APPENDIX A: Approved Design Criteria and Design Designation

Appendix A-1: Design Criteria – Scooter Avenue/Academy Drive
Appendix A-2: Design Criteria – Seward Highway
Appendix A-3: Design Designation – Scooter Avenue/Academy Drive
Appendix A-4: Design Designation – Seward Highway

ALASKA DOT&PF PRECONSTRUCTION MANUAL
Chapter 11 - Design
PROJECT DESIGN CRITERIA

Project Name:	Seward Highway and Scooter Avenue/Academy Drive Roundabout Interchange			
☑ New Construction/Reconstruction	☐ 3R	☐ PM	☐ Other:	
Project Number:	UAA CED 2022.04		☑ NHS	☐ Non NHS
Functional Classification:	Minor Arterial			
Design Year:	2040	**Present ADT:**		300
Design Year ADT:	20,000	**Mid Design Period ADT:**		18,000
DHV:	10%	**Directional Split:**		50/50
Percent Trucks:	3%	**Equivalent Axle Loading:**		
Pavement Design Year:	2032	**Design Vehicle:**		WB-67
Terrain:	Rolling	**Number of Roadways:**		1
Design Speed:	35 mph			
Lane Width:	12 ft			
Shoulder Width:	Outside: 4 ft		Inside:	
Cross Slope:	2%			
Superelevation:				
Min. Radius of Horizontal Curvature:				
Maximum Allowable Grade:	6%			
Stopping Sight Distance:	250 ft			
Vertical Clearance:	16.5 ft			
Design Loading Structural Capacity:	n/a			
Bridge Width:	n/a			
Min. Allowable Grade:	0.5%			
Min. K-Value for Vert. Curves:	**Sag:**	49	**Crest:**	29
Passing Sight Distance:				
Surface Treatment:	**T/W:**	HMA	**Shoulders:**	HMA
Side Slope Ratios:	**Foreslopes:**	4:1	**Backslopes:**	2:1
Degree of Access Control:				
Median Treatment:				
Illumination:				
Lateral Offset to Obstruction:				
Curb Usage and Type:				
Bicycle Provisions:	5 ft			
Pedestrian Provisions:	4 ft			
Misc. Criteria:				

Proposed - Designer/Consultant:	Nikki Flack, SPM, Denali Ridge Civil Engineers	**Date:**	
Endorsed - Engineering Manager:	James McCurtain, P.E., Jacobs	**Date:**	
Approved - Preconstruction Engineer:		**Date:**	

Shaded criteria are commonly referred to as *FHWA controlling criteria for NHS high-speed roadways (design speed >= to 50 mph)* . For NHS low-speed roadways (design speed < 50 mph), the only two *FHWA controlling criteria* which apply are design speed and design loading structural capacity. For NHS routes only, controlling criteria must meet the minimums established in the Green Book, unless a design exception is approved. For all other routes, all criteria must meet the minimums established in the Alaska Highway Preconstruction Manual, unless a Design Waiver is approved.

Design Criteria marked with a " # " do not meet minimums and must have a Design Exception(s) and/or Design Waiver(s) approved. See the Design Study Report for Design Exception/Design Waiver approval(s) and approved design criteria values.

PROJECT DESIGN CRITERIA

Project Name:	Seward Highway and Scooter Avenue/Academy Drive Roundabout Interchange			
☑ New Construction/Reconstruction	☐ 3R	☐ PM	☐ Other:	
Project Number:	UAA CED 2022.04		☑ NHS	☐ Non NHS
Functional Classification:	Freeway			
Design Year:	2040		**Present ADT:**	34,000
Design Year ADT:	69,000		**Mid Design Period ADT:**	55,000
DHV:	12%		**Directional Split:**	50/50
Percent Trucks:	6%		**Equivalent Axle Loading:**	
Pavement Design Year:	2032		**Design Vehicle:**	WB-109D
Terrain:	Rolling		**Number of Roadways:**	2
Design Speed:	70 mph			
Lane Width:	12 ft			
Shoulder Width:	**Outside: 10 ft**		**Inside: 10 ft**	
Cross Slope:	2%			
Superelevation:	n/a			
Min. Radius of Horizontal Curvature:	n/a			
Maximum Allowable Grade:	4%			
Stopping Sight Distance:	730 ft			
Vertical Clearance:	n/a			
Design Loading Structural Capacity:	HL-93			
Bridge Width:	128.5 ft			
Min. Allowable Grade:	0.5%			
Min. K-Value for Vert. Curves:	**Sag:**	181	**Crest:**	247
Passing Sight Distance:	n/a			
Surface Treatment:	**T/W:**	HMA	**Shoulders:**	HMA
Side Slope Ratios:	**Foreslopes:**	4:1	**Backslopes:**	2:1
Degree of Access Control:	Controlled access			
Median Treatment:	Depressed			
Illumination:	n/a			
Lateral Offset to Obstruction:				
Curb Usage and Type:	n/a			
Bicycle Provisions:	n/a			
Pedestrian Provisions:	n/a			
Misc. Criteria:				

Proposed - Designer/Consultant: Nikki Flack, SPM, Denali Ridge Civil Engineers **Date:** ____________

Endorsed - Engineering Manager: James McCurtain, P.E., Jacobs **Date:** ____________

Approved - Preconstruction Engineer: ____________ **Date:** ____________

Shaded criteria are commonly referred to as *FHWA controlling criteria for NHS high-speed roadways (design speed >= to 50 mph)* . For NHS low-speed roadways (design speed < 50 mph), the only two *FHWA controlling criteria* which apply are design speed and design loading structural capacity. For NHS routes only, controlling criteria must meet the minimums established in the Green Book, unless a design exception is approved. For all other routes, all criteria must meet the minimums established in the Alaska Highway Preconstruction Manual, unless a Design Waiver is approved.

Design Criteria marked with a " # " do not meet minimums and must have a Design Exception(s) and/or Design Waiver(s) approved. See the Design Study Report for Design Exception/Design Waiver approval(s) and approved design criteria values.

DESIGN DESIGNATION

State Route Number: 133825/133690 Route Name: Scooter Ave/Academy Dr

Project Limits: Seward Highway, MP 119.8 - MP 121.8

State Project Number: CFHWY00012 Federal Aid Number: 537008

Project Description: The Alaska Department of Transportation & Public Facilities (DOT&PF) Central Region is preparing for construction of mainline highway and interchange improvements on the Seward Highway between O'Malley Road and Dimond Boulevard in the Municipality of Anchorage. The improvements are anticipated to include the widening of the highway to six lanes (three in each direction), the reconfiguration of the two existing interchanges (O'Malley Road and Dimond Boulevard), and a new grade separation at Scooter Avenue.

Design Functional Classification:

- ☐ Freeway
- ☐ Collector, type ____
- ☐ Rural Local Rd.
- ☐ Rural Arterial
- ☐ Local Recreational Rd.
- ☐ Urban Local St.
- ☐ Urban Arterial
- ☐ Local Resource Recovery Rd.
- ☐ Local Service Rd.
- ☒ Other Minor Arterial

Project Type:

- ☒ New Construction - Reconstruction
- ☐ 3R
- ☐ Preventive Maintenance (PM)
- ☐ HSIP

Project Design Life (years): 5 ☐ 10 ☐ 20 ☒ 25 ☐ 30 ☐ Other ____

Traffic Projections:

	Current Year	Construction Year	Mid - Life Year	Design Year
	2017	2021	2031	2040
2-Way AADT*	300	17,000	18,000	20,000
2-Way DHV	10%	10%	10%	10%
Peak Hour Factor	0.92	0.92	0.92	0.92
Directional Distribution	50/50	50/50	50/50	50/50
Percent Recreational Vehicles	N/A	N/A	N/A	N/A
Percent Commercial Trucks	3%	3%	3%	3%
Linear Growth Rate (%)	N/A	N/A	0.90	0.90
ESALs				
Pedestrians (Number/Day)	N/A	N/A	N/A	N/A
Bicyclists (Number/Day)	N/A	N/A	N/A	N/A

* Use AFDM Traffic Data Request Form, Figure 6.1 for pavement design. Form 6.1 is available on-line at: http://www.dot.state.ak.us/stwddes/dcsprecon/assets/pdf/other/traffic_data_req_form.pdf

Design Vehicle: WB-67

Level of Service (Urban Only): C/D

Design Speed: 35 mph

Terrain: ☐ Level ☒ Rolling ☐ Mountainous

APPROVED ____________________ DATE ____________
Preconstruction Engineer

DESIGN DESIGNATION

State Route Number: 130000 Route Name: Seward Highway: Scooter Ave to Dimond Blvd

Project Limits: Seward Highway, MP 119.8 - MP 121.8

State Project Number: CFHWY00012 Federal Aid Number: 537008

Project Description: The Alaska Department of Transportation & Public Facilities (DOT&PF) Central Region is preparing for construction of mainline highway and interchange improvements on the Seward Highway between O'Malley Road and Dimond Boulevard in the Municipality of Anchorage. The improvements are anticipated to include the widening of the highway to six lanes (three in each direction), the reconfiguration of the two existing interchanges (O'Malley Road and Dimond Boulevard), and a new grade separation at Scooter Avenue.

Design Functional Classification:

- [X] Freeway
- [ ] Rural Arterial
- [ ] Urban Arterial
- [ ] Other ____________
- [ ] Collector, type ____________
- [ ] Local Recreational Rd.
- [ ] Local Resource Recovery Rd.
- [ ] Rural Local Rd.
- [ ] Urban Local St.
- [ ] Local Service Rd.

Project Type:

- [X] New Construction - Reconstruction
- [ ] Preventive Maintenance (PM)
- [ ] 3R
- [ ] HSIP

Project Design Life (years): 5 [ ] 10 [ ] 20 [X] 25 [ ] 30 [ ] Other ____________

Traffic Projections:

	Current Year	Construction Year	Mid - Life Year	Design Year
	2017	2021	2031	2040
2-Way AADT*	34,000	40,000	55,000	69,000
2-Way DHV	12%	12%	12%	12%
Peak Hour Factor	0.92	0.92	0.92	0.92
Directional Distribution	50/50	50/50	50/50	50/50
Percent Recreational Vehicles	N/A	N/A	N/A	N/A
Percent Commercial Trucks	6%	6%	6%	6%
Linear Growth Rate (%)	4.60	4.60	4.60	4.60
ESALs				
Pedestrians (Number/Day)	N/A	N/A	N/A	N/A
Bicyclists (Number/Day)	N/A	N/A	N/A	N/A

* Use AFDM Traffic Data Request Form, Figure 6.1 for pavement design. Form 6.1 is available on-line at: http://www.dot.state.ak.us/stwddes/dcsprecon/assets/pdf/other/traffic_data_req_form.pdf

Design Vehicle: WB-109D

Level of Service (Urban Only): C/D

Design Speed: 70 mph

Terrain: [ ] Level [X] Rolling [ ] Mountainous

APPROVED ______________________________ DATE ____________

Preconstruction Engineer

APPENDIX B: Traffic Analysis

The information in this report is compiled for highway safety planning purposes. Federal law prohibits its discovery or admissibility in litigation against state, tribal or local government that involves a location or locations mentioned in the collision data. 23 U.S.C. § 409; 23 U.S.C. § 148(g); *Walden v. DOT*, 27 P.3d 297, 304-305 (Alaska 2001).

