ARRC WASILLA REALIGNMENT
ALTERNATIVES ANALYSIS

Legend

City of Wasilla Boundary

Corridor

Downtown Wasilla

Composite Score
- 13 - 23
- 24 - 29
- 30 - 69

Alignment Name
- Northern Corridor
- Southern Corridor 1

NORTH

0 0.25 0.5 1 Miles

HDR Alaska

Alaska Railroad Corporation Established 1914

FIGURE 26 REPRESENTATIVE ALIGNMENTS

Southern Corridors 2 and 3. Southern corridors 2 and 3 are the longest of the routes. In doing so they also tend to have higher numbers of impacts. Both of these routes have overall constraint scores above 5 million. They also impact among the most amounts of wetland (with Southern Corridor 3 affecting the most at 80 acres; more than twice any of the alternatives recommended to be carried forward). Because they are the longest they would also likely cost the most. Southern Corridor 2 is particularly impactive where it traversed Cottonwood Creek between Knik Goose Bay Road and Suburban Drive. In this location it has serious impacts to the creek, wetlands, and two major residential subdivisions. Southern Corridor 3, aside from being the longest, adds considerable curvature at is southwestern most point. Such curvature and length does not satisfy the components of the purpose and need seeking to reduce curvature and travel time through the alignment. Because there are shorter alternatives, which meet the purpose and need with lower impact scores, these alternatives were rejected.

City Route E. City route E has one of the highest totals of flawed cells (20,921) to be traversed and also has among the highest impacts to wetlands (58 acres). The eastern segment of this alignment is where most of the impacts occur. This eastern segment will largely be unneeded when the ARRC completes the South Wasilla Track Realignment (currently undergoing conceptual engineering and an environmental assessment). The alignment followed in the SWTR project roughly follows the City's propose Alternative E alignment, but it was shifted to avoid the wetland impacts and a potentially eligible historic site. That project ends at milepost 158.

Computer Generated Routes. While both of the computer generated routes had relatively low constraint scores and compare fairly against the environmental factors, they to do not represent alignments that are acceptable from an engineering perspective. The computer does not generate alignments with acceptable curvature, but rather jumps from good cell to good cell in a herky-jerky line. While it was an interesting analytical exercise, it did not generate acceptable alignments.

Alignments to Be Carried Forward

As mentioned earlier, there are two primary corridors to be further pursued, with alignment variations that will require additional engineering and environmental analysis to make a final location decision.

Northern Corridor Routes. Three of the city's proposed routes (A, B, and C) show promise and should be further evaluated as design/engineering variations of a northern corridor route. While not fully within the ARRC identified corridors, these routes have scores and evaluation factor results which make them difficult to eliminate without additional engineering and environmental work. The segments located outside of the identified corridors, however, are where the greatest challenges of these alignments occur. Routes B and C traverse perpendicular to areas of considerable slope that will either require extensive fill (which occurs across identified wetland areas) or long, expensive structures. As a result of this difficult terrain, these routes did not score as well as the ARRC identified route (identified as the "northern Corridor Route in Table 15 (City Alternative A is the closest of the city alignments to the one evaluated in Appendix A by the ARRC).

The "Northern Corridor" route has the lowest overall constraint score, the lowest constraint per foot score, and lowest acreage of wetlands affected of any of the northern corridor routes. For these reasons it was chosen as a representative route for conceptual engineering and cost estimating as part of this alternatives analysis (see Appendix A).

The north alternative is approximately 4.59 miles long, involves 4 structures (bridges/grade separated crossings) and will cost approximately $83,000,000. It will reduce travel time by 2.9 minutes and reduce the curvature by 78 degrees. See Appendix A for more details about the north alternative.

Southern Corridor Routes. There are two southern corridor routes, which are essentially design variations of each other. Based on the level of information available and the engineering that has occurred, it is not possible to recommend one over the other without additional engineering and environmental work. Because Southern Corridor 1 has the lower constraint score, fewer flawed cells, and a lower constraint/linear foot, and affects fewer residential parcels, it was selected as the representative route for conceptual engineering and cost estimating as part of this alternatives analysis (see Appendix A).

The south alternative, assuming the South Wasilla Track Realignment is built, is approximately 8.11 miles long, involves 7 structures (bridges/grade separated crossings) and will cost approximately $129,500,000. It will reduce travel time by 2.8 minutes and reduce the curvature by 244 degrees. See Appendix A for more details about the north alternative.

Findings and Recommendations

There are a number of findings and recommendations gleaned by the team that can be taken away from this analysis.

- There are two reasonable corridors that should be further explored during NEPA and preliminary engineering (1) a northern corridor and (2) a southern corridor. Appendix A contains conceptual engineering drawings of representative alignments within those corridors based on the evaluation measures explored in this document. Alignment alternatives would be developed during the next phase of the project.
- A northern corridor that traverses from near MP 158 to 163 that could start either east or west of the City Sewage Treatment Plant. Additional engineering should be performed to finalize the location of the alignment relative to the severe terrain and associated engineering costs of dealing with that terrain.
- The opportunity for a highway bypass to coincide with the northern railroad corridor, would hinge on the ability to construct an interchange in the vicinity of South Hermon and the Parks Highway. Further engineering should be performed to evaluate this interchange. Further discussion with ADOT&PF is required.
- Land development is rapidly closing opportunities to complete the northern corridor. One critical location is the parcel of land south of Lake Lucille Park, but north of the ball fields/subdivisions. New subdivisions in this last relatively open corridor could close off opportunities for a northern bypass. If too much time passes, southern bypass options may become the only reasonable choice.
- No reasonable corridors for rail bypass on the north side of the Parks Highway were identified. Extensive development, lakes, and roadways block that route.
- Southern corridor routes, while longer, provide greater flexibility for alignment variation to avoid and minimize project related impacts.

