicase the Parks (lighway veters into Denatt State Park and follows the west died of Cury Ridge while the Chulfuns River is to the West Eventually the Chulfuns crosses the highway and the road continues south through Trapper Circes. South of Trapper Circes about 10-miles the road crosses the Sustains River, then the railroad before intersecting with the Tailsectin Spur Road.	crossings occur. Soils consist of silts over glacialfluvial deposits, glacial till over bedrock, and bedrock and alluvial deposits in the river s floodplains. Permafrost is discontinuous or	72.6	Chulitna River Crossing, Susitna River Crossing	32	17	9698.6 (Partial Wetlands)	0	2	100%	4.0	Stream crossings are below average and potentially impacted welfands are below average. Overall permitting issues and concerns are not substantially different between metric of potential permits required for the project can be found in Appendix 4-1.	3.0	Byers Lake Campground; Trapper Creek Mine; Troublesome	Inguistic - registering lature related to extreme cold, pernations, restands and residently; <u>Biological</u> ; reversional & subsistence harvest of fish & game; moose ruting, where and summer concentration areas; Trumpter Sams dispersed nesting, twodring, rearing area; black bear denning concentration areas, black and brown best beety concentration areas; Migrany Bild Act restrictions on the properties of the properties of the properties of the properties of Recreational fishing and hunting stakeholder outreach; Population impacts on sociocultural norms; Mitigation of impacts on tourism industry	2.5	3.0		3.1		
	AEAI	A few miles south of Hurricans the intentie mores was and prisent the Statistic River daringer, creating the Statistic River daringer, creating the Statistic River daringer, creating the Statistic atop the ridge just east of the river and following into Talleensa. Just before Talleense the intentie must cross the Talleensa River, and skirts to the east of town (between Bald with the Parks Highway near the Talleensa Spur Roadffarks Highway Jotn.	g consist of silts over glacialfluvial deposits, glacial till over bedrock, and bedrock and alluvial deposits in the river floodplains. Between the Susitna River and Talkeetna River Crossings, the route travels	65.9	Sustina River Crossing, Tailseetna River Crossing	42	10	No Data	0	0	0%	1.0	Stream crossings are average and potentially impacted westlands were unknown. We consider the control of the project can be found in Appendix 4-1.	2.0	Physical: Transition zone climate; core discontinuous permatrious present vicetands present; Blobigical: alpine tundra, high shrivib thicket and spruce-hardwood forest; anadromous stream; mocee, bear, sheep, furbearing and svian species present; no endangered species present; the future of the present of	Inguistic - engineering issues related to extreme cold, pernations, wetlands and estientive; Biological recreational & assistance harvests of fish & game; moose rutting, winter and summer concentration areas; Trumpters Yame dispersed nesting, brooding, rearing area; Biack bear denning concentration areas, Black and brown clearing vegetation, revidence of home making area; the contraction of	2.5	2.5		2.0		
	ARRC	South of Hurricane the railroad turns to the east and joins the one of the south of the south of the south of the souther later of the south of the south of the souther later of the south of the south of the souther later of the south of the south of the south of the south of the south of the south of the south of the south of the south of south of sou	Solis consist of sists over glacialfluvial deposits, glacial for over backs, solid blacks and diffusible solid districts of the sistence of the Churillas Creek crossing, areas of permatrest are absent or isotened.	68.5	Susitna River Crossing, Talkeetna River Crossing	51	26		2	0	100%	1.0	Stream crossings are alightly above average and potentially impacted welfands are unknown. Overall permits issues and concerns are not substantially different between the route options. A full matrix of potential permits required for the project can be found in Appendix 4-1.	2.0	Shapital: Transition store climates some discontinuous immediates present vehiculas present, <u>Biologicalis</u> dipine sumufficial present, vehiculas present, <u>Biologicalis</u> dipine sundra, Sight shruth tribides and spruce-tent-wood forest, maniformous services, mones, bear, shreep, state-berring and sendormous present present. <u>States of the States States</u> Compagnants, Trapper Cares Mone, <u>Tathasetra</u>	Tagging conjuncting listens intend to extense gold generalized, violational and statements, <u>Biological Constitution</u> consistences harvested of fish & game, moses rating, whose and summer constitution seen. "Improper See mis dispersed nesting, brooding, brooding, seen." Trapped See may be dispersed nesting, brooding, brooding, and the seen of the seen	2.5	1.5		1.8		

Sheet Hurricane Gulch to Talk John
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							En	gineering					Permitti	ing		Socio Economic		Right-of-Way		Weigh	nting