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TRANSPORTATION ENGINEERING / PLANNING
880 H Street, Suite 202, Anchorage AK 99501 P 907.646.7995

TECHNICAL MEMORANDUM

Seward Highway Improvements - O'Malley Road to Dimond Boulevard

Existing Conditions Summary Report

Date:	October 14, 2016	Project #: 18409
To:	James Potts, CH2M	
From:	Brett Korporaal, Andrew Ooms, PE, Kenneth Ota, and Gary Katsion, PE	

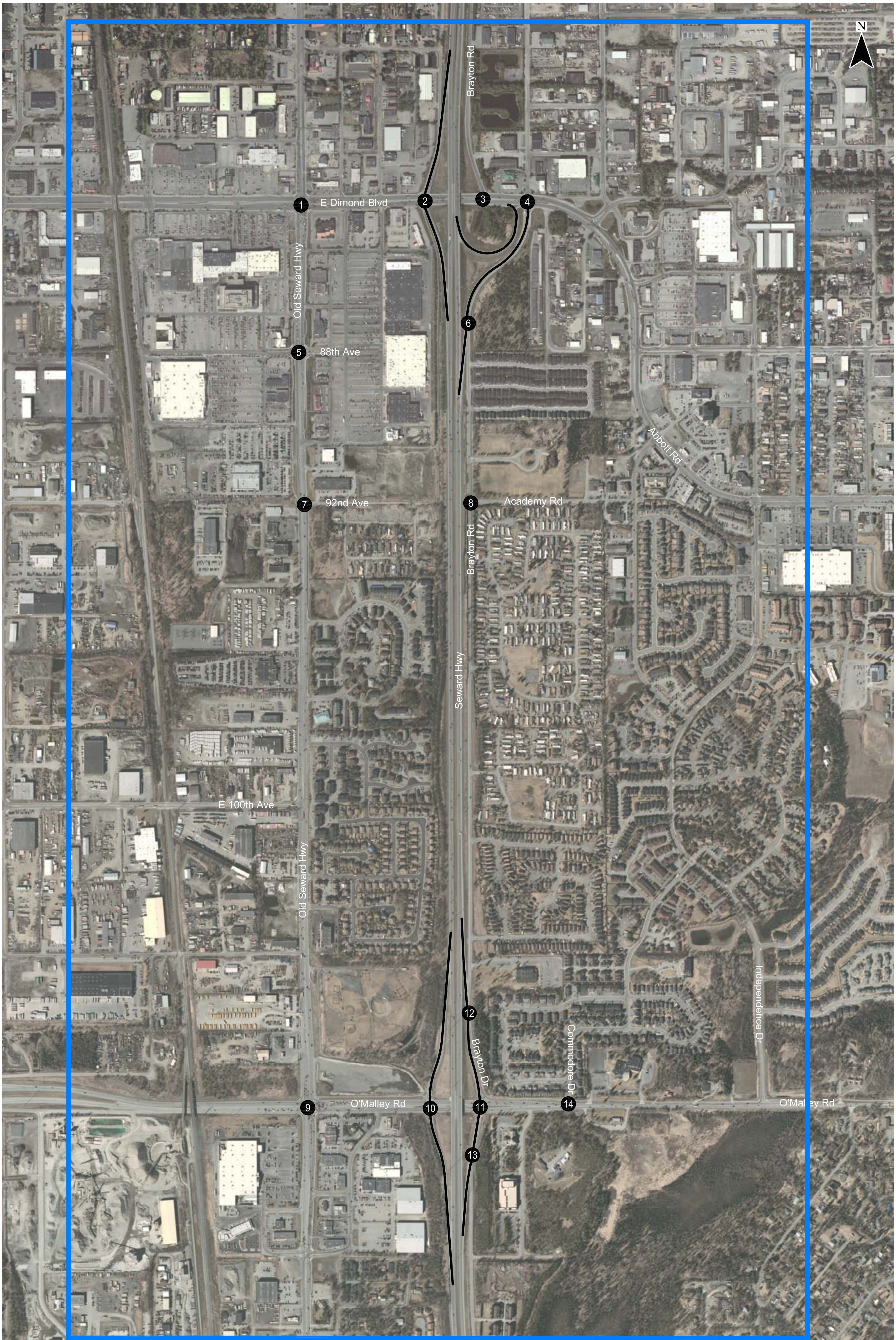
INTRODUCTION

The Alaska Department of Transportation & Public Facilities (DOT&PF) Central Region is preparing for the construction of mainline highway and interchange improvements on the Seward Highway between O'Malley Road and Dimond Boulevard in the Municipality of Anchorage. The improvements are anticipated to include the widening of the highway to six lanes (three in each direction), the reconfiguration of two existing interchanges (O'Malley Road and Dimond Boulevard), and a new grade separation at 92nd Avenue.

This memorandum summarizes the existing transportation system conditions within the study area of the Seward Highway O'Malley Road to Dimond Boulevard project. This memorandum documents the current facilities in place and their operational and safety performance of all travel modes within the study area. The existing conditions analysis establishes the baseline conditions of the current transportation system for comparison in the future conditions analysis.

STUDY AREA

The study area is located approximately five miles southeast of downtown within the Municipality of Anchorage (MOA). The study area includes a 1.5 mile corridor of Seward Highway from the O'Malley Road Interchange to the Dimond Boulevard Interchange. The study area includes Old Seward Highway on the west, Dimond Boulevard on the north, Brayton Drive on the east, and O'Malley Road on the south. Figure 1 illustrates the study area and study intersections.



LEGEND

- # - STUDY INTERSECTION
- STUDY MERGE/DIVERGE SEGMENT
- STUDY AREA

Study Area
Anchorage, Alaska

Figure
1

K:\H_Anchorage\projfile\18409 - Seward Highway Improvements-O'Malley to Dimond\dwgs\figs\18409_Figures.dwg Oct 07, 2016 - 11:40am - bkorporaal Layout Tab: Study Area

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Study Intersections

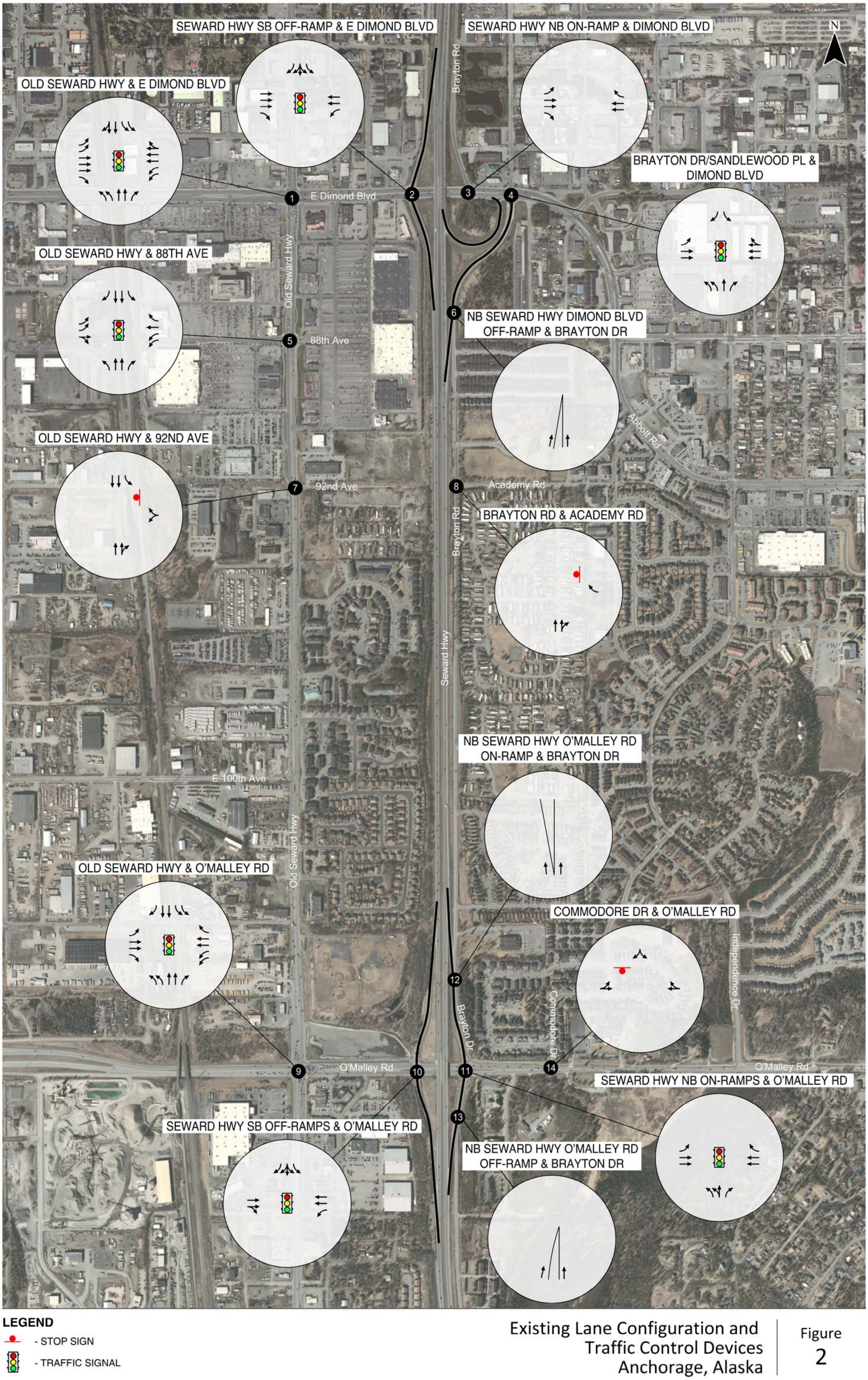
The following intersections were analyzed to understand existing corridor and intersection conditions of Seward Highway, Old Seward Highway, Dimond Boulevard, Abbott Road, Brayton Drive, and O'Malley Road with respect to operational conditions, pedestrian facilities, bike facilities, and transit routes.

1. Old Seward Highway / Dimond Boulevard
2. Seward Highway Southbound Ramp Terminus / Dimond Boulevard
3. Seward Highway Northbound Ramp Terminus / Brayton Drive / Dimond Boulevard
4. Brayton Drive / Dimond Boulevard/Abbott Road / Sandlewood Place
5. Old Seward Highway / 88th Avenue
6. Seward Highway Northbound Dimond Off-Ramp / Brayton Drive – (Merge Segment)
7. Old Seward Highway / 92nd Avenue
8. Brayton Drive / Academy Drive
9. Old Seward Highway / O'Malley Road / Minnesota Drive
10. Seward Highway Southbound Ramp Terminus / O'Malley Road
11. Seward Highway Northbound Ramp Terminus / O'Malley Road
12. Seward Highway Northbound O'Malley Road On-Ramp / Brayton Drive – (Merge Segment)
13. Seward Highway Northbound O'Malley Road Off-Ramp / Brayton Drive – (Merge Segment)
14. O'Malley Road / Commodore Drive

Turning movement count data was collected at each of the intersections in July 2016 and a field visit confirming roadway facilities and operational results was completed in September 2016. Study intersection lane configurations are illustrated in Figure 2.

Land Use and Zoning

The MOA Land Use Plan Map identified in the *2006 Anchorage Bowl Land Use Plan Map* (Reference 1) illustrates various zoning within the study area. An excerpt of that plan is shown in Exhibit 1. Industrial zones are found in the northeast and west and regional commercial in the northwest. Residential zoning is generally designated to the southern portion of the study area. Residential zoning varies from single unit housing, compact mixed housing, and multifamily housing east and west of Seward Highway.



Existing Lane Configuration and Traffic Control Devices
Anchorage, Alaska

Figure 2

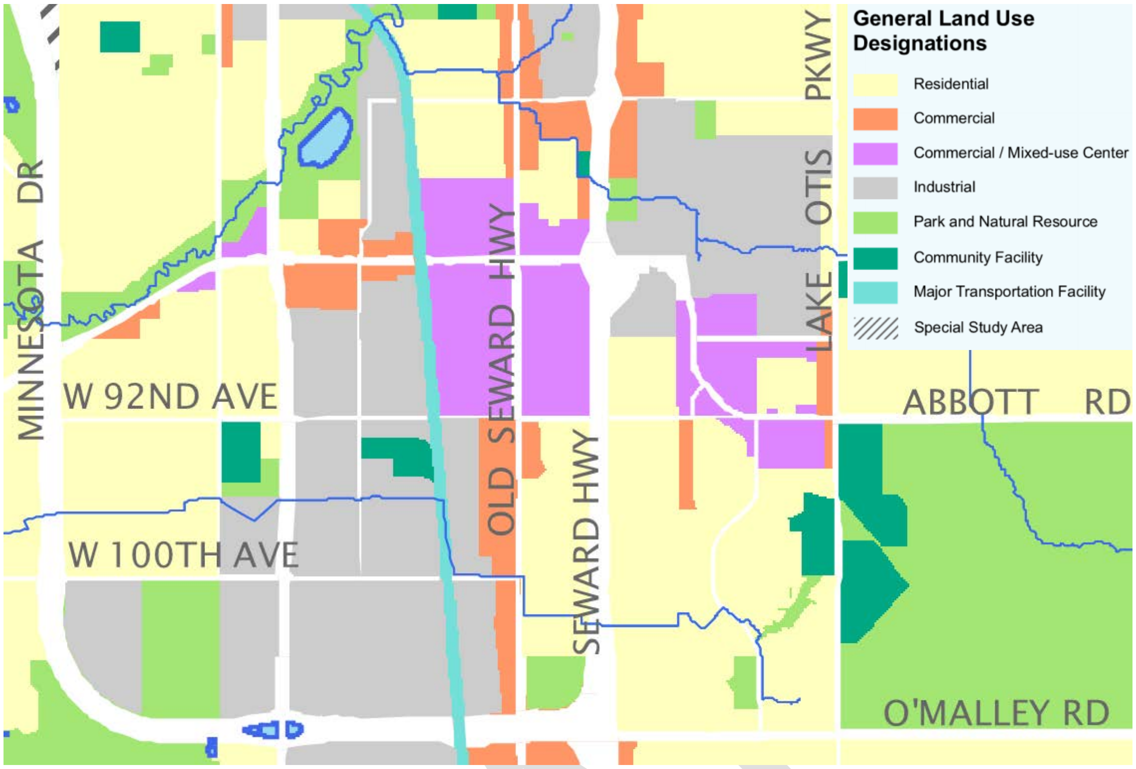


Exhibit 1. Site Vicinity Land Use Map (Source: MOA Planning)

Roadway Facilities

Major roadways in the study area were identified and catalogued. Table 1 provides a summary of the roadway facilities being studied.