Table 15 Analysis Summary

	Alignment	Length (linear feet)	Area (acres)	Constraint Score[1]	Constraint Score Breakdown (# of Cells)	Constraint Score/Linear Foot	Wetland (acres)	Number of parcels with a building appraised value over $100,000	Number of Residential Parcels	Number of Stream Crossings	Number of Road Crossings[2]	Gravel sub surface (% of Corridor with > 15% gravel content)	Substantially within Corridor
Northern Routes	Northern Corridor	26,450	304	2,847,197	Good:88,198 Acceptable:33,095 Flawed:12,909	108	31.1	17	30	2	6	48.0%	Yes
	City Route A	29,274	336	3,298,717	Good:99,169 Acceptable:36,618 Flawed:14,514	113	35.5	18	27	2	4	50.8%	Yes
	City Route B	30,224	347	3,372,384	Good:101,565 Acceptable:32,913 Flawed:18,599	112	44.7	9	19	2	5	50.7%	Yes
	City Route C	28,197	324	3,084,245	Good:97,596 Acceptable:32,425 Flawed:12,918	109	37.4	12	22	2	6	51.6%	Yes
Southern Routes	Southern Corridor 1	41,890	481	4,385,461	Good:164,150 Acceptable:42,733 Flawed:4,508	105	34.7	16	36	3	8	57.9%	Yes
	City Route D	39,548	454	4,417,796	Good:131,947 Acceptable:55,842 Flawed:11,924	112	34.8	24	44	3	8	47.1%	Yes
Rejected Alternatives	Shortest MP 154-163	38,335	440	4,944,729	Good:84,529 Acceptable:60,052 Flawed:49,072	129	39.1	54	68	3	16	41.6%	No
	Shortest MP 157-163	29,154	335	3,961,717	Good:60,162 Acceptable:36,500 Flawed:51,037	136	32.7	31	67	2	9	37.5%	No
	Section Line MP 154-163	42,993	493	5,254,446	Good: 99,578 Acceptable:87,220 Flawed:29,781	122	31.5	59	96	3	14	79.1%	No
	Section Line MP 158-163	22,742	261	2,883,948	Good:61,310 Acceptable:22,971 Flawed:31,116	231	19.8	41	68	2	10	20.4%	No
	Southern Corridor 2	45,146	518	5,000,984	Good:161,237 Acceptable:56,614 Flawed: 9,830	111	56.8	18	47	4	15	33.1%	Yes
	Southern Corridor 3	48,846	561	5,433,028	Good:168,352 Acceptable:64,504 Flawed:13,325	111	80.3	15	39	4	6	35.1%	Yes
	City Route E	40,777	468	4,607,577	Good:122,109 Acceptable:62,642 Flawed:20,921	113	58.0	16	27	3	7	55.3%	Yes
	Computer Analysis MP 154 – 163	40,595	466	4,369,127	Good:135,870 Acceptable:51,086 Flawed: 16,852	108	21.7	43	73	3	17	54.7%	No
	Computer Analysis MP 158 - 163	25,473	292	2,748,626	Good:85,006 Acceptable:25,784 Flawed: 17,542	108	17.2	39	67	2	10	68.1%	Yes

Key

Constraints which contribute to rejection

Factors used to identify routes on which to perform conceptual engineering

1. The constraint score is the total of all the cell values on the composite map for each of the alignments based on a 500-foot wide corridor (wide enough for highway and rail. Longer alignments tend to have higher scores. To help normalize the alignments for comparison, the total constraint score was divided by the length of the alignment to get a per linear foot rank.
2. To calculate the number of road crossing, the centerline of the 500 foot ROW was used.

- Southern corridor routes (2 and 3) were rejected at this time because of the added length (and therefore greater costs and impacts). If too much time elapses and development continues to sprawl southward from Wasilla, these options may represent the only remaining opportunity for a bypass without incurring even greater costs and impacts.
- The corridor evaluation and/or representative alignments should be adopted into the Mat-Su Borough and Wasilla LRTPs and Comprehensive Plans. Corridor preservation measures should be implemented to both alert prospective homeowners and to preserve the ability to construct a bypass with undo social environmental impacts and right-of-way costs.
- The opportunity for a highway bypass to coincide with the southern railroad corridor, would hinge on the ability to construct an interchange on the Glenn Highway, south of the recently completed Glenn-Parks Interchange. Sufficient separation between the ramps will be required and could be challenging and/or affect the southern corridor alignment. Further engineering should be performed to evaluate this interchange. Further discussion with ADOT&PF is required.
- Three of the city's proposed routes (A, B, and C) show promise and should be further evaluated as design/engineering variations of a northern corridor route. While not fully within the ARRC identified corridors, these routes have scores and evaluation factor results which make them difficult to eliminate without additional engineering and environmental work.

References

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Appendix A

Conceptual Cost Estimates and Alignments

Wasilla Realignment Alternative Analysis

Conceptual cost estimate: single track on double embankment

DESCRIPTION	Pay Unit	Unit Price	South Alternative 8.11 miles Quantity	South Alternative 8.11 miles Amount	North Alternative 4.59 miles Quantity	North Alternative 4.59 miles Amount
TRACK; RAIL & TIES	FT	$250	42,816	$10,704,045	24,254	$6,063,500
Removal of existing track: rail & ties	FT	$9	43,622	$392,598	25,545	$229,905
Powered switches	EACH	$925,000	2	$1,850,000	2	$1,850,000
Non-powered switches	EACH	$150,000	2	$300,000	--	--
BALLAST	YD^3	$43	136,199	$5,856,557	77,155	$3,317,665
UNCLASSIFIED EXCAVATION	YD^3	$5	706,911	$3,534,555	165,897	$829,485
EMBANKMENT						
- BORROW B	YD^3	$9	348,808	$3,139,272	241,882	$2,176,940
Clearing and grubbing	acre	$4,200	197	$825,656	111	$467,708
ROAD STRUCTURAL SECTION						
Aggregate Base Course	YD^3	$22	4,133	$90,933	2,067	$45,467
Asphalt Concrete 2"	YD^3	$93	1,378	$128,133	689	$64,067
AC, Grade PG 58-28	YD^3	$240	76	$18,187	38	$9,093
Overpass guardrail	ft	$50	9,300	$465,000	6,200	$310,000
Overpass temporary detour road (3ea)	LUMP SUM	--	All Req'd	$465,000	All Req'd	310,000
STRUCTURES						
Wasilla Creek RR Bridge, 165' long	LUMP SUM	--	All Req'd	$2,943,000	--	--
South Davis Road	LUMP SUM	--	All Req'd	$1,236,440	--	--
Cottonwood Creek Bridge, 65' long	LUMP SUM	--	All Req'd	$1,443,000	All Req'd	$3,018,000
Lake Lucille Creek Bridge, 45' long	LUMP SUM	--	All Req'd	$1,143,000	All Req'd	$1,518,000
Fairview Loop Road Bridge, 85' long	LUMP SUM	--	All Req'd	$1,236,440	--	--
Knik-Goose Bay Road Bridge, 85' long	LUMP SUM	--	All Req'd	$1,236,440	All Req'd	$1,434,440
Church Road Bridge, 90' long	LUMP SUM	--	All Req'd	$1,285,940	All Req'd	$1,285,940
SOFT SOILS WORK	LUMP SUM	--	All Req'd	$5,000,000	All Req'd	$2,832,340
Noise & Vibration Mitigation	LUMP SUM	--	All Req'd	$2,500,000	All Req'd	$1,875,000
FIBERSTAR RELOCATION	MILE	$380,000	8.109	$3,081,468	4.594	$1,745,553
WETLAND MITIGATION	LUMP SUM	--	All Req'd	$1,908,500	All Req'd	$1,710,500
MOBILIZATION (10%)	LUMP SUM	--	All Req'd	$4,329,420	All Req'd	$2,576,255
SURVEYING (3%)	LUMP SUM	--	All Req'd	$1,298,826	All Req'd	$772,877
EROSION and POLLUTION (3%)	LUMP SUM	--	All Req'd	$1,298,826	All Req'd	$772,877
CONST TRAFFIC CONTROL AND RR FLAGGING	LUMP SUM	--	1%	$432,942	1%	$352,156
SUBTOTAL				**$58,144,178**		**$35,567,768**
CONTINGENCY 30%				**$17,443,253**		**$10,670,330**
CONSTRUCTION SUBTOTAL				**$75,600,000**		**$46,300,000**
CONST ADMINISTRATION (15%)				**$11,340,000**		**$6,945,000**
DESIGN (10%)				**$7,560,000**		**$4,630,000**
PROJECT SUBTOTAL				**$94,500,000**		**$57,875,000**
UTILITIES (3%)	LUMP SUM		All Req'd	$2,268,000	All Req'd	$1,389,000
RIGHT-OF-WAY	LUMP SUM		All Req'd	$32,687,550	All Req'd	$23,819,950
			GRAND TOTAL YEAR 2004	**$129,500,000**		**$83,100,000**
Inflation rate of 3.5% used for these projections			YEAR 2014, +10yrs	$183,000,000		$118,000,000
			YEAR 2019, +15yrs	$217,000,000		$140,000,000
			YEAR 2024, +20yrs	$258,000,000		$166,000,000
			YEAR 2029, +25yrs	$307,000,000		$197,000,000