Segment	Route Option	General Route Description	Terrain Description	Segment Length [miles]	Significant Engineerin Obstacles		Crossings Anadromous Fish	Wetland Areas (linear feet)	No. of Major Road Crossings	No. of Railroad Crossings	Approx. Length on New Workpad	Rating (0 = Lowest, 5 = Highest)	Permitting Analysis	Rating (0 = Lowest, 5 = Highest)	Affected Environment	Potential Impacts	Rating (0 = Lowest, 5 = Highest)	Rating (0 = Lowest, 5 = Highest)	Engr 25.00%		25.00% 25.00%
Talkeetna Jctn to Willow		Denail Pipeline Route (1992, MP 272-317): Route continues south slong the Parks Hoy ROW to Willow, crossing Mertana, Disease, (No Suggestions) and other smaller creeks.		28.7	None	13	8	32311.2	0	1		2.5	Stream crossings are below average and potentially impacted wetlands are slightly below average. Overall permitting issues and concerns are not substraintly different between the route options. A full martix potential permits required for the potential permits are provided to the potential permits and permits are provided to the provided to the permits and permits are provided to the permits and permits and permits are permits and permits and permits are permits and permits and permits are permits and permits and permits and permits are permits and permits are permits and permits are permits and permits and permits are permits and permits and permits are permits and permits ar	3.0	streams; moose, bear, sheep, furbearing and avian species present; no endangered species present; Human: Montana &	permafrost, wetlands and seismicity; <u>Biological</u> : recreational & subsistence harvests of fish & game; mosor utting, winter and calving concentration areas; Trumpeter Swan nesting and brood oraring concentration areas, Wignardy Bird Act restrictions on clearing vegetation; avoidance of known nesting areas; <u>Human:</u> Historical and archeological land impact mitigation;		3.0		2.	8
		AMODA Route (2005). Route crosses to the west side of the Parks Highway to sword the Trapper Creak wear. The colle- says on the west side of the highway to the north side of the sushins filter Crossing. Route crosses the Sustins River downstream of the existing Parks Highway Bridge and parallel the highway on the south and west for approximately? I'miles, approximately 5 more miles. At this point, the route leaves the highway toward the east and follows the Mateniask Electric Association (MEA) power line ROW, intersecting the Alaska Rorry Authority (AEA) Interte sligment. The route turns the Alaska Railroad to the southern terminus of the Intertie at Willow.	glaciat III over bedrock, and bedrock and altuvial deposits in the river floodplains. Permafrost is mostly absent but itolated pockets may occur where protected by thick organics. Permafrost soils are likely thaw unstable.	27.3	None	21	15	81738.8	1	0		3.5	Stream crossings are average and potentially impacted wetlands are well above average. Overall permitting average. Overall permitting average average of the permitting average of the permitting average of the permitting permitting permitting permitting permitting required for the project can be found in Appendix 4-1.		permafrost present; wetlands present; <u>Biological</u> : alpine tundra, high shrub thicket and spruce-hardwood forest; anadromous streams; moose, bear, sheep, furbearing and avian species present: human: Montana &	subsistence harvests of fish & game; moose ruting, winter and calving concentration areas; Trumpeter Swan nesting and brood rearing concentration area; Migratory Bird Act restrictions on clearing vegetation; avoidance of known nesting areas; <u>Human</u> : Historical and archeological land impact mitigation;		2.5		2.	9
	Parks Hwy	The Parks Highway leaves Trapper Creek to the south and crosses the Sustina River approximately 10-miles from Trapper continues and the second second second second River to Willow.	Soils consist of silts over glacialfluvial deposits, glacial till over bedrock, and bedrock and allivial mostly appeared to the construction of th	28.8	None	11	9	3996.9	0	1		2.5	Stream crossings are below average and potentially impacted wetlands are well below average. Overall permitting issues and concerns are not substantial concerns are not substantial propions. A full matrix of potential permits required for the project can be found in Appendix 4-1.	3.0	Physical: Transition zone climate; some discontinuous pernalrost present; vettantos present: <u>Biological</u> : alpine tundra pernalrost present; vettantos present: <u>Biological</u> : alpine tundra etramat; mosa, bean sheep, tultering and avian species present: ne endangered species present: <u>Humar</u> : Montana Amounta, caveli: Sheep (zeros. Sustanta Landing; to take the present species present) and the present species present tultering. Lake, Willow; MEA; Local Businesses	Physical: engineering issues related to extreme cold, permafrox, wetlands and selamicity, <u>Biological</u> : recreational & calving concentration areas, Trumpers Swan nesting and broad rearing concentration areas, Trumpers Swan nesting and broad rearing concentration areas, Edigratory Bird Act restrictions on clearing vegetation, avoidance of homo nesting areas; <u>Human-</u> catering vegetation, avoidance of homo nesting areas; <u>Human-</u> Recreational hunting & fishing disturbances; Population impacts along highway residences; Boom-bust impacts on highway-proximity businesses		3.0		2.	8