Table 1. Study Roadway Facilities

Roadway	Functional Classification[1]	# of Travel Lanes	Posted Speed (mph)	Pedestrian Facilities	Bicycle Facilities	Average Annual Daily Traffic (AADT)[2]
88^{th} Street	Commercial / Industrial Collector	2	25	Partial	None	6,000
92^{nd} Street	Minor Collector	2	25	Partial	None	800
Academy Drive	Minor Collector	2	25	Partial	None	1,500
Brayton Drive	Major Collector	2 (one-way)	45	None	None	2,500
Dimond Boulevard / Abbott Road	Principal Arterial	4/6	40	Yes	Path	39,000
O'Malley Road	Principal Arterial	4	50	Yes	Path/ Sidewalk	30,000
Old Seward Highway	Principal Arterial	5	45	Yes	Path	19,000
Seward Highway	Interstate	4	65	Partial	Partial Path	37,000

[1] Per DOT&PF Statewide Functional Classification GIS Map

[2] Representative AADT volumes per DOT&PF 2014 Annual Average Daily Traffic (AADT) GIS Map

MOTOR VEHICLE CONDITIONS

This section summarizes the existing traffic operations analysis within the study area.

Daily Traffic Volumes on Seward Highway

The DOT&PF publishes the *Annual Traffic Volume Report* (Reference 2) which provides average annual daily traffic (AADT) volumes along Seward Highway for the past 14 years (1995 - 2013). AADT for year 2014 was collected from DOT&PF'S online AADT GIS Map (Reference 3). The AADT along Seward Highway includes two-way traffic volumes between 76th Avenue and Huffman Road. In 2014, AADT along Seward Highway varied from 42,500 north of Dimond Boulevard to 27,000 south of O'Malley Road.

Exhibit 2 presents a graphical representation of the range of AADT on Seward Highway for the past 20 years along each of the three Seward Highway study segments. Over the past 15 years, there has been a consistent decline in AADT along Seward Highway ranging from a 22.7 percent decline north of Dimond Boulevard, to 7.4 percent decline between Dimond Boulevard and O'Malley Road and 4.2 percent south of O'Malley Road. These three study segments have experience a range of a 0.3 to 1.5 average percent decline annually since year 2000.

One reason for the decrease in AADT north of Dimond Boulevard can be attributed to the removal of the northbound on-ramp on the north side of Dimond Boulevard with the construction of the eastbound to northbound loop ramp in year 2003. This configuration change eliminated all westbound to northbound vehicles at Dimond Boulevard from the count location as they enter the highway near 76th Avenue to the north of the count station, contributing to the sharp decline in 2004. However, traffic counts at this location have still declined 14.8 percent since the change was made in 2004.

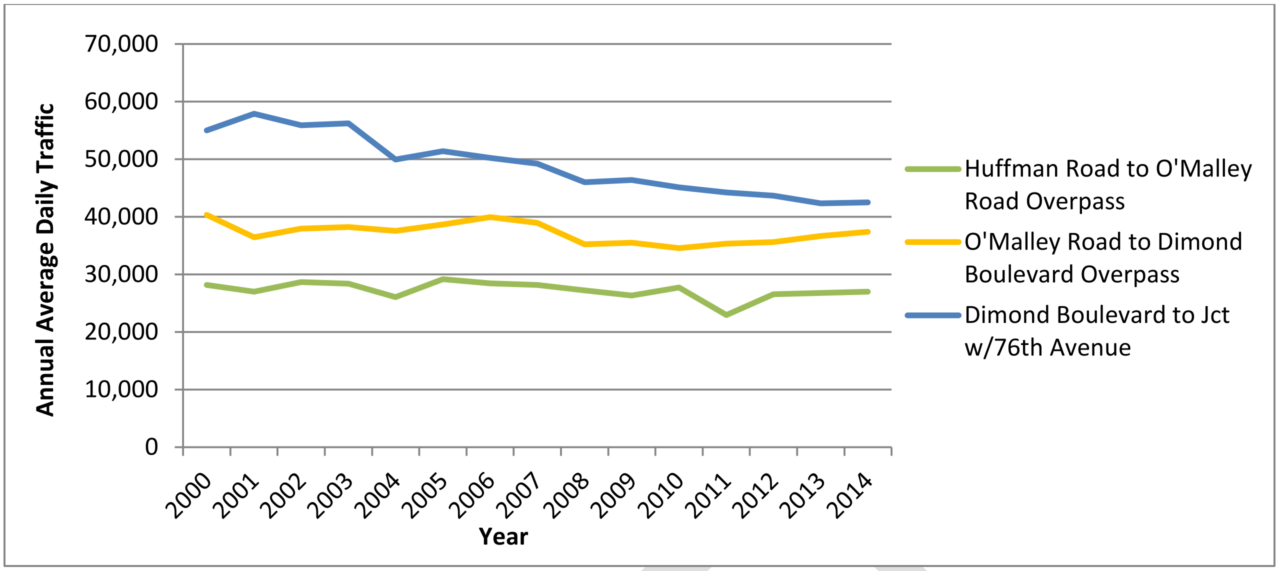


Exhibit 2. 20 Year (2000 - 2014) AADT on Seward Highway

Exhibit 3 summarizes a typical mid-weekday (Tuesday – Thursday), 24-hour profile of the AADT volumes on Seward Highway from Dimond Boulevard to O'Malley Road. Consistent with the segments north of Dimond Boulevard and south of O'Malley Road, Seward Highway has a distinct a.m. peak that occurs in the northbound direction from 7:00 a.m. to 8:00 a.m. and in the southbound direction during the p.m. peak that occurs from 5:00 p.m. to 6:00 p.m.

Within this segment of Seward Highway, the a.m. and p.m. peak hour volumes account for approximately 7.8% and 12.4% of AADT, respectively.

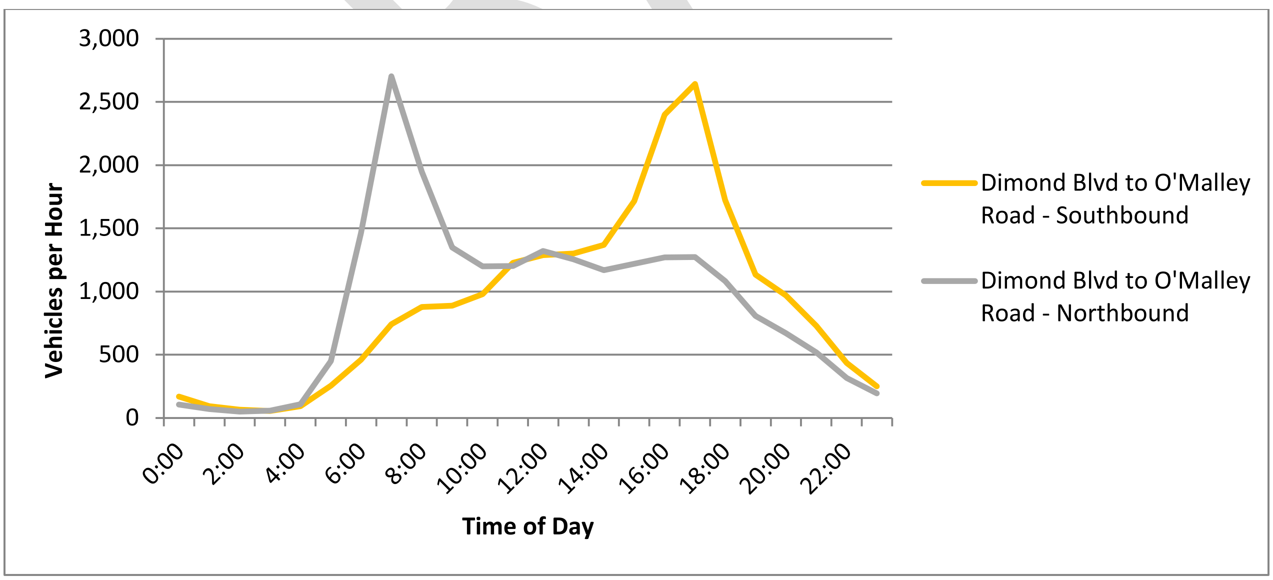


Exhibit 3. Hourly AADT Profile by Direction on Seward Highway between Dimond Blvd and O'Malley Rd

Exhibit 4 presents the weekly profile of AADT by direction on Seward Highway between Dimond Boulevard and O'Malley Road. The typical mid-week day (Tuesday – Thursday) volumes were relatively equal, with a noticeable increase in volume on Fridays. As typical with freeway segments, there was a distinctive decrease in AADT on Saturday and Sunday. Sunday's experience approximately 30% less traffic than a typical mid-week day.

Because of the consistency of AADT counts during the typical mid-week days, these volumes were averaged for the merge, diverge and freeway segment analyses presented later in this section.

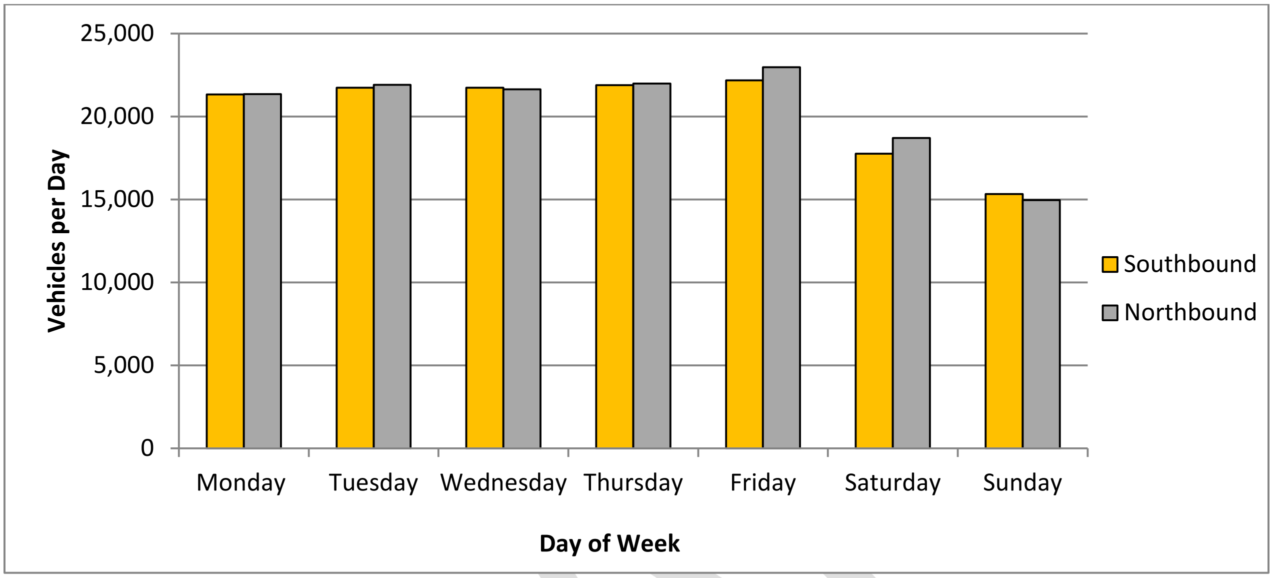


Exhibit 4. Weekly AADT Profile by Direction on Seward Highway between Dimond Blvd and O'Malley Rd

Vehicle Classification

Vehicle classification data is reported in the DOT&PF *Annual Traffic Volume Report,* aggregated by month. These data were averaged to develop the vehicle class proportions shown in Exhibit 5. As shown in the exhibit, 93 percent of vehicles on the Seward Highway are standard sized vehicles (passenger cars/SUVs/vans/pick-up trucks), 6 percent are single-unit trucks and less than 1 percent are heavy trucks.