The cost is for single track on a double track embankment
Assumed that 75% of excavation will be used for embankment construction
Soft soils work includes excavation of poor soil, extra borrow & geogrid or geotextile
Utilities include overhead lines and natural gas line relocations

Highway co-location costs not included in this estimate

Wasilla Realignment Alternative Analysis
Conceptual Level Cost Estimate
The cost is for single track on a double track embankment

	South Alternative								North Alternative					
	Alt S2 Railroad	Alt S2 Wasilla Creek	Alt S2 Cottonwood Creek	Alt S2 Lake Lucille Creek	Alt S2 Fairview Loop Overpass	Alt S2 Knik-Goose Bay Overpass	Alt S2 Church Road Overpass	Alt S2 South Davis Frontage	Alt N1 Railroad	Alt N1 Cottonwood Creek	Alt N1 Lake Lucille Creek	Alt N1 Knik-Goose Bay Overpass	Alt N1 Church Road Overpass	
Length (mile)	8.109	--	--	--	0.294	0.294	0.294	0.294	4.594	--	--	0.294	0.294	
Length (feet)	42,816	--	--	--	1,550	1,550	1,550	1,550	24,254	--	--	1,550	1,550	
Track		--	--	--	--	--	--	--		--	--	--	--	
Track Cost =	$10,704,045	--	--	--	--	--	--	--	$6,063,500	--	--	--	--	
Ballast	71,975	--	--	--	--	--	--	--	40,773	--	--	--	--	yd^3
Sub-ballast	64,224	--	--	--	--	--	--	--	36,382	--	--	--	--	yd^3
Ballast total	136,199	--	--	--	--	--	--	--	77,155	--	--	--	--	yd^3
Ballast Cost =	$5,856,557								$3,317,665					
Removal of existing track														
Length	48,315								25,543					ft
Powered switch	2								2					
Powered switch cost =	$1,850,000								$1,850,000					
non-electric switch	2													
non-electric switch cost =	$300,000													
Excavation	706,911	--	--	--	--	--	--	--	165,897	--	--	--	--	yd^3
75% usable	530,183	--	--	--	--	--	--	--	124,423	--	--	--	--	yd^3
Excavation Cost =	$3,534,555	--	--	--	--	--	--	--	$829,485	--	--	--	--	
Embankment total	453,426	--	--	--	--	--	--	--	191,901	--	--	--	--	yd^3
From project	530,183	--	--	--	--	--	--	--	124,423	--	--	--	--	yd^3
From other sources	76,757	--	--	--	--	--	--	--	67,478	--	--	--	--	yd^3
Borrow Cost =	$690,815	--	--	--	--	--	--	--	$607,304	--	--	--	--	
Clearing & grubbing area	197	--	--	--	--	--	--	--	111	--	--	--	--	acre
Clearing & grubbing cost =	$825,656	--	--	--	--	--	--	--	$467,708	--	--	--	--	
Wetland mitigation														
acres of impact	34.7								31.1					
Mitigation cost =	$1,908,500								$1,710,500					
Fiberstar relocation														
Relocation Cost =	$3,173,912	--	--	--	--	--	--	--	$1,797,920	--	--	--	--	
Noise & Vibration mitigation cost =	$2,500,000								$1,875,000					
Bridges														
Bridge length	--	165	65	45	85	85	90	85	--	170	70	105	90	ft
Bridge width	--	--	--	--	36	36	36	36	--	--	--	36	36	ft
Bridge cost =	--	$2,475,000	$975,000	$675,000	$841,500	$841,500	$891,000	$841,500	--	$2,550,000	$1,050,000	$1,039,500	$891,000	
Abutment area retaining wall area	--	7,200	7,200	7,200	6,076	6,076	6,076	6,076	--	7,200	7,200	6,076	6,076	sf
Retaining wall cost =	--	$468,000	$468,000	$468,000	$394,940	$394,940	$394,940	$394,940	--	$468,000	$468,000	$394,940	$394,940	
Road														
Asphalt	--		--	--	--	--	--	--	--	--	--	--	--	yd^3
Asphalt Cost =	--		--	--	--	--	--	--		--	--	--	--	
PG 58-28	--		--	--	--	--	--	--		--	--	--	--	yd^3
PG 58-28 Cost =	--		--	--	--	--	--	--		--	--	--	--	
Structural section	--		--	--	--	--	--	--	--	--	--	--	--	yd^3
Structural section Cost =	--		--	--	--	--	--	--		--	--	--	--	
Overpass ramps														
Embankment total	--		--	--	87,202	87,202	87,202	87,202	--	--	--	87,202	87,202	yd^3
Embankment cost =	--		--	--	$784,818	$784,818	$784,818	$784,818	--	--	--	$784,818	$784,818	
Asphalt	--		--	--	344	344	344	344	--	--	--	344	344	yd^3
Asphalt Cost =	--		--	--	$33,067	$33,067	$33,067	$33,067	--	--	--	$33,067	$33,067	
PG 58-28	--		--	--	19	19	19	19	--	--	--	19	19	yd^3
PG 58-28 Cost =	--		--	--	$4,679	$4,679	$4,679	$4,679	--	--	--	$4,679	$4,679	
Structural section	--		--	--	1,033	1,033	1,033	1,033	--	--	--	1,033	1,033	yd^3
Structural section Cost =	--		--	--	$23,767	$23,767	$23,767	$23,767	--	--	--	$23,767	$23,767	
Guardrail =	--		--	--	3100	3100	3100	3100	--	--	--	3100	3100	ft
Detour road cost =	--		--	--	$155,000	$155,000	$155,000	$155,000	--	--	--	$155,000	$155,000	
Construction subtotal	$23,959,884	$2,943,000	$1,443,000	$1,143,000	$2,237,771	$2,237,771	$2,287,271	$2,237,771	$12,615,874	$3,018,000	$1,518,000	$2,435,771	$2,287,271	