	AEAI		Sails consist of silns over glacialtivisid deposits, glacialtitil over bedroot, and beforck and allivisid deposits in the river floodplains. Permafrost is mostly absent but isolated pockets may occur where protected by thick organics. Permafrost colds are tilled that the control of the cont	27.1	None	25	18	71810.7 (Partial Wetlands)	0	0		3.5	Stream crossings are above average and potentially impacted wetlands are well above average. Overall permitting issues and concerns are not substantially different between the route options. A full matrix of potential permits required for the project can be found in Appendix 4-1.	2.0	permafrost present; wetlands present; <u>Biological</u> : alpine tundra, high shrub thicket and spruce-hardwood forest; anadromous streams; moose, bear, sheep, furbearing and avian species present; no endangered species present; <u>Human</u> : Montana & Montana Creek: Caswell: Sheep Creek: Sustina Landing:	subsistence harvests of fish & game; moose ruting, winter and calving concentration areas; Trumpeter Swan nesting and brood rearing concentration area; Migratory Bird Act restrictions on clearing vegetation; avoidance of known nesting areas; <u>Human</u> : Historical and archeological land impact mitigation;		1.5		2.	4
	ARRC	The route leaves from Talkesina, heads south, dong the east side of the Susina River into Willow.	Soils consist of allin over glaculativist depends, glacid fill over helproch, and beforch and allivist deposits in the river floodplates. Permetrost is morely assert but satisfied prockets may occur where protected by shall engages. Permetrost only are their protected and all are their phase unstables.	28.4	None	29			1	•		3.0	Stream crossings are above average and potentially impacted wetlands are unknown. Overall permitting issues and concerns are not substantially different between the rous options. A full matrix of potential permits required for the project can be found in Appendix 4-1.	2.5	Pyracial Transition zone climate zone discontinuous permalinas present, velandap present, <u>Biological a</u> ajune tundra high shrub thickes and spruce-hardwood forest; anddomous tenent, mouse, bees, shees, thirteening and sives species and the species of the species of the species of the species of the species of the species florana Creek, Caswell: Steine Creek, Statista, Landing, becapition, Creek, S becladed Lake Demogrounde, Rashwitza Lake, Willow Creek State Rocreasional Area, Willow, MEA; Local Dusinesses	<u>Employ</u> engineering issues related to extreme cold, permatrices, whereas and estimative, (<u>Holicolasti recreational & subsistance harvests of fish & game</u> , moore ruthing, where and calving concentration areas, <u>Throniesto Saan resting</u> and brood calcular concentration areas, <u>Throniesto Saan resting</u> and brood dearding vogeration, areas through the concentration of the control of the control of the control of the control of the control of the control of Recreational hunting & fishing disturbances. Population impacts along highway residences. Boom-bust impacts on highway proximity businesses	2.5	1.0		2.:	3

Sheet. Talk Jun to Willow
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				1									T					T	
							1	Engineering	g				Permitti	ing		Socio Economic		Right-of-Way	Weighting
Segment	Route Option	General Route Description	Terrain Description	Segment Length [miles]	Significant Engineering Obstacles	Stream C	Crossings Anadromous Fish	Wetland Areas (linear feet)	No. of Major Road No	o. of Railroad Crossings	Approx. Length on New Workpad	Rating (0 = Lowest, 5 = Highest)	Permitting Analysis	Rating (0 = Lowest, 5 = Highest)	Affected Environment	Potential Impacts	Rating (0 = Lowest, 5 = Highest)	Rating (0 = Lowest, 5 = Highest)	Engr Permits Socio-Econ ROW 25.00% 25.00% 25.00% 25.00%
Willow to ENSTAR line (Wasilla)	Denali	Denail Pipeline Route (1992): Proceeds along the Parks Highway through Houston, At Houston, the route follows the powerine ROW, was of Wasilla, crosses Lucile Creek and Fish Creek to Point Mackenzie Road.	Through Houston, soils are silts over glacialitival deposits. South of Houston, the soils consist of thick silts and muskey deposits over glacialitival deposits and abused deposits in floodplains. Permafrost is mostly absent.	15.9	Castle Mountain Fault	8	5	4.7	2	2		2.5	Stream crossings are slightly above average and potentially impacted wetland are well below severage. Overall of the stream of t	2.5	Physical: Transition zone climate; some discontinuous permair des present; Belogiagi: slajne tundra, high shrub thicket and spruce-har descord forest; the state of spruce-har descords, measilies; Palmer Hay Flats State Game Refluge; Big Lake Recreation Area; Substate Game Refluge; Iditated Astional Historic Trail; Mat-Su Chamber of Commerce & Local Businesses;	Physical: engineering issues related to extreme cold, permutrost, wetlands and estemicity; Biological: receivational & subsistent charvests of fish & game, moose retring, witner and artistic personal programment of the personal programment of known nesting areas; thuman; Miligation archivingsets on excitoral fathing and hunting activities; Communications with community councils; Historical and archeological properties; Propulation impacts on sociocultural norms; Visual and noise impacts of construction; Boombust impacts on local businesses	2.5	2.0	2.4