The weigh-in-motion station located on the Seward Highway at 76th Avenue also collect speed data, but only for commercial vehicle classes. The average truck speeds collected in April 2015 was 62 mph with an 85th percentile truck speed of 69 mph.

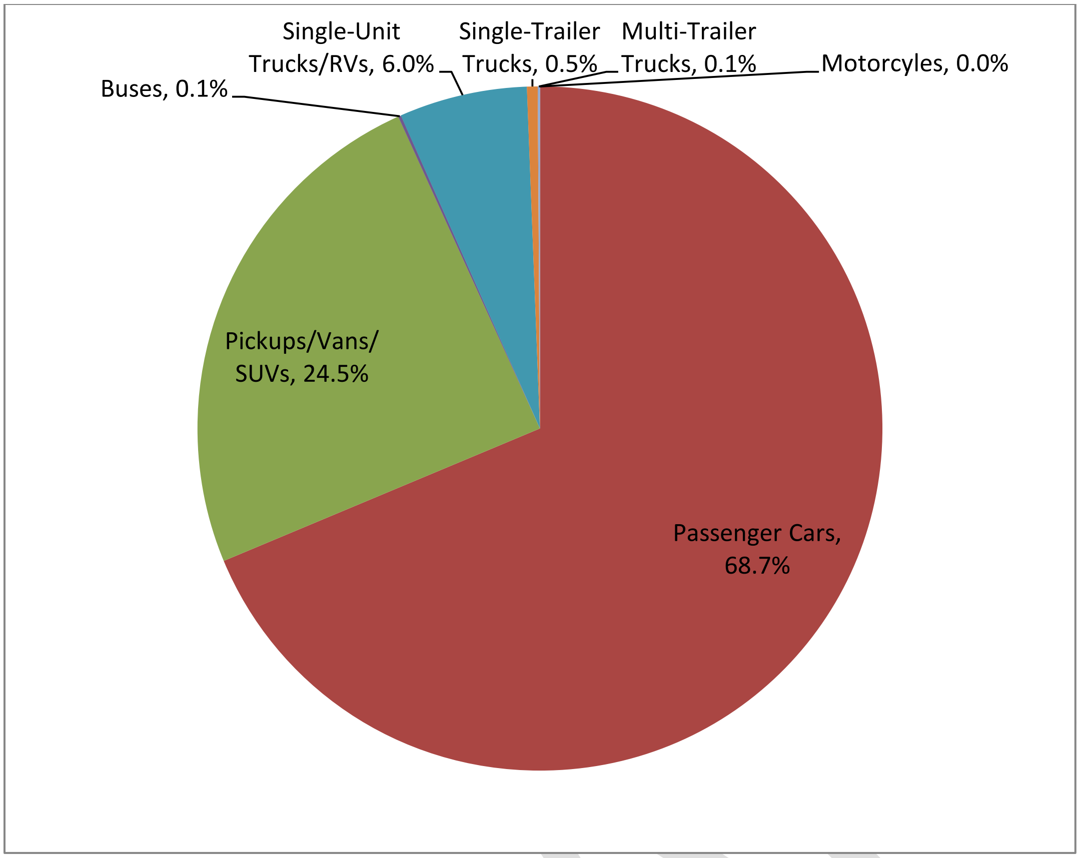


Exhibit 5. Average Vehicle Classification: Seward Highway at 76th Avenue

Operations Analysis Methodology

The intersection operational analysis for signalized, stop-controlled, and yield-controlled intersections conducted was prepared using Synchro 9 and following the Highway Capacity Manual (HCM) 2000 (Reference 4) analysis procedures. For signalized intersections, KAI obtained traffic signal timings from the MOA Traffic Department in order to correctly model and analyze each intersection.

All intersection level-of-service (LOS) analyses use the peak 15-minute flow rate during the weekday a.m. and p.m. peak hours. Using the peak 15-minute flow rate ensures that this analysis is based on a reasonable worst-case scenario. For this reason, the analysis reflects conditions that are only likely to occur for 15 minutes out of each average peak hour. The transportation system will likely operate better than the conditions described in this report during all other time periods.

The merge and diverge (on- and off-ramp) segment and freeway segment analyses were completed using the Highway Capacity Software (HCS), Version 6.10 which implements the HCM 2010 (Reference 5) methodology in determining the level of service on the freeway mainline and at merge segment locations based on variety of factors including volume, speed, number of lanes, length of segment, and terrain. Freeway count data was collected in June 2015 and provided from DOT&PF. Hourly freeway count data was not complete for the freeway segment north of Dimond Boulevard to 76th

Avenue. Therefore, peak hour freeway volumes in this section were calculated using freeway count data south of Dimond Boulevard and on- and off-ramps data at the Dimond Boulevard interchange.

Intersection Operating Standards

Vehicle operations at intersections are assessed by the volume-to-capacity ratio at average vehicle delay. The LOS is assigned to an intersection based on average vehicle delay. Signalized intersections report LOS for the intersection as a whole, while LOS is reported for an unsignalized intersection's critical movement, typically a minor street turning movement.

The DOT&PF uses LOS thresholds for determining an intersection's operating standards. For this project, the DOT&PF identifies acceptable intersection operational standards as operating at level of service (LOS) C or better. However, where LOS C can only be accomplished by alternatives with excessive cost, LOS D may be acceptable. While a volume-to-capacity (V/C) ratio is not used to determine LOS standards at signalized or unsignalized intersections, a critical movement's V/C ratio of 0.90 is typically considered acceptable at an unsignalized intersection.

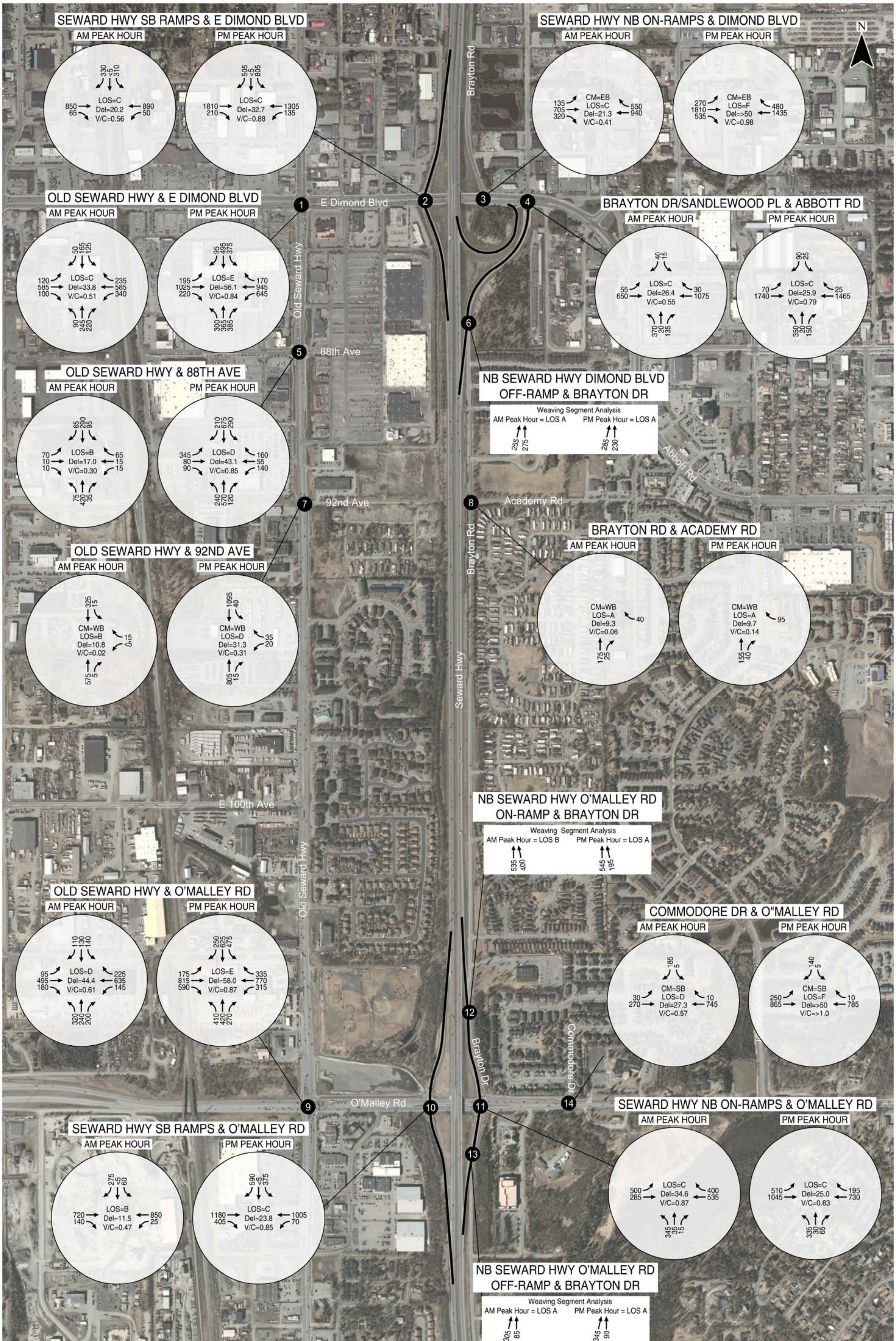
Weekday AM and PM Peak Hour Traffic Conditions

Turning movement counts were collected at each of the study intersections in July 2016, with the exception of counts at the unsignalized intersections of Commodore Drive/O'Malley Road and 92nd Avenue/Old Seward Highway. These counts were derived from the *Seward Highway: 92nd Avenue Connector Project* and the *AMATS: O'Malley Road Reconstruction, Phase I, Seward Highway to Livingston Street Project*, respectively (Reference 6 & 7). Vehicle counts were manually balanced as necessary where no driveways and/or side streets exist between two intersections. The volumes were not seasonally adjusted due to being collected in a peak month. Appendix 1 includes the existing weekday a.m. and p.m. peak period counts at each of the study intersections.

Turning movement counts were collected during a typical midweek (Tuesday – Thursday) a.m. (7:00 a.m. to 9:00a.m.) and p.m. (4:00 p.m. to 6:00 p.m.) peak periods. A system wide peak hour was identified for the a.m. (7:35 a.m. to 8:35 a.m.) and p.m. (4:55 p.m. to 5:55 p.m.) peak periods.

Figure 3 summarize the study intersection turning movement counts and operational results for the existing weekday a.m. and p.m. peak hour traffic conditions. Ten of the study intersections operate at acceptable operating standards during the existing conditions weekday a.m. and p.m. peak hours while the following intersections currently do not meet the acceptable operating standards:

- **Old Seward Highway & E Dimond Boulevard** operates at LOS E with a v/c ratio of 0.84 during the weekday p.m. peak hour.
- **Seward Highway NB On-Ramp & Dimond Boulevard** the critical movement is the eastbound left-turn which operates at LOS F with a v/c ratio of 0.98 during the weekday p.m. peak hour. This movement is planned to be removed with the Seward Highway Dimond Boulevard to Dowling Road project.