Track Cost =	$250	rail, ties ($/ft)
Ballast Cost =	$43	yd^3
Excavation Cost =	$5	yd^3
Borrow Cost =	$9	yd^3
Sheet pile Cost =	$26	ft^2
Fiberstar relocation Cost =	$391,400	$/mile
Asphalt Cost =	$96	yd^3
pg 58-28	$247	yd^3
Structural section Cost =	$23	yd^3
Guardrail Cost =	$50	ft
Bridge cost =	$275	psf
Rail bridge cost =	$15,000	ft
Powered switch cost =	$925,000	each
non-electric switch cost =	$150,000	each
Retaining wall cost =	$65	sf
Clearing & grubbing cost =	$4,200	acre
Wetland mitigation	$55,000	acre

Each underpass ramp is 775' long, 4% grade, 31' high. Ramp crosssection is 160' wide at the bottom and 36' across the top. Total volume of two ramps is 31x98x775 = 2,354,450cf

Unit prices from ADOT 1998-2002 bid tabulation summary
Costs increased 3% per year to 2004
Embankment, ballast, structural section based on 1.9 tons per cubic yard
Asphalt based on 2.025 tons per cubic yard

Wasilla Alternative Analysis
Conceptual Level Cost Estimate
Land acquisition cost

The grand total cost assumes the purchase of the entire lot for each lot impacted by the right-of-way requirer
The ROW cost assumes that fractions of lots are purchased, only that land required for the right-of-way.

Multiply appraised value by a land acquisition cost factor to estimate true cost of land acquisition.

land acquisition cost factor	3.5	see note below

South Alternative		
Number of Properties impacted	91	
Total acreage of those properties	4,455	
total land appraised value	$5,904,700	Adjusted
total building appraised value	$3,434,600	Grand total
Grand Total	$9,339,300	$32,687,550
Cost per acre	$2,096	
Acreage we need	481	
ROW cost	$1,008,272	

North Alternative		
Number of Properties impacted	73	
Total acreage of those properties	3,161	
total land appraised value	$3,103,400	Adjusted
total building appraised value	$3,702,300	Grand total
Grand Total	$6,805,700	$23,819,950
Cost per acre	$2,153	
Acreage we need	304	
ROW cost	$654,421	

The two alternatives do not pass through a commercial district or through urban areas.

Land acquisition cost factor derived from ADOT real estate estimating method. The factor includes multiplying the assessed value by 1.25 to determine market value, then adding appraisal costs, acquisition costs, possible relocation costs, administration costs (20%) and contingency costs (20%). At the present time the actual cost to acquire property is approximately 3.2 times the assessed value. The 3.2 was rounded up to 3.5 for this estimate. The factor of 3.5 is based on an urban commercial district where the cost of relocation is higher. Thus the 3.5 will over estimate the land costs somewhat for less developed rural area the corridor passes through..

Wasilla Realignment Alternative Analysis
Transit Times

Alignment alternatives compared to the existing track

North Alternative	sec	min	mph
North alternative =	280	4.7	59
Existing track 158-163 =	201	3.3	25
Existing track 158-163 =	253	4.2	49
Total existing transit time =	454	7.6	
Time reduction =	174	2.9	

South Alternative	sec	min	mph
South alternative =	495	8.2	59
Existing track 154-163 =	822	13.7	25
Existing track 154-163 =	253	4.2	49
Total existing transit time =	1075	17.9	
Time reduction =	580	9.7	

South Alternative*	sec	min	mph
South alternative =	495	8.2	59
Existing track 158-163 =	201	3.3	25
Existing track 158-163 =	253	4.2	49
Existing track 154-158 =	209	3.5	59
Total existing transit time =	663	11.0	
Time reduction =	168	2.8	

Distances

North Alternative		
Existing length =	4.838	
Proposed length =	4.594	
Reduction =	0.244	mile

South Alternative		
Existing length =	9.151	
Proposed length =	8.109	
Reduction =	1.041	mile

South Alternative*		
Existing length =	8.262	
Proposed length =	8.109	
Reduction =	0.152	mile

*This assumes that the South Wasilla Track Realignment is approved and built

Track lengths	feet	mile	
Existing track length 154-163	48,316	9.151	
Existing track length 158-163	25,544	4.838	
South Wasilla Track Realignment (SWTR)	18,007	3.410	Project from 154 to 158
North alternative	24,255	4.594	
South alternative	42,817	8.109	

For the North Alternative

Existing 158-163	7,364	existing 25 mph segment between 158-163
Existing 158-163	18,181	existing 49 mph segment between 158-163

For the South Alternative

Existing 154-163	30,135	existing 25 mph segment between 154-163
Existing 154-163	18,181	existing 49 mph segment between 154-163

For the South Alternative*

Existing 158-163	7,364	existing 25 mph segment between 158-163
Existing 158-163	18,181	existing 49 mph segment between 158-163
SWTR 154-158	18,077	proposed 59 mph segment between 154-158

Train travel speeds

mile/hour	feet/sec
25	36.667
49	71.867
59	86.533

The transit times assume instantaneous acceleration or deceleration between the different speed zones. The intent is to show relative transit times between the alternatives and not actual travel time. The use of instantaneous acceleration understates the transit time of the project, perhaps significantly. A computer model might be used in the later phases of the project to accurately estimate travel times.