	ANGDA	northwest of Houston. From this point, the route follows the	Through Houston, soils are silts over glacializated adoptions to south of Houston, the soils consist of thick silts and muskeg deposits over glaciafluvial deposits and altuvial deposits in floodplains. Permarrost is mostly absent.	35.4(Willow to Jct of Parks and Glenn)	Castle Mountain Fault	13	13	40390.6	3	2		2.5	Stream crossings are above average and potentially impacted wetlands are above average. Overall permitting issues and concerns are not substantially different as the control of the project can be found in Appendix 4-1.	2.0	Physical: Transition zone climate; some discontinuous permarrost present; welfands present; Biological: apline tunda, high shrub thicket and spruce-hardwood forest; anadromous streams; moose, bear, sheep, furbearing and avian species present; no Lack State Rosension Area, Hooston, Wasilla; Palmer Hay Flats State Game Refuge; Big Lake Recreation Area, Subanch, Wasilla; Palmer Hay Flats State Game Refuge; Sig Lake Game Refuge; Milarod Asian Alisonia State Game Refuge; Milarod Asian Alisonia Historia Trail; Mat-Su Chamber of Commerce & Local Businesses;	councils; Historical and archeological properties;	2.5	2.0	2.3
	AEAI	The route leaves from the east side of Talkeetna, heads in a southwest direction, roughly paralleling the Susitna River.	Solis consist of silts over glacialfluvial deposits, glacial till over bedrock, and bedrock and sluvial deposits in the river tilcodeplains. Permatrost is mostly absent but isolated pockets may occur where protected by thick organics. Permatrost soils ar	23.7	Parks Highway	9	10	48609.5	1	1		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Alt 1	AI Willow, the alignment continues to follow the Susitina River, through the Castle Mountain Fault Jone and near the Nancy Lake State Recreation Area, terminating at the existing ENSTAR 20-in pipeline near MP 39,	Through Houston, solis are allis over glacialtivial deposits. South of Houston, the solis consist of thick silts and muskeg deposits over glaciotifivial deposits and alluvial deposits in floodplains. Permafrost is mostly absent.	29.9	Castle Mountain Fault	9	6	21982.9	0	0		4.5	Stream crossings are slightly above average and potentially impacted wellands are average. Overall permitting issues and concerns are not substantially different between the route options. A full matrix of potential permits required for the project can be found in Appendix 4-1.	3.0	Physical: Transition zone climate; some discontinuous permarlost present; withands present; <u>Biological</u> : alpine tundra, high shrub thicket and spruce-hardwood forever. anadromous streams; moose, bear; sheep, rutherating and avian species present; no endangered species present; <u>Human</u> : Nancy Lake State Recraotion Area, Sustina River, Red Shirt Lake, Hock Lake, My Lake	Impacial, engineering issues related to extreme cold, permarkors, withdrash and seismicity; Biological: recreational & subsistence harvests of fish & game, moose ruttine, wither and calving concentration areas; Migratory Bird Act restrictions on chearing vegetation, avoidance of known nesting areas; Human; Miligation of impacts on recreational fishing and hunting activities	3.0	4.5	3.8
		The route continues along the Parks Highway and crosses the Castle Mountain Fault near Houston. The alignment then turns west and follows Big Lake Road, terminating at the existing ENSTAR 20-in pipeline near MP 39.	Through Houston, soils are silts over glacialfluvial deposits. South of Houston, the soils consist of thick silts and muskeg deposits over glaciofluvial deposits and alluvial deposits in floodplains. Permafrost is mostly absent.	36.0	Castle Mountain Fault	4	3	4952.6	0	0		3.5	Stream crossings are below average and potentially impacted wellands are well below average. Overall permitting issues and concerns are not substantially different between the route options. A full matrix options. A full matrix option potential permits required for the project can be found in Appendix 4-1.	3.0	Physical: Transition zone climate; some discontinuous permafrost present; Wedfands present; Biological: aligine tunda, high shrub thicket and spruce-hardwood forest; anadromous streams; moose, bear, sheep, furbearing and avian species present; no endangered species present; Binam: Big Lake Campgrounds, Big Lake Recreational Blusinesses, Diamond Lake, Jewel Lake, Carpenter Lake	Physical: engineering issues related to extreme cold, permifrost, wetlands and seismicity; Biological: recreational & subsistence harvests of fish & game, mose rutning, winter and calving concentration areas; Migratory Biol Andread Concentration areas; Migratory Biol Andread Carlesticitors on clearing vegetation; avoidance of restrictions on clearing vegetation; avoidance of impacts on recreational fishing and hunting activities, Soon-bust impacts on recreational business in Big Lake area. Propulsition impacts during summer construction in Big Lake area	2.5	3.0	3.0