LEGEND

CM = CRITICAL MOVEMENT (UNSIGNALIZED)
LOS = INTERSECTION LEVEL OF SERVICE (SIGNALIZED)/CRITICAL MOVEMENT LEVEL OF SERVICE (UNSIGNALIZED)
Del = INTERSECTION AVERAGE CONTROL DELAY (SIGNALIZED)/CRITICAL MOVEMENT CONTROL DELAY (UNSIGNALIZED)
V/C = CRITICAL VOLUME-TO-CAPACITY RATIO

Existing Traffic Conditions
Weekday AM and PM Peak Hour
Anchorage, Alaska

Figure 3

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- **Old Seward Highway & 88th Avenue** operates at LOS D during the weekday p.m. peak hour. This intersection is being converted to signal control.
- **Old Seward Highway & 92nd Avenue** the critical movement is the westbound approach, which operates at LOS D during the weekday p.m. peak hour.
- **Old Seward Highway & O'Malley Road** operates at LOS D and E during the weekday a.m. and p.m. peak hours, respectively.
- **Commodore Drive & O'Malley Road** the critical movement is the southbound approach which operates at LOS D during the weekday a.m. peak hour and LOS F and a v/c ratio of greater than 1.0 during the weekday p.m. peak hour. The 140 right turns at this location experience only moderate delay. However, the HCM methodology does not correctly model the behavior of the three observed southbound left turns at this location.

  The eastbound approach narrows from two through lanes to one through lane roughly 250 feet upstream from the intersection. Because of the taper length there is enough room to create a de facto left-turn lane, allowing through vehicles to maneuver around left-turning vehicles. Therefore, intersection operations may be functioning better than reported. This intersection is planned to be reconfigured as part of the O'Malley Road Reconstruction Phase 1 Seward Highway to Livingston Street project.

Appendix 2 includes the traffic operation worksheets for the year 2016 existing traffic conditions scenarios.

95th Percentile Queuing Analysis

The 95th percentile queues were assessed at each of the study intersections to identify if any deficiencies in queue spillback or inadequate storage length capacity exists during the weekday a.m. and/or p.m. peak hours. The 95th percentile queue lengths are calculated using Synchro 9 and represents the worst-case queue that would be expected to occur 5% of the time of the peak 15 minutes of the peak hour. Queue lengths were rounded up to the nearest 25 feet, assuming each vehicle uses 25 feet of space in a queue. Table 2 summarizes the 95th percentile queue lengths at the Seward Highway ramp terminals. As noted above, no 95th percentile queues exceeded storage length capacity during the a.m. peak hour. The cells highlighted in grey indicate 95th percentile queues that equals or exceeds the existing storage length during the p.m. peak hour.

Table 2. 95th Percentile Queue Lengths at Seward Highway Ramp Terminals

Study Ramp Terminals	Peak Period	95th Percentile Queue Lengths (ft)[1]							
		EBL	EBR	WBL	WBR	NBL	NBR	SBL	SBR
1. Old Seward Hwy & E Dimond Blvd	Storage Length[2]	285	435	375	-	360	200	225	-
	AM Peak	100	25	175	-	75	50	75	-
	PM Peak	125	75	**375**	-	200	125	250	-
2. Seward Hwy SB Ramps & E Dimond Blvd	Storage Length[2]	-	60	150	-	-	-	300	300
	AM Peak	-	25	100	-	-	-	250	150
	PM Peak	-	50	**250**	-	-	-	**575**	**450**
3. Seward Hwy NB Ramps & Dimond Blvd	Storage Length[2]	150	-	-	-	-	-	-	-
	AM Peak	50	-	-	-	-	-	-	-
	PM Peak	**200**	-	-	-	-	-	-	-
4. Brayton Rd & Dimond Blvd	Storage Length[2]	185	-	-	-	350	180	65	-
	AM Peak	75	-	-	-	175	50	50	-
	PM Peak	65	-	-	-	180	91	51	-
10. Seward Hwy SB Ramps & O'Malley Rd	Storage Length[2]	-	-	150	-	-	-	495	495
	AM Peak	-	-	0	-	-	-	75	100
	PM Peak	-	-	100	-	-	-	375	250
11. Brayton Rd & O'Malley Rd	Storage Length[2]	400	-	-	-	-	-	-	-
	AM Peak	**400**	-	-	-	-	-	-	-
	PM Peak	**450**	-	-	-	-	-	-	-

Notes: [1] 95th percentile queues were rounded up to the nearest 25 feet, one vehicle represents 25 feet; [2] Storage lengths were reported where applicable at the respective intersection; **Bold** and highlighted cells indicate 95th percentile queues at or exceeding existing storage length.

Where 95th percentile queue lengths that equals or exceeds the existing storage available during the a.m. and/or p.m. peak hour are listed below:

- **Old Seward Highway & Dimond Boulevard** the westbound left-turn is reported to be operating at or near the available storage length with the 95th percentile queue length nearing the 375 feet of storage during the p.m. peak hour. The southbound left-turn movement's 95th percentile queue length is 250 feet during the p.m. peak hour, exceeding the turn storage length of 225 feet.
- **Seward Highway SB Ramps & Dimond Boulevard** the westbound left-turn lane's 95th percentile queue length is 250 feet, exceeding the 150 feet of storage during the p.m. peak hour. Additionally, the southbound left-turn lane's 95th percentile queue length of 575 feet exceeds the 300 foot exclusive left-turn lane storage during the p.m. peak hour.
  - The three southbound queue storage lengths are striped for approximately 300 feet; continuing past the storage lanes, there are two lanes, each providing approximately 275 feet of additional storage where Homer Drive and the Seward Highway southbound off-ramp merge.
- **Seward Highway NB Ramps & Dimond Boulevard** the eastbound left-turn operates at or near the existing storage length with a 95th percentile queue length of 200 feet, exceeding the approximately 150 feet of storage during the p.m. peak hour. This movement is planned to be removed with the Seward Highway Dimond Boulevard to Dowling Road project.

- **Old Seward Highway & 88th Avenue** the eastbound left-turn's 95th percentile queue of 225 feet, exceeds the 150 feet of storage during the p.m. peak hour.
- **Brayton Drive & O'Malley Road** the eastbound left-turn's 95th percentile queue of 400 feet is reported to be operating at or near the available storage length with the 95th percentile queue length nearing the 400 feet of storage during the a.m. peak hour. During the p.m. peak hour, this turn movement exceeds the existing storage length by two vehicles, with a total 95th percentile queue of 450 feet. A queue of this length would back into the Seward Highway SB Ramps/O'Malley Road intersection.

Appendix 3 includes Synchro 9 queue reports at each study intersection.

Existing AM and PM Peak Hour Ramp and Freeway Operations

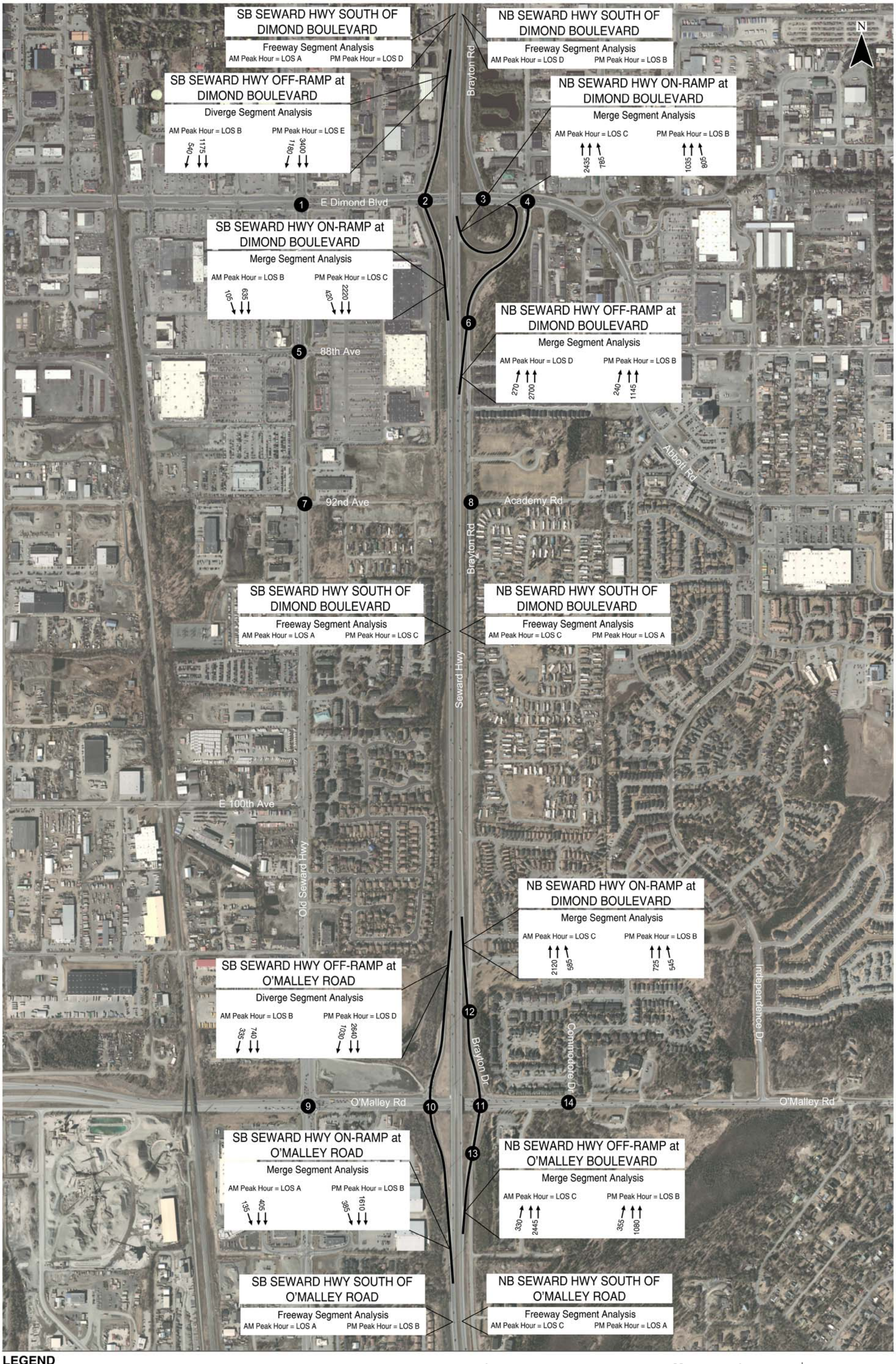
DOT&PF provided the data for the ramp and freeway operation analyses. The ramp analysis evaluates on-ramps, referred to as merge segments and off-ramps, referred to as diverge segments, separately. As mentioned previously, volumes for ramp and freeway segments were average conditions for a typical mid-weekday. All existing condition ramp and freeway operation results are displayed in Figure 4. Appendix 4 includes the operation worksheets for the ramp and freeway analyses.

Existing AM and PM Merge and Diverge Operations

The study merge and diverge segments include all ramps at the Dimond Boulevard and O'Malley Road interchanges. Under existing conditions, no merge segments operate below LOS standards. The northbound and southbound off-ramps at both interchanges do not have dedicated deceleration lanes for diverging vehicles. Therefore, cars diverging from the freeway slowdown in the mainline lane in anticipation of the approaching off-ramp, resulting in slower free flow speeds when freeway volumes are at their peak. Slower free flow speed on a freeway mainline segment results in a lower LOS for that ramp and freeway mainline.

Because of directional peaking characteristics of Seward Highway, the following diverge segments fall below LOS standards under existing conditions:

- NB Off-Ramp at Dimond Boulevard operates at LOS D during the a.m. peak hour.
- SB Off-Ramp at Dimond Boulevard operates at LOS E during the p.m. peak hour.
- SB Off-Ramp at O'Malley Road operates at LOS D during the p.m. peak hour.



LEGEND

— - STUDY MERGE/DIVERGE SEGMENT

Existing Ramp and Freeway Segment Traffic Conditions
Weekday AM and PM Peak Hour
Anchorage, Alaska

Figure 4

Existing AM and PM Freeway Operations

Freeway mainline segment LOS is driven by free flow speeds. HCS calculates free flow speed for a mainline segment using traffic volume, number of lanes and their width, shoulder width, terrain, and total ramp density within the segment. Based on these parameters most of the freeway segments operate at or above LOS C with the following exceptions:

- Seward Highway northbound, north of Dimond Boulevard during the a.m. peak hour.
- Seward Highway southbound, north of Dimond Boulevard during the p.m. peak hour.