Wasilla Realignment Alternative Analysis
Curvature

North alternative curvature	
Existing track 158-163 =	247
North alternative =	169
REDUCTION =	78

South alternative curvature	
Existing curvature 154-163 =	730
South alternative =	283
REDUCTION =	447

South alternative*	
Existing track + SWTR =	527
South alternative =	283
REDUCTION =	244

*This assumes that the South Wasilla Track Realignment is approved and built

Existing curvature 154-163	730	degrees	Along year 2004 existing track
Existing track 158-163	247	degrees	
Proposed South Wasilla Track Realignment (SWTR)	280	degrees	Proposed project from 154 to 158
Existing track + SWTR	527	degrees	Existing track 158 to 163 + SWTR
North alternative	169	degrees	158-163
South alternative	283	degrees	154-163

Design Criteria for ARRC Wasilla Realignment Alternatives Analysis Study

	Rail	Rail	Highway	Frontage Road	Unit	Source
Functional Classification	Commuter	Freight	Freeway	Local Road		
Level-of-Service	--	--	B	D		H: GB p512; L: GB Exh 2-32
Terrain	--	--	Rolling	Rolling		
Design Life	25	25	25	20	yrs	H: SB 226*; L: GB p65, 384
Design Speed	79	60	70	40	mph	H: GB p512; L: GB Exh 5-1
Design Vehicle Geometric	E-80	E-80	WB-120	WB-67		H & L: E-mail 6-1-2000
Design Vehicle Structural	E-80	E-80	HS-25	HS-25		H & L: PCM Sec 1120.3.2
Typical Section						
Lane Width	--	--	12	12	ft	H: GB p508
Shoulder Width	--	--	4 or 10	6	ft	H: GB p509; L: GB Exh 5-5
Horizontal Alignment						
Maximum Grade	1.3	1.3	4	10	%	H: GB Exh 8-1; L: PCM Fig 1120-1
Minimum Curve Radius	5,730	2,865	2,050	510	ft	H & L: GB Exh 3-22
Maximum Superelevation	3"	3"	6	6	%	H & L: PCM Fig 1120-1
Spiral Length	260	210	--	--	ft	
Sight Distance						
Passing Sight Distance	--	--	2480	1470	ft	H: GB Exh 7-1; L: GB Exh 5-3
Stopping Sight Distance	--	--	730	305	ft	H: GB Exh 7-1; L: GB Exh 5-2
Vertical Alignment						
Crest K Value	231	131	247	44		H: GB p278, Exh 3-78; L: GB p274, Exh 3-76
Crest curve length	600	340	1,980	880	ft	
Sag K Value	231	131	181	44		H: GB p278, Exh 3-78; L: GB p274, Exh 3-76
Sag curve length	600	340	1,450	880	ft	
Vertical curve lengths based on maximum grades						
Embankment & Excavation Slopes			Fore/Back	Fore/Back		
Embankment	1V:2H	1V:2H	1V:6H/1V:3H	1V:4H/1V:3H		H: GB p516; L: PCM Table 1130-8
Excavation	1V:2H	1V:2H	1V:2H	1V:2H		
Vertical Clearance						
Rail under highway and local road	--	--	23.5	23.5	ft	
Highway under rail and local roads	18.5	18.5	--	18.5	ft	PCM Table 1130-1
Local road under rail and highway	16.5	16.5	16.5	--	ft	PCM Table 1130-1
Right-Of-Way Width	200	200	~250**	~50	ft	
Combined Rail and Highway Corridor	500	500	500	--	ft	

* Assumes the MatSu Borough will become an MPO

** Add 200-feet at each interchange, minimum

H = Highway

L = Local / Frontage road

Other Comments

Rail

Embankment & Ballast section for double track

Later studies will likely have a higher design speed, probably 79mph, with attendant increases in superelevation to 5", curve radius and spiral length.

Highway

Highway section 4 lane divided highway, with provisions for adding 2 more lanes, and full control of access

Rail design criteria suitable for highway design speed of 75 mph with 6% maximum superelevation

For grade determination terrain in project area is rolling

One hundred foot separation between track centerline and nearest highway appurtenance assumes limited access highway and separated grade crossings for all cross streets

Local / Frontage Road

Rural frontage roads should use the "Local Roads" standards (GB p516)

Road section width 36' ; two 12' lanes, two 6' shoulders

Road section should also include pathway facilities (10-foot paved)

While the maximum grade for local roads is 10%, it is assumed that the roads will be designed to a 4-6% grade

The HS-25 truck is a tractor with a semi-trailer

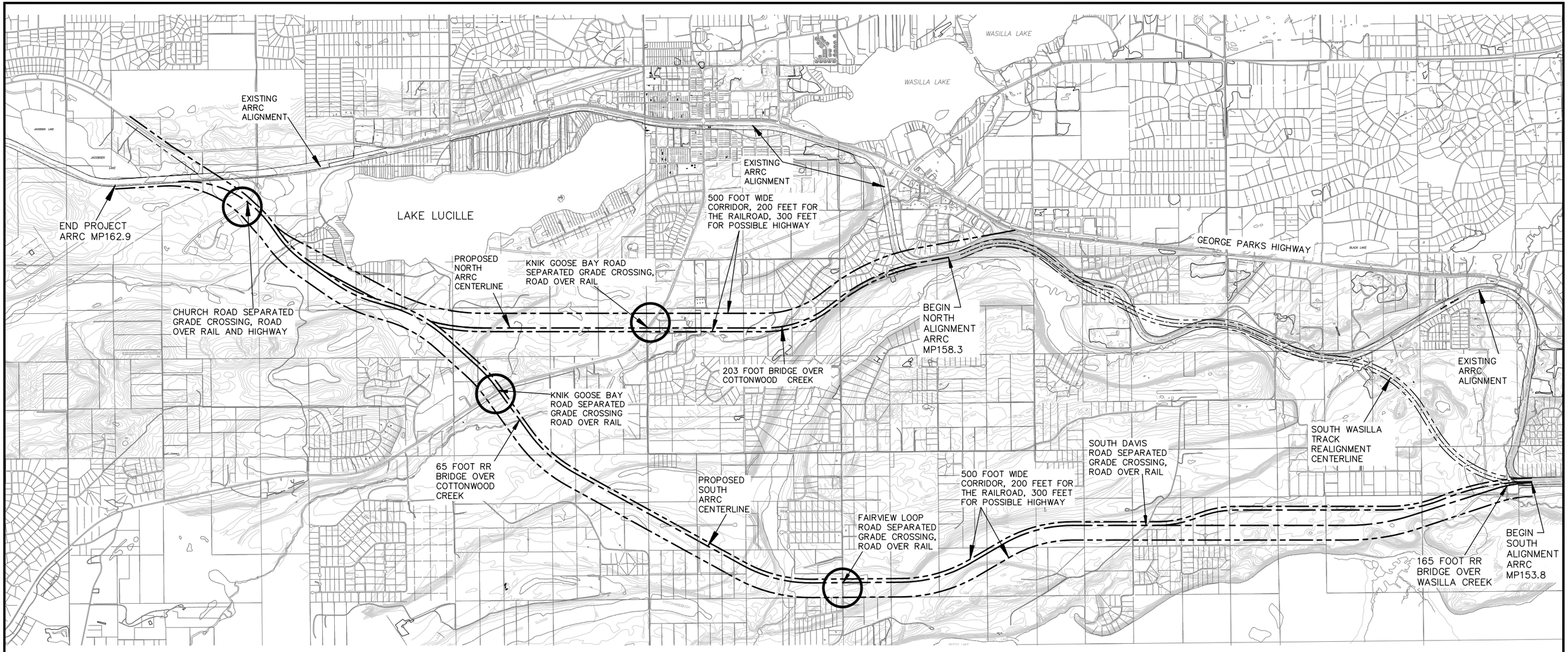
K value is a measure of curvature and is the distance needed for a 1% change in grade. The greater the K value the flatter the curve.