		terminates at the	glacialfluvial deposits. South of Houston, the oils consist of thick aits and muskeng deposits over glacialfluvial deposits and deposits in modelplains. Permafrost is mostly absent.	24.6	Castle Mountain Fault	2	3	3988	0	0		3.5	Stream crossings are below average and potentially impacted weltands are well below average. Overall permitting issues and concerns are not substantially different between the route options. A full matrix of potential permits required for the project can be found in Appendix 4-1.	3.0		Totalical: regineering issues related to extreme color permature, wetwards and selementary (Sological: recreational & substainence harvests (Sological: recreational & substainence harvests of fish & game, moose ruttine, wither and calving concentration areas; Migratory Bird Act restrictions on clearing vegetation, avoidance of known nesting areas; Human: Population impacts on socioutural anoma of Houston area, Construction disturbances to AEAI intertie	2.5	2.5	2.9
	Alt 4	The route continues along Parks Highway from Willow, crosses the Castle Mountain Fault near Houston and terminates at the junction of the Parks Highway and the existing ENSTAR 4-in pipeline.	Through Houston, soils are allts over glacialfivial deposits. South of Houston, the soils consist of thick silts and muskeg deposits over glaciofitivial deposits and alluvial deposits in floodplains. Permafrost is mostly absent.	25.4	Castle Mountain Fault	4	1	0	0	0		3.0	Stream crossings are below average and there are no potentially impacted welfands. Overall permitting issues and concerns are not substantially different between the route options. A full matrix of potential permits required for the project can be found in Appendix 4-1.	2.5	Physical: Transition zone climate; some discontinuous permarfost present; wellands present; <u>Biologica</u> : alpine tundra, high shrub tricket and spruce-bardwood forest; anadromous streams; moose, barz, sheep, truhearling and avian spectes present; no endangered species present; <u>Himmar</u> ; Lucile Creek, Houston, Krisk Goose Bay Road	Physical: engineering issues related to extreme codd, permaforal, wetlands and selemicity; Biological: recreational & subsistence harvests of fin & game, moose ruttine, wither and calving concentration areas; Migratory Bird Act restrictions on clearing vegletation, avoidance of restrictions on chearing vegletation, avoidance of the property of the	2.5	2.0	2.5

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							Eng	gineering		•		Permitti	ng		Socio Economic		Right-of-Way		Weigh	ting	
Segment	Route Option	General Route Description	Terrain Description	Segment Length [miles]	Significant Engineering Obstacles	Stream Cr Total Number	Anadrom	Wetland Areas	No. of Major Road Crossings	No. of Railroad Crossings	Rating (0 = Lowest, 5 = Highest)	Permitting Analysis	Rating (0 = Lowest, 5 = Highest)	Affected Environment	Potential Impacts	Rating (0 = Lowest, 5 = Highest)	Rating (0 = Lowest, 5 = Highest)	Engr 25.00%	Permits 25.00%	Socio-Econ 25.00%	ROW 25.00%
to Paxson		intersection.	with soils consisting of glacial tills with thin silt	76.5	Five Pipeline Crossings, Donnelly Dome Fault Crossing, DenallyHinz/McGinness Fault Crossings, Delta River Floodplain Crossing	46	3	N/A in existing reports	6	0	2.0	Stream crossings are average and there are no potentially impacted wetlands. Overall permitting issues and concerns are not substantially different between the route options. A full matrix of potential permits required for the project can be found in Appendix 4-1.	2.5	Human: Delta Junction; TAPS; Ft. Greely		2.5	1.5		2.	1	
	TAGS	above the river valley. The route returns to the east	with soils consisting of glacial tills with thin silt cover. South of Donnelly the terrain steepens as the route ascends into the mountainous terrain of the Alasak Range, Soils exhibit conditions that alternate from floodplain deposits to coarse fan deposits to glacial deposits (till) over shallow bedrock. The soils in this segment are generally unfrozen in the active floodplain areas and	77	Donnelly Dome Fault Zone Crossing, McGinnis Glacier Crossing, Denall Fault Crossing	42	0	N/A in existing reports	9	0	4.0	Stream crossings are below average and there are no potentially impacted wetlands. Overall permitting issues and concerns are not substantially different between the route options. A full matrix of potential permits required for the project can be found in Appendix 4-1.	2.5	Physical: Continental climate; seismically active; permatrost present; no documented wetlands; Biological: Bogimuskeg, alpine tundra, high shrub thicket and spruce-hardwood forest; no anadromous streams crossed; moose, bear, caribou, sheep, turbearing and avian species present; no endangered species; <u>Human: Delta Junction:</u> TAPS; Ft. Greely (Missile Defrens Developmen Site); Allen Air Field (Army); Black Rapids (Training Site), Sargent & Raylo Creek Miries; Gulkana Giscier Training Site (Army); Summit Lake Recreational Area	Physical: engineering issues related to extreme cold, permatrost and seismicity; <u>Biologicals</u> recreational & subsistence harvests of fish & game; Migratory Bird Act restrictions on clearing vegetation; avoidance of known nesting areas; <u>Human</u> : 1. Quality-of-LifePopulation impacts on Debta Junction; 2. Potential Permitting Challenges Through/Algoent to Dol Property; 3. Power Generation to Area Mines; 4. View & Noise Impacts to Recreational Areas	2.5	2.5		2.	9	