PEDESTRIAN AND BICYCLE CONDITIONS

Pedestrian and bicycle conditions and facilities were assessed and summarized in Figure 5.

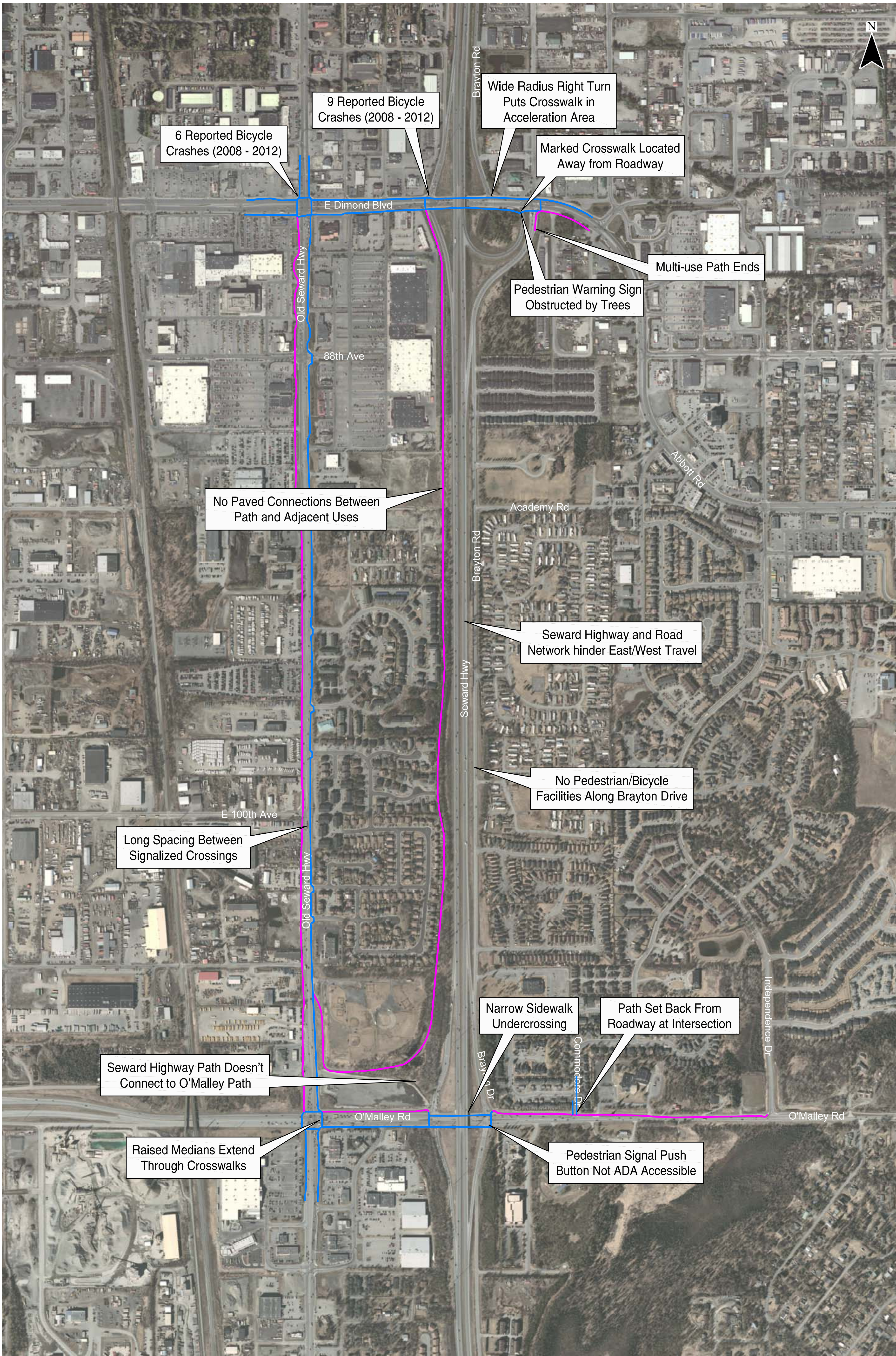
Existing Nonmotorized Activity

Peak hour pedestrian and bicycle intersection volume counts were collected to assess nonmotorized travel activity in the study area. No long-term pedestrian or bicycle count data is available for the study area. These counts, shown in Table 3, indicate non-motorized travel activity varies along across the study area. The Dimond Center shopping area and nearby transit stops are substantial pedestrian generators and experience the highest pedestrian activity in the study area. Peak hour bicycle use was low during the observed period, though the closure of the path on the west side of Seward Highway between Dimond Boulevard and O'Malley Road may have reduced bicycle activity in the area.

Table 3. Nonmotorized Peak Hour Intersection Counts

Intersection	Pedestrian Crossings		Bicycle Movements	
	Weekday AM Peak Hour	Weekday PM Peak Hour	Weekday AM Peak Hour	Weekday PM Peak Hour
Old Seward Hwy/E Dimond Blvd	17	32	2	0
Seward Hwy SB Ramps/E Dimond Blvd[1]	18	23	1	0
Seward Hwy NB On-Ramp/Dimond Blvd	6	25	1	0
Brayton Dr/Dimond Blvd	10	26	0	0
Old Seward Hwy/88th Ave	12	53	0	0
Brayton Dr/Seward Hwy NB Off-Ramp	0	2	4	1
Old Seward Highway/92nd Avenue	0	0	0	0
Brayton Dr/Academy Dr	0	1	4	1
Old Seward Hwy/O'Malley Rd	7	16	0	2
Seward Hwy SB Ramps/O'Malley Rd	18	8	0	0
Brayton Dr/O'Malley Rd	4	9	0	0
Brayton Dr/Seward Hwy NB On-Ramp	1	0	0	1
Brayton Dr/Seward Hwy NB Off-Ramp	0	0	0	1
Commodore Dr/O'Malley Rd	4	9	0	0

[1] The Seward Highway multiuse path was closed for construction during this count.



LEGEND
- SIDEWALK / MARKED CROSSWALK
- MULTI-USE PATH

Existing Pedestrian and Bicycle Conditions
Anchorage, Alaska

Figure
5

K:\H_Anchorage\projfile\18409 - Seward Highway Improvements-O'Malley to Dimond\dwgs\figs\18409_Figures.dwg Oct 14, 2016 - 12:05pm - bkorporaal Layout Tab: Existing-Ped&Bike

Kittelson & Associates, Inc.
Transportation Engineering/Planning

Nonmotorized Travel Routes

The activity tracking company Strava has assembled a substantial data set based on reported bicycle trips. While this data is informal and potentially biased towards recreational users, Strava is working with cities across the country to apply their dataset to bicycle planning efforts. The Strava Heatmap dataset (Reference 8) in Exhibit 6 shows relative bicycle use across the roadway network.

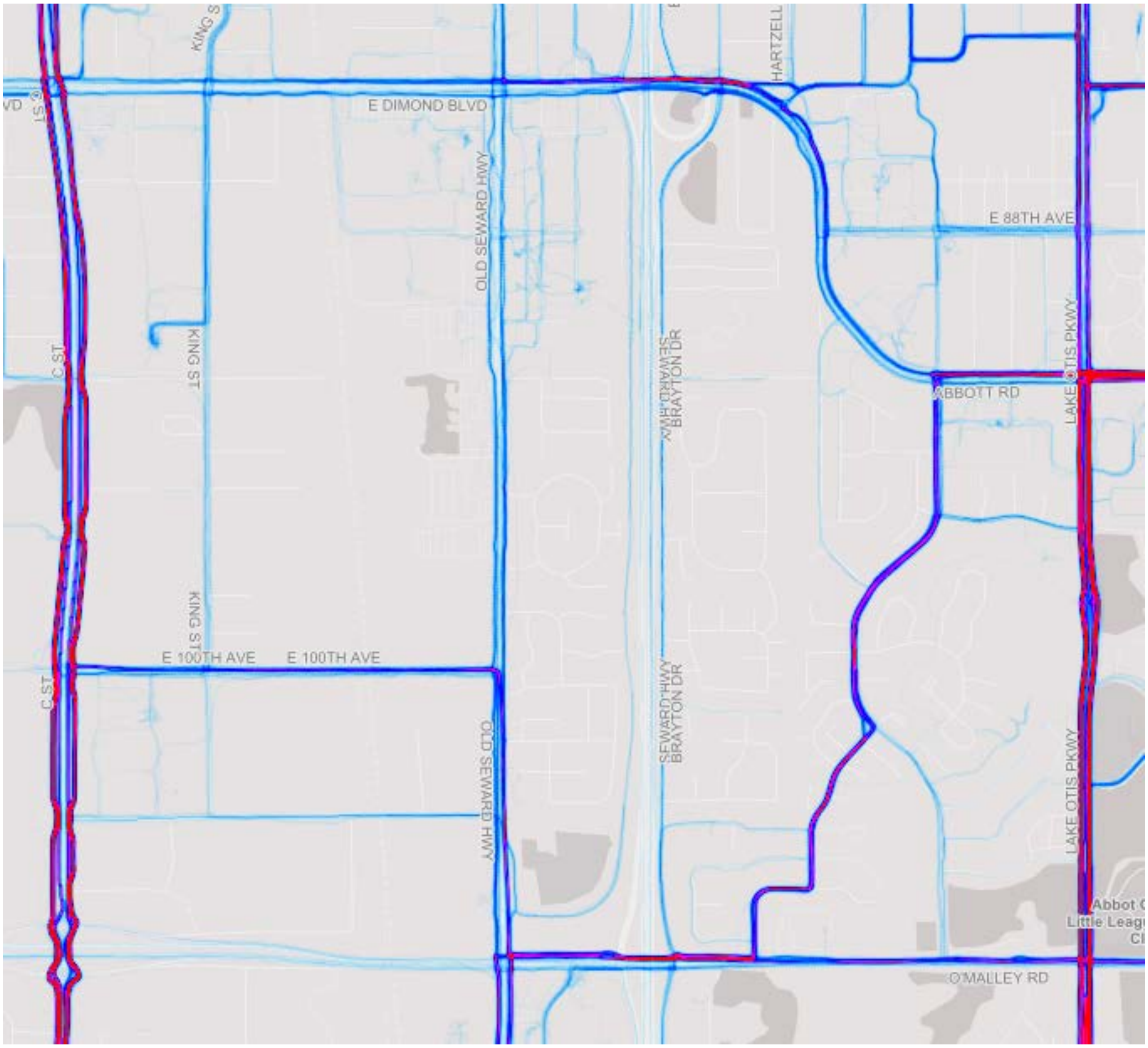


Exhibit 6. Bicycle Route Relative HeatMap (Source: Strava, 2015)

These data, along with analysis of the existing bicycle network, including the 2016 Anchorage Bicycle Map (Reference 9), indicate the current paths utilized by cyclists to navigate the study area. The Seward Highway and the Alaska Railroad Corporation tracks restrict east/west travel through the study area and concentrates trips on the north side of the Dimond Boulevard and O'Malley Road undercrossings. While Old Seward Highway sees some bike usage, the primary north/south routes in the area are C Street and Lake Otis Parkway. Additionally, direct through routes away from major arterials are popular with cyclists, such as 100th Avenue, Independence Drive, Jamestown Drive, and Dimond Boulevard/84th Court. The bike path adjacent to the Seward Highway sees little relative use.

TRANSIT FACILITIES

The Anchorage transit system People Mover has stops along study corridors and a transit center at the Diamond Center, which is served by five separate bus lines, as shown in Exhibit 7. No scheduled service utilizes the Seward Highway.