Criteria Sources

PCM = Alaska PreConstruction Manual

GB = AASHTO Geometric Design of Highway and Streets

Rail criteria from AREMA Manual for Railway Engineering arid ARRC Standard Drawings



THESE DRAWINGS DEPICT POSSIBLE NORTH AND SOUTH ALIGNMENTS FOR THE RAILROAD BYPASS OF DOWNTOWN WASILLA.

THE TRACK CENTERLINE IS SHOWN ALONG WITH A 500-FOOT WIDE RIGHT-OF-WAY CORRIDOR. THIS CORRIDOR IS WIDE ENOUGH FOR BOTH RAILROAD AND HIGHWAY.

THE DRAWINGS ARE BASED ON THE 1986 TOPOGRAPHIC MAPPING PROVIDED BY THE MATANUSKA SUSITNA BOROUGH. THE CONTOUR INTERVALS FOR THIS MAP IS 5 FEET.

DEVELOPMENT SINCE 1986 MAY NOT BE SHOWN ON THESE DRAWINGS.

ESTIMATED TRANSIT TIMES

	ALTERNATIVES	
	NORTH	SOUTH*
EXISTING ALIGNMENT	7.6 min	11.0 min
PROPOSED ALIGNMENT	4.7 min	8.2 min
TIME REDUCTION	2.9 min	2.8 min

ALIGNMENT LENGTH

	ALTERNATIVES	
	NORTH	SOUTH*
EXISTING LENGTH	4.8 mile	8.3 mile
PROPOSED LENGTH	4.6 mile	8.1 mile
LENGTH REDUCTION	0.2 mile	0.2 mile

TRACK CURVATURE

	ALTERNATIVES	
	NORTH	SOUTH*
EXISTING CURVATURE	247°	527°
PROPOSED CURVATURE	169°	283°
CURVATURE REDUCTION	78°	244°

MAXIMUM DEGREE OF CURVE = 2°
MAXIMUM GRADE = 1%

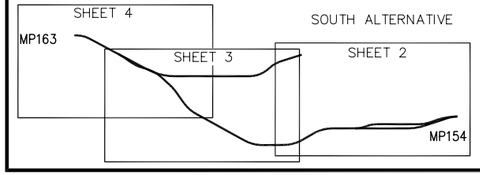
*SOUTH ALTERNATIVES COMPARISON ASSUMES THAT THE SOUTH WASILLA TRACK REALIGNMENT IS APPROVED AND BUILT.

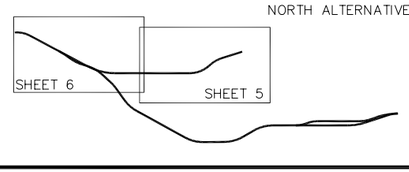
THE SOLID CIRCLES IDENTIFY POSSIBLE LOCATIONS FOR HIGHWAY INTERCHANGES IF A HIGHWAY IS BUILT PARALLEL TO THE PROPOSED RAIL ALIGNMENT.

SEPARATED GRADE CROSSINGS ARE SHOWN FOR SOUTH DAVIS, FAIRVIEW LOOP, KNIK-GOOSE BAY AND CHURCH ROADS ONLY. THE MAT-SU LONG RANGE TRANSPORTATION PLAN IS PRESENTLY IN THE PROCESS OF DETERMINING A SUITABLE ROAD NETWORK FOR THIS AREA.

THE LONG RANGE TRANSPORTATION PLAN MAY RECOMMEND ADDITIONAL CROSSINGS OF THE PROPOSED RAIL/HIGHWAY CORRIDOR.

1500 0 1000 2000 1 MILE 5280





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M.A.S.C.O.T. MAT-SU COMMUNITY TRANSIT VALLEY RIDES

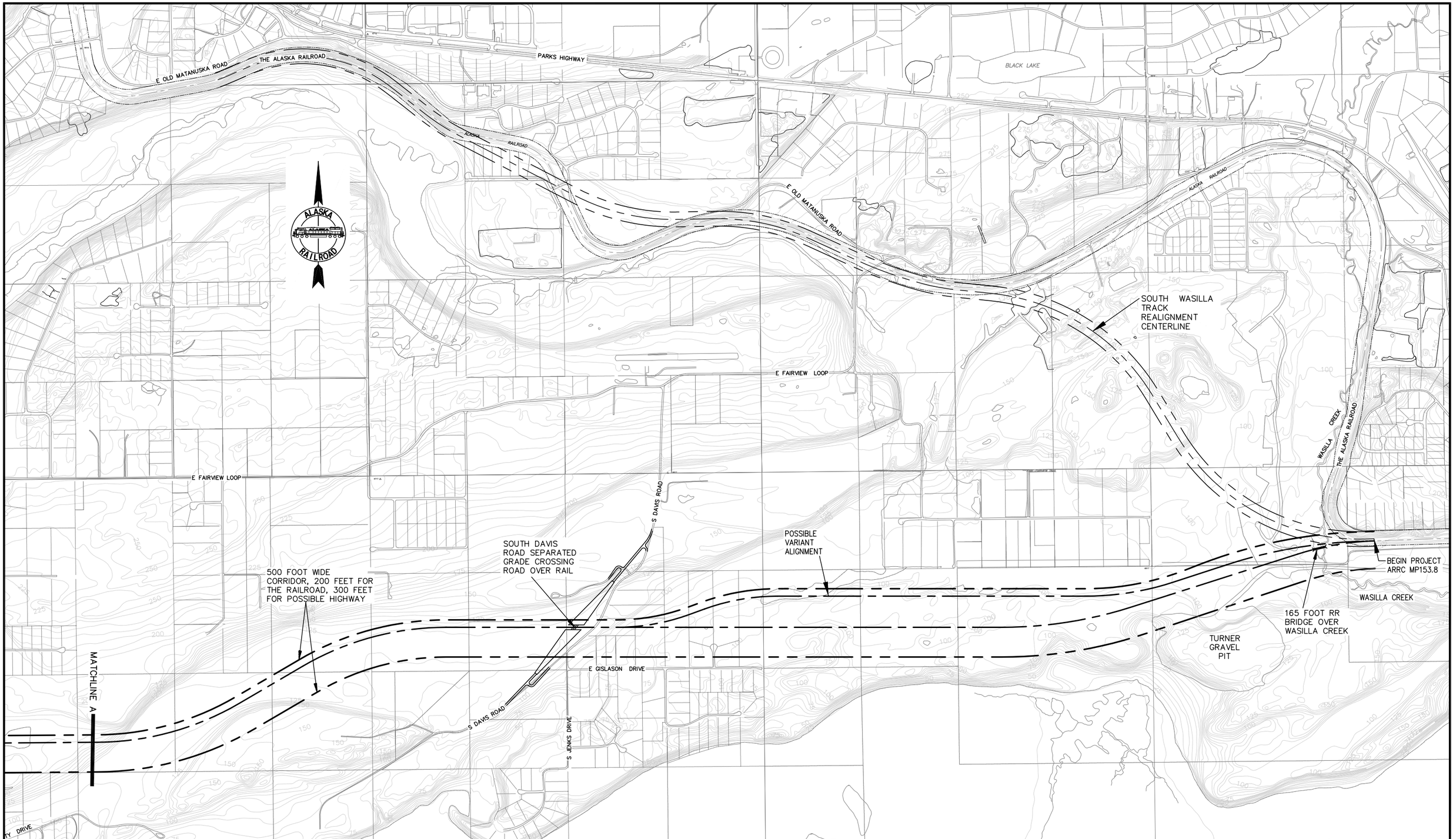
ALASKA RAILROAD CORPORATION
OFFICE OF THE CHIEF ENGINEER
P.O.BOX 107500, ANCHORAGE, ALASKA 99510-7500