	Rich Hwy	the TAPS approximately 10 miles from Delta Junction, turns east traveling around the Donnelly Dome, meeting the TAPS again approximately 9-miles south of turn-off around Donnelly Dome. Route continues along the east side of the Delta River, crossing the TAPS twice just north of Darling Creek. It continues along the east side of the Delta River until Phelan	the route ascends into the mountainous terrain of the Alaska Range, Soils exhibit conditions that alternate from floodplain deposits to coarse fan deposits to glacial deposits (till) over shallow bedrock. The soils in this segment are generally unfrozen in the active floodplain areas and discontinuously frozen in the upland areas. Frozen	79.9	Donnally Donna Fault Zone Crossing, McGinnis Olacier research Crossing, TAPS Crossing x 3	53	7	N/A in existing reports	0	0	3.0	Stream crossings are slightly above average and there are well and the stream of the s	2.5	Physical: Continental climate selemically active, permatrical present; no documented active, permatrical present; no documented active, permatrical present; no documented active and active and active activ	Physical: engineering issues related to extreme cold, permatriost and selsmicity. <u>Biological</u> 6 and selsmicity. <u>Biological</u> 6 and	2.5	2.5		2.	6	

Sheet: Delta Junt to Paxson
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						Er	ngineering	1				Permittir	ng		Socio Economic		Right-of-Way		Weig	hting	
S	Route Option	General Route Description	Terrain Description	Segment Length [miles]	Significant Engineering Obstacles	Stream Crossings Total Anadrom Number ous Fish	Wetland Areas	No. of Major Road	Railroad	Approx. Length on New Workpad	Rating	Permitting Analysis	Rating	Affected Environment	Potential Impacts	Rating	Rating	Engr 25.00%	Permits 25.00%	Socio-Econ	
Paxson to Glennallen	ANGDA/	ANGDA Route (2005): Follows the existing TAPS ROW. Begins at TAPS milepost 611.6, approximately 5 miles north of Paxson and Denail Highway intersection, and continues to TAPS milepost 684.5, in Copper River Valley, near Glennallen.	Terrain in the northern portion of this segment (Paxson to Hogan		Obstacles Guikans River Crossing, Refrigerated Workpad	18 2	Areas 90359.9 (Partial Wetlands)	Crossings	Crossings	Workpad	2.0	Permitting Analysis Stream crossings are everage and potentially impacted and potentially impacted cellends are above everage. Overall permitting issues and concerns are not substantially different between the route options. A full matrix of potential permits required for the project can be found in Appendix 4-1.	2.5	Physical: Continental climate; seismically active; permafrost present; <u>Biological</u> : Bog-muskeg,	Physical: engineering issues related to extreme cold, permafrost and seismicity Biological: recreational & subsistence harvests of fish & game; Migratory Bird Act restrictions on clearing vegetation; avoidance of known nesting areas;	Highest)	1.5	23.00%		.1	23.00
	TAGS	Gulkana Wild and Scenic Rivers Conservation Unit. The route heads southwest to the Gulkana River, where it crosses approximately 22 miles from Glennallen. The route continues south and follows along the east side of the aboveground TAPS to Glennallen.	Hill) is rolling with steep cross-slopes. Soils are primarily glacial till overlying shallow bedrock. The northern segment lies in thaw unstable continuous to discontinuous permafrost where areas of outcropping bedrock, south facing slopes and stream crossings may be unfrozen to sporadically frozen. The southern segment contains gently rolling to moderately level terrain that are	64.2	Gulkana River Crossing	19 3	150363.2 (Partial Wetlands)	2	0		4.0	Stream crossings are average and potentially impacted wellands are above average. Overall permitting issues and concerns are not substantially different between the route options. A full matrix of potential permits required for the project can be found in Appendix 4-1.	2.5	spruce-hardwood forest; anadromous streams; moose, bear, caribou, sheep, furbearing and avian	Indigial: engineering issues related to estateme cold permaners and seismicity Biological recreational & subsistence harvests of fish & game: Migratory Bird Act restrictions on clearing vegetation; avoidance of known nesting areas; Human: 1. Subsistence Area Disturbances; Zeneradional Fishing Impacts; S. Needed cooperation with ArtTMA on sharholder outreach and employment; 4. Socio-cultural (crime & quality of title) impacts along route	2.5	2.5		2	.9	