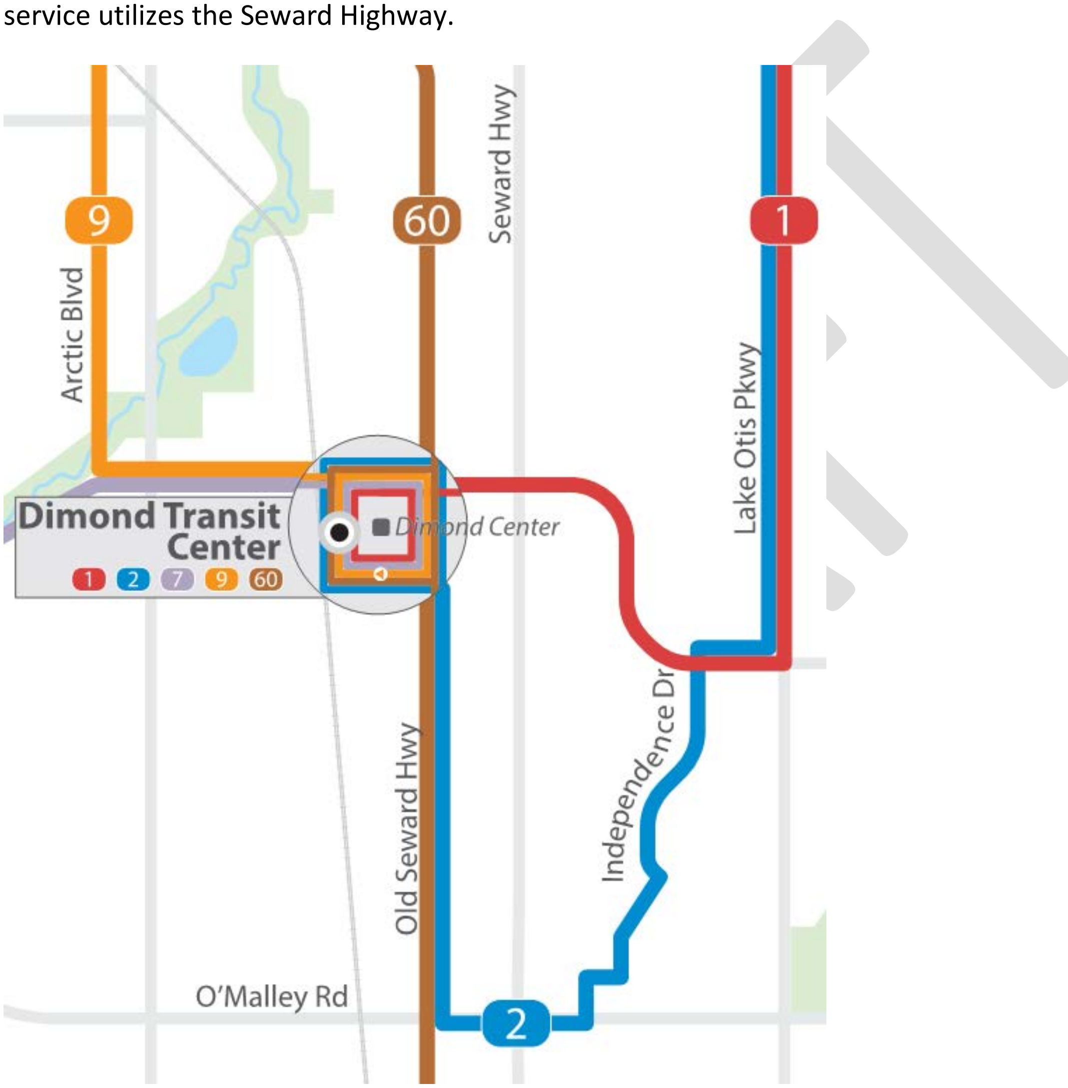


Exhibit 7. Study Area Transit Routes (Source: People Mover)

Routes 1, 2, and 60 generally operate with 60 minute headways, while routes 7 and 9 have 30 minute headways during weekday daytime hours. The MOA Public Transportation Department is in the process of conducting the Anchorage Talks Transit project and recommendations should be forthcoming. The Seward Highway design team will be monitoring the results of the transit service study and will incorporate relevant recommendations into the alternatives development and evaluation analysis.

SAFETY ASSESSMENT

Crash analysis of the corridor was performed to identify opportunities to reduce crashes. Crash histories were reviewed for trends and patterns and used to calculate critical crash rates by intersection. Any identified issues were noted and will be considered through the concept development.

Crash records were obtained from the DOT&PF for the most recent available five-year period from January 1, 2008 through December 31, 2012. A summary of the crash data over the five-year period is provided in Table 4. Appendix 5 contains the crash data worksheets.

Table 4 Study Area Crash Summary (2008-2012)

Intersection	Collision Type							Severity			Total Crashes
	Angle	Side-swipe	Rear End	Head On	Fixed Object	Ped / Bike	Other	PDO	Injury	Fatality	
Brayton Dr/Abbott Rd/Sandlewood Pl	21	2	29	0	4	2	1	39	20	0	59
Brayton Dr/Academy Dr	2	1	1	0	1	1	1	5	2	0	7
Dimond Blvd/Briarwood St	19	1	16	0	0	3	5	25	19	0	44
Old Seward Hwy/88th Ave	52	5	35	3	2	1	3	75	26	0	101
Old Seward Hwy/92nd Ave	5	1	4	0	2	0	2	10	4	0	14
Old Seward Hwy/Dimond Blvd	82	11	162	0	14	7	13	208	81	0	289
Old Seward Hwy/O'Malley Rd/Minnesota Dr	25	2	68	3	8	1	5	82	30	0	112
O'Malley Rd/Commodore Dr	7	0	4	0	0	0	4	10	5	0	15
Seward Hwy NB Dimond Off-Ramp/Brayton Dr	0	0	0	0	2	0	0	1	1	0	2
Seward Hwy NB O'Malley Off-Ramp/Brayton Dr	1	0	1	0	0	0	0	1	1	0	2
Seward Hwy NB O'Malley On-Ramp/Brayton Dr	5	0	3	0	1	0	4	10	3	0	13
Seward Hwy NB Ramp Terminus/Brayton Dr/ Dimond Blvd	18	1	15	0	2	2	7	34	11	0	45
Seward Hwy NB Ramp Terminus/O'Malley Rd	41	1	30	0	5	0	4	47	34	0	81
Seward Hwy SB Ramp Terminus/Dimond Blvd	28	4	71	0	1	9	5	77	41	0	118
Seward Hwy SB Ramp Terminus/O'Malley Rd	28	0	17	0	2	1	3	32	19	0	51

A review of the above crash data found that the intersection of Old Seward Highway and Dimond Boulevard had the highest crash occurrence with 289 crashes. Rear end crashes at this intersection accounted for 162 of the total crashes with 63 of the rear end crashes occurring on the westbound travel direction of Dimond Boulevard. Rear end crashes mostly occurred before and into the PM peak hour from 1:00 to 5:00 p.m. Angle crashes accounted for 82 of the total crashes with 50 of those angle crashes occurring as straight ahead movements on the eastbound and westbound travel directions of Dimond Boulevard. Fourteen of the angle crashes occurred between eastbound and southbound vehicles. While 54 of the angle crashes occurred at or within the intersection, another 28 angle crashes were reported at driveways immediately adjacent to the intersection. This intersection also had six bicycle-related crashes reported, all with non-incapacitating/minor injuries. Three of the six bicycle-related crashes occurred in the eastbound travel direction. At least half of the total bicycle-related crashes occurred at driveway accesses within 150 feet of the intersection.

The Seward Highway Southbound Ramp Terminus and Dimond Boulevard intersection included 118 reported crashes. The majority of crashes at this intersection included rear end crashes with a total of 71 crashes. Nearly half of all rear end crashes occurred on westbound Dimond Boulevard. Eastbound and southbound travel directions at this intersection had 19 and 18 rear end crashes, respectively. Of note at this intersection were the nine bicycle-related crashes. Seven of the nine bicycle-related crashes occurred on the southbound travel direction with at least five of those crashes involving southbound right turning vehicles. Adjacent to the southern leg of this intersection is the beginning of a bike path that follows Seward Highway from Dimond Boulevard to O'Malley Road. Bicyclists crossing Dimond Boulevard to get to or from the bike path must cross in front of right turning vehicles from the Seward Highway off ramp.

The intersection of Old Seward Highway and 88th Avenue experienced 101 crashes over the five year study period. Of the 101 crashes, 52 were angle crashes of which 21 involved left turning or u-turning vehicles from the northbound or southbound approaches. These movements operate as protected/permitted via a five-section "doghouse" signal. Rear end crashes also represented 35 of the total crashes at this intersection while 24 of the 35 rear end crashes occurred on southbound Old Seward Highway.

Angle crashes are the majority of crashes at the Seward Highway Northbound Ramp Terminus intersection with O'Malley Road. Of the 81 reported crashes, 41 were angle crashes. Left turns accounted for 32 of the 41 angle crashes.

The Dimond Boulevard and Briarwood Street intersection includes a left turn pocket from eastbound Dimond Boulevard onto Briarwood Street. This left turn lane involves crossing three lanes of Dimond Boulevard and 12 angle crashes occurred on this eastbound left turn. This intersection also had 16 rear end crashes out of 44 total crashes. Most of the rear end crashes occurred on westbound and eastbound Dimond Boulevard where queueing forms from the intersections of the Seward Highway southbound ramp terminus as well as Old Seward Highway.

The intersection of Old Seward Highway and O'Malley Road/Minnesota Drive included 112 reported crashes over the five year period. Over half of the crashes (68) were rear end crashes with the majority of rear end crashes (25) occurring on westbound O'Malley Road.

DOT&PF provided statewide average crash rates at a variety of intersection configurations based on number of approaches and traffic control types. The average crash rate represents the approximate number of crashes that are "expected" at a study intersection. However, this average crash rate was used to calculate the critical crash rate for each study intersection based on the DOT&PF Highway Safety Improvement Program (HSIP) Manual methodology.

Per the DOT&PF HSIP Manual, intersections are flagged for further review when the safety index, calculated by the observed crash rate over the critical crash rate, is greater than or equal to 0.90, or if the intersection has experienced one fatal crash or two major injury crashes in the past five years.

The summary crash data in Table 5 reports the observed crashes, million entering vehicles (MEV), the observed crash rate per MEV, the statewide average crash rate, critical crash rate, and safety index for all study intersections. Some intersections did not adequately fit any approach styles used in the DOT&PF HSIP Manual methodology, so applicable data was denoted with an "N/A" and was not reviewable. Additionally, some intersections lacked average daily traffic (ADT) counts, so applicable data was denoted with an "N/A" and was not reviewable.

Table 5 Crash Rate Analysis (2008-2012)

Intersection	Total Crashes	Total Million Entering Vehicles (MEVs)	Crash Rate (per MEV)	DOT&PF Average Crash Rate (per MEV)	Critical Crash Rate	Safety Index
Brayton Dr/Abbott Rd/Sandlewood Pl	59	86.7	0.68	1.47	1.69	0.40
Brayton Dr/Academy Dr	7	6.4	1.09	0.51	1.05	**1.04**
Dimond Blvd/Briarwood St	44	N/A	N/A	N/A	N/A	N/A
Old Seward Hwy/88th Ave	101	65.4	1.54	1.47	1.72	**0.90**
Old Seward Hwy/92nd Ave	14	43.7	0.32	0.47	0.65	0.49
Old Seward Hwy/Dimond Blvd	289	114.2	2.53	1.47	1.66	**1.52**
Old Seward Hwy/O'Malley Rd/Minnesota Dr	112	119.5	0.94	1.47	1.66	0.57
O'Malley Rd/Commodore Dr	15	44.7	0.34	0.47	0.65	0.52
Seward Hwy NB Dimond Off-Ramp/Brayton Dr	2	11.4	0.17	N/A	N/A	N/A
Seward Hwy NB O'Malley Off-Ramp/Brayton Dr	2	9.6	0.21	N/A	N/A	N/A
Seward Hwy NB O'Malley On-Ramp/Brayton Dr	13	16.1	0.81	N/A	N/A	N/A
Seward Hwy NB Ramp Terminus/Brayton Dr/ Dimond Blvd	45	98.6	0.46	0.52	0.64	0.71
Seward Hwy NB Ramp Terminus/O'Malley Rd	81	63.9	1.27	1.13	1.36	**0.93**
Seward Hwy SB Ramp Terminus/Dimond Blvd	118	106.3	1.11	1.13	1.31	0.85
Seward Hwy SB Ramp Terminus/O'Malley Rd	51	79.2	0.64	1.13	1.34	0.48

Table 5 shows that four of the eleven intersections with reviewable safety indices were at or above the 0.90 DOT&PF threshold:

- Brayton Drive/Academy Drive
- Old Seward Highway/88th Avenue

- Old Seward Highway/Dimond Boulevard
- Seward Hwy NB Ramp Terminus/O’Malley Road

The review of the crash data also displayed that four of the intersections were at or above the severity threshold of two major injury crashes over a five year period. Those intersections included the following:

- Dimond Boulevard/Briarwood Street
- Old Seward Highway/Dimond Boulevard
- Seward Hwy NB Ramp Terminus/O’Malley Road
- Seward Hwy SB Ramp Terminus/O’Malley Road

The crash rates at these intersections indicate a proclivity to respond to safety mitigations. Planned and proposed safety and operational treatments are presented later in this document.