HDR Alaska, Inc.

PROJECT: WASILLA REALIGNMENT ALTERNATIVE ANALYSIS MP 154 to MP 163

TITLE: KEY SHEET

DESIGNED BY: -
DRAWN BY: -
REVIEWED BY: -
APPROVED BY: -
SCALE :
DATE : FEBRUARY 2005
FILE NO.
DWG NO. 1 OF 6



SHEET 4
MP163
SHEET 2
MP154
SHEET 3

600 0 500 1000 2000

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FOUNDED 1917 CITY OF WASILLA · ALASKA

MATANUSKA-SUSITNA BOROUGH 1964

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HDR Alaska, Inc.

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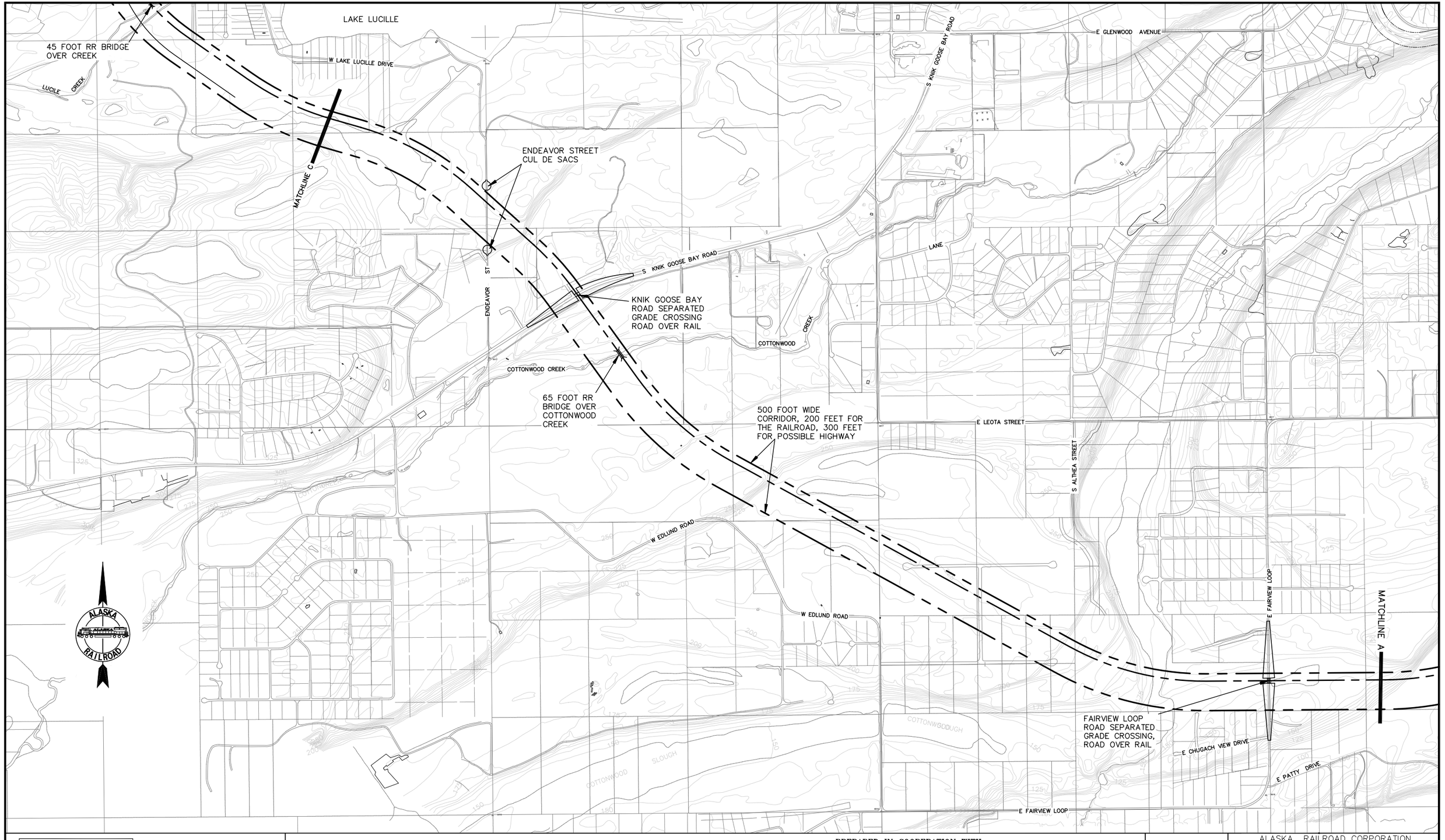
OFFICE OF THE CHIEF ENGINEER
P.O.BOX 107500, ANCHORAGE, ALASKA 99510-7500

PROJECT: **WASILLA REALIGNMENT ALTERNATIVE ANALYSIS MP 154 to MP 163**

TITLE: **SOUTH ALTERNATIVE**

DESIGNED BY: –
DRAWN BY: –
REVIEWED BY: –
APPROVED BY: –
SCALE :
DATE : FEBRUARY 2005
FILE: FILE
DWG NO. 2 OF 6



SHEET 4
MP163
SHEET 2
MP154
SHEET 3

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DWG NO. 3 OF 6

PARKS HIGHWAY

JACOBSEN LAKE

THE ALASKA RAILROAD

CHURCH ROAD

PARKS HIGHWAY

ALASKA RAILROAD

LAKE LUCILLE

END PROJECT
ARRC MP 162.9

1ST OPTION
HIGHWAY BRIDGE
LENGTH 425'

2nd OPTIONS
HIGHWAY BRIDGE
LENGTH 300'

WASILLA AIRPORT

WASILLA
MULTI–USE
SPORTS
COMPLEX
AND PARKING

W LAKE LUCILLE DR

W BAILEY AVE

LAKE LUCILLE

45 FOOT RR BRIDGE
OVER CREEK

W LAKE LUCILLE DRIVE

LUCILE CREEK

The area north of the sports complex will require careful design to provide separated grade crossings for the proposed parallel highway and the sports complex access road.