	Rich Hwy		Hill) is rolling with steep cross-slopes. Soils are primarily glacial till overlying shallow bedrock. The northern segment lies in thaw unstable continuous to discontinuous permafrost where areas of outcropping bedrock, south facing slopes and stream crossings	71.2	Gulkana River Crossing, TAPS Crossing	25 5	14838.8 (Partial Wetlands)	0	0		3.0	Stream crossings are above average and potentially impacted wellands are below average. Overall permitting issues and concerns are not substantially different between the route options. A full matrix of potential permits required for the project can be found in Appendix 4-1.	2.5	spruce-hardwood forest; anadromous streams; moose, bear, caribou, sheep, furbearing and avian species present; no endangered species; <u>Human</u> : City of Paxson, Paxson Lake Campgrounds;	Human: 1. Subsistence Area Disturbances; 2. Recreational Fishing Impacts; 3. Needed cooperation with AHTNA on shareholder outreach and employment; 4.Socio-cultural (crime & quality of life) impacts along route		2.5		2	.6	

Sheet: Paxson to Glennallen
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								Engine	ering				Permitti	ing	S	ocio Economic		Right-of-Way		Weighting	
Segment	Route Option	General Route Description	Terrain Description	Segment Length [miles]	Significant Engineering Obstacles	Stream C Total Number	crossings Anadrom ous Fish	Wetland Areas (linear feet)	No. of Major Road Crossings	No. of Railroad Crossings	Approx. Length on New Workpad	Rating (0 = Lowest, 5 = Highest)	Permitting Analysis	Rating (0 = Lowest, 5 = Highest)	Affected Environment	Potential Impacts	Rating (0 = Lowest, 5 = Highest)	Rating (0 = Lowest, 5 = Highest)	Engr 25.00%	Permits Socio-E 25.00% 25.00	
Giennalien to Eureka	ANGDA	directly west for approximately 16.2 miles before turning southwest and joining the the Glenn Highway ROW. It continues through th juncture of Glenn Highway, west of Glennallen, proceeds to the west, within the highway ROW across the remainder of	sloping to flat terrain comprised of the "GL" landform common in the Copper River Basin. The "GL" soils include varved clay, silty clay, clayey silt, very fine sand, and occasional layers of sand, gravel, cobbles, and boulders. Thermal Conditions in the Copper River Basin are		Winter Construction	30	3	92927.1	2	0		4.0	Stream crossings are average and potentially impacted wetlands are above average. Overall permitting issues and concerns are not substantially different between the route options. A full matrix of potential permits required for the project can be found in Appendix 4-1.	2.5	shrub thicket and spruce- hardwood forest; anadromous streams; moose, bear, caribou sheep, furbearing and avian species present; no endangered species; <u>Human</u> : Wrangell-St. Elias National Park; Glennallen; AHTNA; Lak Louise State Recreation Area; Tazlina Lake Recreational Area Matanuska-Sustina Borough; Copper Valley Electric	related to extreme cold, permafrost and seismicity; Biological; recreational & subsistence harvests of fish & game; Netchina Caribou herd is an important harvest; Migratory Bird Act restrictions on clearing vegetation; avoidance of known nesting areas; Human: Subsistence Impacts to Athapaskan and Tatlatan; Disturbance to sport hunting	2.5	3.0		3.0	
	Glenn Hw	Route crosses the TAPS one last time after turning west on the Glenn Highway from the Richardson Highway. The route continues west along the north side of the Tazlina River and heads in a southwesterly direction through the MatSu Borough to Eureka.	sloping to flat terrain comprised of the "GL" landform common in the Copper River Basin. The "GL" soils include varved clay, silty		TAPS Crossing	27	3	377.8 (Partial Wetlands)	0	0		3.5	Stream crossings are average and potentially impacted wetlands are below average. Overall permitting issues and concerns are not substantially different between the route options. A full matrix of potential permits required for the project can be found in Appendix 4-1.	3.0	hardwood forest; anadromous streams; moose, bear, caribou sheep, furbearing and avian species present; no endangered species; <u>Human;</u> Wrangell-St. Elias National Park; Glennallen; AHTNA; Lak Louise State Recreation Area; Tazlina Lake Recreational Area Matanuska-Susitna Borough; Copper Valley Electric	related to extreme cold, permafrost and seismicity; <u>Biological</u> : recreational & subsistence harvests of fish & game; Nelchina Caribou herd is an important harvest; Migratory Bird Act restrictions on clearing vegetation; avoidance of known nesting areas; <u>Human:</u> Subsistence Impacts to Athapaskan and Tatlatan;	2.5	2.0		2.8	

Sheet: Glennallen to Eureka
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							Engineer	ing				Permittin	g	s	ocio Economic		Right-of-Way		Weighting	ı
Segment	Route Option	General Route Description	Terrain Description	Segment Length [miles]	Significant Engineering Obstacles	Stream Crossing Total Anadr Number ous Fi	Areas om (linear	No. of Major Road Crossings	No. of Railroad Crossings	Approx. Length on New Workpad	Rating (0 = Lowest, 5 = Highest)	Permitting Analysis	Rating (0 = Lowest, 5 = Highest)		Potential Impacts	Rating (0 = Lowest, 5 = Highest)		Engr 25.00%	Permits Soci 25.00% 25.	