Due to the shallow skew angle it is difficult to keep the length of the highway bridge under 200 feet and stay within the 500–foot corridor

MACK ROAD

MATCHLINE C

ENDEAVOR STREET
CUL DE SACS

ENDEAVOR ST

S KNIK GOOSE BAY ROAD

KNIK GOOSE BAY
ROAD SEPARATED
GRADE CROSSING
ROAD OVER RAIL

COTTONWOOD CREEK

COTTONWOOD CREEK

65 FOOT RR
BRIDGE OVER
COTTONWOOD
CREEK

500 FOOT WIDE
CORRIDOR, 200 F
THE RAILROAD, 3
FOR POSSIBLE HI

SHEET 4

MP163

SHEET 2

MP154

SHEET 3

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PALMER WASILLA HIGHWAY

KNIK GOOSE BAY ROAD

GLENWOOD AVE

PARKS HIGHWAY

HERMAN ROAD

E WOODCREST DRIVE

S THOMAS STREET

S BERTHA LANE

OLD MATANUSKA ROAD

ALASKA RAILROAD

BEGIN PROJECT ARRC MP158.3

EXISTING ARRC CENTERLINE

EXISTING ARRC ROW

MATCHLINE B

KNIK GOOSE BAY ROAD SEPARATED GRADE CROSSING, ROAD OVER RAIL

500 FOOT WIDE CORRIDOR, 200 FEET FOR THE RAILROAD, 300 FEET FOR POSSIBLE HIGHWAY

POSSIBLE HIGHWAY CENTERLINE

PROPOSED ARRC CENTERLINE

205 FOOT BRIDGE OVER COTTONWOOD CREEK

COTTONWOOD CREEK

E SNOWBIRD

PROPOSED CONNECTION

S FERN STREET

MP163

SHEET 6

SHEET 5

MP158

600 0 500 1000 2000

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PROJECT: **WASILLA REALIGNMENT ALTERNATIVE ANALYSIS MP 158 to MP 163**

TITLE: **NORTH ALTERNATIVE**

SCALE :

DATE : FEBRUARY 2005

FILE: FILE

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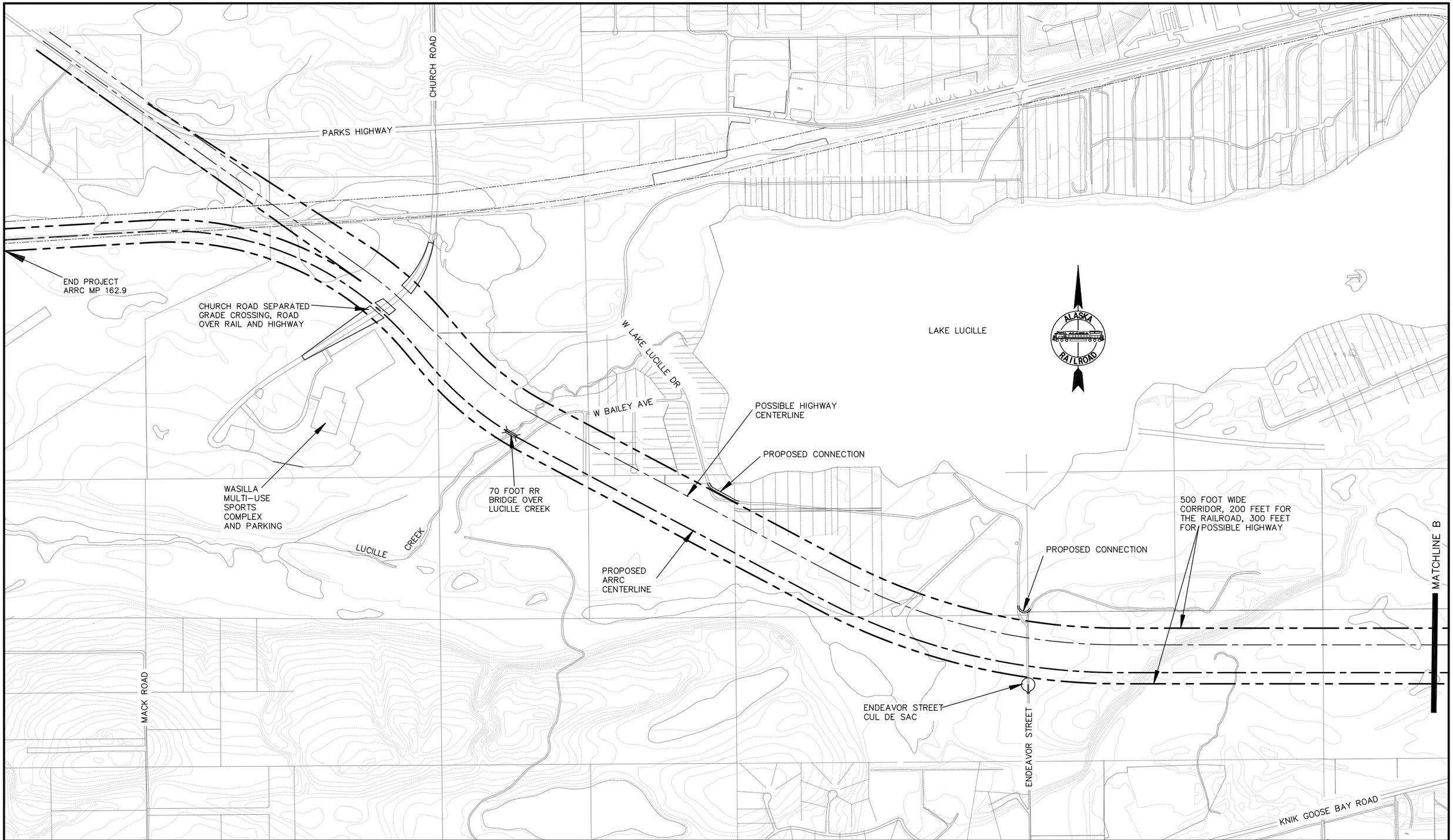

MP163 **SHEET 6** SHEET 5 MP154

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