Eureka to Chickaloon		of the Eureka Roadhouse, where the highway heads southwest to skirt Gunsight Mountain, deviates from the highway and travels to the west down the Squaw Creek drainage. At Squaw Creek and Caribou Creek, the route will angle north and ascent Caribou Creek drainage up to Chitna Pass. After Chitna Pass, the route descends the Boulder Creek Valley and crosses	This segment transitions out of the "GL" soils into the rolling hills of the Talkeetna Mountains. The majority of the segment is located in or near floodplains and streambeds. However, a portion of the segment travels through steep mountainous terrain. Soils consist of thick silts and organic (muskeg) deposit over glaciforlival deposits, and alluvial deposits in river floodplains. The glacifoliuval and alluvial deposits may also contain large boulders. Soils in the mountainous terrain most likely consist of silts and sands overlying weathered bedrock. Permafrost in this segment is sporadic with mostly thaw stable soils.		Remote Location, Castle Mountain & Carlbou (X4) Fault Crossings, Chickaloon River Crossing	58 1	13385.1	0	0		2.5	Stream crossings are above average and potentially impacted wetlands are above average. Overall permitting issues and concerns are not substantially different between the route options. A full matrix of potential permits required for the project can be found in Appendix 4-1.	2.0	climate; seismically active; permafrost present; <u>Biologicat</u> Alpine tundra, high shrub thicket and spruce-hardwood forest; anadromous streams; moose, bear, caribou, sheep, furbearing and avian species present; no endangered species; <u>Human</u> : Mat-Su Borough;	harvests of fish & game; Matanuska Valley Moose Range is extensively utilize for moose harvest; Nelchina Caribou her is an important harvest; Migratory Bird Act restrictions on clearing vegetation; avoidance of known nesting areas;	— —	2.5		2.3	
	Glenn Hwy	Route continues from Eureka in a southwest direction along the north side of the Matanuska River, past the Matanuska Glacier to Chickaloon.	After transitioning out of the "GL" soils the route travels through soils consisting primarily of thick stilts and organic (muskeg) deposit over glaciofluvid eposits, and alluvial deposits. Bedrock is present along a large portion of the route with numerous outcrops located along select portions of the highway. Permafrost in this segment, although mostly absent, is sporadic with mostly thaw stable soils.	46.6	Caribou Creek Crossing, Castle Mountain Fault, Pinochle Hill, Generally difficult construction		0	0	0		3.0	Stream crossings are below average and there are no potentially impacted wetlands. Overall permitting issues and concerns are not substantially different between the route options. A full matrix of potential permits required for the project can be found in Appendix 4-1.	3.0	climate; seismically active; permafrost present; <u>Biologicat</u> Alpine tundra, high shrub thicket and spruce-hardwood forest; anadromous streams; moose, bear, caribou, sheep, furbearing and	Physical: engineering issues related to extreme cold, permafrost and seismicity; Biological: recreational & subsistence harvests of fish & game; Matanuska Valley Moose Range is extensively utilize for moose harvest; Nelchina Caribou here is an important harvest; Migratory Bird Act restrictions on clearing vegetation; avoidance of known nesting areas; Human: Historical and archeological properties; Tourism disruption during construction; Usual impacts during construction; Economic (boom-bust) impacts on small business along highway		2.5		2.8	

Sheet: Eureka to Chickaloon
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	Route Option	General Route Description	Terrain Description				Engine	perina				Permitting		Socio Economic			Right-of-Way	Weighting		
Segment				Length Engi	Streanificant ineering Totastacles Numb		n Wetland	No. of Major Road Crossings	No. of Railroad Crossings	Approx. Length on New Workpad	Rating (0 = Lowest, 5 = Highest)	Permitting Analysis	Rating (0 = Lowest, 5 : Highest)		Potential Impacts	Rating (0 = Lowest, 5 = Highest)	Rating (0 = Lowest, 5 = Highest)	Engr 25.00%	Permits Socio-	
Chickaloon to Palmer		ANGDA Route (2005): Begins near Chickaloon, heading west and follows portions of the Chickaloon Trail then continues	This segment crosses rolling hills and several drainages. Soils consist of thick silts and organic (muskep) deposit over glaciofluvial deposits, and alluvial deposits in river floodplains. Soils in the along the hillsides may also include the presence of silts and sands overlying weathered bedrock. Permafrost is mostly absent.	36.4 Moos	se Creek 18	11	14332.4	0	0	2227	3.0	Stream crossings are average and potentially impacted wetlands are slightly average. Overall permitting issues and concerns are not substantially different between the route options. A full matrix of potential permits required for the project can be found in Appendix 4-1.		Physical: Continental and transition zone climate; seismically active; permafrost present; Biological: Alpine tundra, high	Physical: engineering issues related to extreme cold, permafrost and seismicity; Biological: recreational & subsistence harvests of fish & game; Matanuska Valley	3.0	2.0		2.6	
	Glenn Hwy		This segment crosses rolling terrain with soils consisting of thick silts and organic (muskeg) deposit over glaciofluvial deposits, and alluvial deposits in river floodplains. Bedrock is not uncommon along this segment. Permafrost is mostly absent.		se Creek 7	6	0	0	0		2.5	Stream crossings are average and there are no potentially impacted wetlands. Overall permitting issues and concerns are not substantially different between the route options. A full matrix of potential permits required for the project can be found in Appendix 4-1.	3.0	Physical: Continental and transition zone climate; seismically active; permafrost present; <u>Biological</u> : Alpine tundra, high shrub thicket and spruce-hardwood forest; wetlands; anadromous streams; Matanuska River; mose, bear, caribou, sheep, furbearing and avian species present; no endangered species; <u>Human</u> ; Mat-Su Borough; Chickaloon Village Traditional Council; Matanuska Valley Moose Range; Caribou Creek; Palmer; Alpine CC; Butfalo/Soapstone CC; Farm Loop CC; North Lakes CC; Gateway CC; South Lakes CC; Palmer Hay Flats State Game Refuge; Matanuska River; Area Businesses	Physical: engineering issues related to extreme cold, permafrost and seismicity; Biological: recreational & subsistence harvests of fish & game; Matanuska Valley Moose Range is extensively tuilized for moose harvest; Migratory Bird Act restrictions on clearing vegetation; avoidance of known nesting areas; Palmer Hayflats Game Refuge extensively used for waterfowl harvest; Human; Historical and archeological properties; Tourism disruption during construction; Visual impacts during construction; Economic (boom-bust) impacts on small business along highway	2.5	2.0		2.5	

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