FIELD SAFETY AND OPERATIONS ASSESSMENT

An assessment was conducted at the study intersections in September 2016 to evaluate the existing pedestrian/bicycle, operations, and safety conditions.

Old Seward Highway / Dimond Boulevard

- Pedestrians using the crosswalks must cross as many as nine vehicle lanes, which lead to pedestrian crossing times of over 30 seconds.
- Multiple driveway accesses are located within 150 feet of the intersection, leading to potential vehicle movement conflicts and queue interactions.
- Vehicles performing u-turns conflict with vehicles turning right on red.
- Citizens have reported conflicts with drivers turning right on red not looking for and not yielding to pedestrians in the crosswalk.

Seward Highway Southbound Ramp Terminus / Dimond Boulevard

- Bicyclists cross the west leg of this intersection to access the Seward Highway multiuse path.

Seward Highway Northbound Ramp Terminus / Brayton Drive / Dimond Boulevard

- Eastbound left turning drivers were observed to aggressively accept small gaps and not yielding to pedestrians crossing the north leg.
- The westbound right turn radius is large, contributing to high turning speeds and longer pedestrian crossings.

- The westbound right-turn lane is a drop lane. Drivers were observed to make late lane changes to continue westbound on Dimond Boulevard.

Brayton Drive / Abbott Road / Sandlewood Place/Dimond Boulevard

- The path along Brayton Drive end just south of the intersection, reducing nonmotorized connectivity.
- The multiuse path along the south side of Dimond Boulvevard crosses the eastbound loop on-ramp set back from the intersection, which reduces pedestrian visibility.
- The pedestrian crossing beacons are not push button activated.
- One of the pedestrian signs is obstructed by trees and shrubbery.
- A crosswalk pedestrian sign also tells bicyclists to “Walk Bikes.” This sign does not reflect recent changes in Municipal Code Title 9, which gives bicyclists moving at a reasonable speed priority at this intersection.

Old Seward Highway / 88th Avenue

- The northbound and southbound left-turns operate as protected/permitted with five-section “doghouse” signal heads.

Old Seward Highway / 92 Avenue

- The intersection of Old Seward Highway and 92nd Avenue is currently under construction and is being converted to a signal.

Old Seward Highway / O’Malley Road

- Three crosswalks at this intersection have a raised median within the crosswalk. The raised median on the east leg crosswalk spans the entire width of the crosswalk and is not ADA compliant.

Seward Highway Southbound Ramp Terminus / O’Malley Road

- The pedestrian signal push button at the southwest corner of the intersection is far from the ramps and the ramps at the same corner are missing detectable (tactile) warning surfaces.
- The sidewalks along O’Malley Road under the Seward Highway are narrow and do not provide a buffer between sidewalk users and the motor vehicle lanes.
- The Seward Highway path does not directly connect to this intersection.
- The westbound left-turns operate as protected/permitted with five-section “doghouse” signal heads.

Seward Highway Northbound Ramp Terminus / O'Malley Road

- The eastbound left-turns operate as protected/permitted with five-section "doghouse" signal heads.
- Permissive eastbound left-turns were observed to be difficult during peak periods.

O'Malley Road / Commodore Drive

- A multi-use path crosses Commodore Drive set back from the intersection of O'Malley Road and Commodore Drive, reducing path user visibility.
- Vehicles leaving Commodore Drive stop past the "Stop" sign and in the path crosswalk in order to see traffic on westbound O'Malley Road.
- Intersection is located in merge area making lane delineation and usage ambiguous. Eastbound vehicles waiting to turn left are often passed on the right.

NEAR-TERM PLANNED ROADWAY IMPROVEMENTS

The section describes the near-term planned roadway improvements that will influence existing intersection operations.

Seward Highway, 92nd Avenue Connector

The DOT&PF is currently constructing the first phase of the 92nd Avenue and Academy Drive separation project. The first phase of the project includes a southbound auxiliary lane from Dimond Boulevard to O'Malley Road, and reconstruction of 92nd Avenue from the Old Seward Highway to the New Seward Highway. The reconstruction of 92nd Avenue includes a new traffic signal at the Old Seward Highway & 92nd Avenue intersection. Per the DOT&PF, this project is scheduled to be complete by July 2017 (Reference 10).

With the addition of a traffic signal at the Old Seward Highway & 92nd Avenue intersection, intersection operations are expected to improve because of the reduced delay for the turning movements on 92nd Avenue onto Old Seward Highway and provide controlled crossing opportunities for pedestrians and cyclists.

Ultimately, the project will connect Academy Drive to the west beneath the Seward Highway with 92nd Avenue. This connection was designed to alleviate congestion in the Dimond Boulevard / Seward Highway area, providing an option for east/west traffic between Dimond Boulevard and O'Malley Road to access Seward Highway via a new grade separation at 92nd Avenue.

Seward Highway Dimond Boulevard to Dowling Road Project

The Seward Highway Dimond Boulevard to Dowling Road project involves designing and constructing improvements to the Seward Highway from south of the Dimond Boulevard Interchange to Dowling Road. The project will provide an additional lane of capacity in both directions, with an auxiliary lane in the southbound direction between 76th Avenue and Dowling Road. The 76th Avenue and Dowling Road interchanges will be upgraded to improve access and connectivity, as well as safety enhancements. Dimond Boulevard interchange improvements will include a new northbound on-ramp allowing westbound traffic on Dimond Boulevard/Abbott Road to access the freeway without having to travel through the new 76th Avenue intersection. Eastbound vehicles on Dimond Boulevard looking to access 76th Avenue will be able to do so via the improved Sandlewood Place roadway (Reference 11).

O'Malley Road Reconstruction, Phase I – Seward Highway to Livingston Street

Phase I of this project includes roadway improvements along O'Malley Road from Seward Highway to Livingston Street. Roadway improvements will include widening the road to four lanes, two lanes in each direction. The roadway will include a 16-foot raised median to separate oncoming traffic and a 10-foot separated, paved, multi-use pathway on both the north side and south side of O'Malley Road. In addition to continuous illumination along this stretch of roadway, a left-turn lane will be provided for eastbound left-turns at the Commodore Drive and Independence Drive intersections. The addition of the eastbound left-turn lane at Independence Drive is expected to alleviate cut-through traffic on Commodore Drive. Construction for Phase I is planned to begin in 2017, but may require two construction seasons to complete (Reference 12).

Academy Drive/Vanguard Drive Area Traffic Circulation Improvements

This project is being funded by the MOA to run concurrent with DOT&PF's 92nd Avenue Connector project. The project defined the transportation and safety issues along Academy Drive and Vanguard Drive and presented potential improvements, which included the Academy Drive & Abbott Road intersection. The project includes widening Academy Drive to accommodate left-turn lanes and a median with the intention of improving safety of vehicular, pedestrian and bicycle traffic. The preferred alternative includes a proposed traffic signal at the Academy Drive & Abbott Road intersection. The schedule of the project will continually be updated based on coordination with DOT&PF and available funding. Currently the project is its design phase with plans to begin construction in May 2018 (Reference 13).

PROPOSED SAFETY AND OPERATIONS TREATMENTS

Preliminary proposed treatments have been developed to address the safety and operational issues identified in this study. These treatments will be refined, expanded, and evaluated in the next stage of the report.

Old Seward Highway / Dimond Boulevard

- The 92nd Avenue Connector project should reduce congestion at this intersection, likely reducing rear end and other crashes.
- Access management near the intersection would likely improve traffic flow and reduce conflicts in the intersection area.

Seward Highway Southbound Ramp Terminus / Dimond Boulevard

- A push-button activated leading pedestrian interval for the pedestrian crossing of Dimond Boulevard may make cyclists and pedestrians more visible to right-turning drivers.
- Enhancing signal head visibility for westbound drivers may reduce the number of rear end crashes in that direction.

Seward Highway Northbound Ramp Terminus / Brayton Drive / Dimond Boulevard

- Proposed elimination of eastbound left turn lane would eliminate the reported crashes associated with that maneuver.
- Narrowing the westbound right-turn lane would shorten the pedestrian crossing distance.

Brayton Drive / Abbott Road / Sandlewood Place/Dimond Boulevard

- Replacing the beacons with an active beacon would likely improve driver yielding behavior.
- Shift the path crossing closer to Dimond Boulevard to improve pedestrian visibility.

Old Seward Highway / 88th Avenue

- Install flashing yellow arrow signal heads on the northbound and southbound approaches.
- Implement time-of-day protected only operation.

Old Seward Highway / 92 Avenue

- The signalization of this intersection would likely address the reported westbound delay.

Brayton Road

- Install a sidewalk or multiuse path.

Old Seward Highway / O'Malley Road

- Shift median noses outside of marked crosswalks.

Seward Highway Southbound Ramp Terminus / O'Malley Road

- Provide connections from multiuse path to adjacent uses and connect directly to the Seward Highway Southbound Ramp Terminus / O'Malley Road intersection.
- Provide wider pedestrian/bicycle path on north side of O'Malley Road under the Seward Highway.
- Install flashing yellow arrow signal head on the westbound approaches.
- Implement time-of-day protected only operation.

Seward Highway Northbound Ramp Terminus / O'Malley Road

- Install flashing yellow arrow signal head on the westbound approaches.
- Implement time-of-day protected only operation.

O'Malley Road / Commodore Drive

- Proposed reconfiguration will address the sight distance, path configuration, and lane delineation issues.

NEXT STEPS

Traffic projections will be developed to evaluate the safety and operations of the future no-build condition to assess the impacts of planned near-term projects and identify additional issues. The preliminary treatment list will be refined and expanded to address all identified issues. These treatments will be combined into alternatives and evaluated, leading to a preferred alternative.

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APPENDIX C: Material Recommendations

Statewide Materials
Department of Transportation and Public Facilities

Memorandum State of Alaska

TO: Sean Baski, P.E.
Project Manager

DATE: October 16, 2019

THRU:

FROM: Mitch Miller, P.E.
Geotechnical Engineer

TELEPHONE NO: 269-6245

SUBJECT: Seward Hwy. O'Malley to Dimond
Project No**.** CFHWY00012
Structural Section
Recommendations

Central Region Materials (CRM) conducted a field exploration program that required multiple mobilizations in support of design elements. The goal of the geotechnical investigation was to evaluate the subsurface soils ability to support the proposed improvements and evaluate the condition of the existing highway and frontage road embankments. A major component of this effort was establishing the accuracy of existing construction records. Verifying the accuracy of the asbuilt drawings allowed us to comfortably interpolate between test hole locations and utilize those records as well as historical test hole information in the development of these recommendations.

Project History

Prior to development in the late 1960s and early 1970s the area between O'Malley Rd. and Dimond Blvd. was characterized by undulating topography with intermittent peat deposits in the low lying areas. This section of highway was constructed in phases. Its current configuration was developed according to the following series of projects:

<u>1970-1971</u>
Potter to Dowling Road. Grading, Drainage, Surfacing

- Constructed and paved 2-lane highway from south end of Potter Marsh to Dimond Blvd. (became the southbound lanes of the divided highway ultimate configuration)
- Constructed and paved 4-lane separated highway from Dimond Blvd. to Dowling Rd
- Removed all peat from under the embankment footprint

<u>1975-1976</u>
Seward Highway Interchanges Dimond and Dowling Grading, Drainage, Paving, Bridges and Illumination

- Constructed grade-separated interchanges at Dimond Blvd. and Dowling Rd.
- Extended the peat dig out limits to include the embankment widening resulting from the mainline grade raises at the interchanges
- Extended 4-lane divided highway to approx. 1,800 feet south of Dimond
- Paved previously placed Brayton Dr. embankment from DeArmoun to Dowling

- Surcharged and paved portions of the frontage roads that were realigned at the new interchanges
- Surcharged and paved on and off ramps at the new interchanges

1979-1980

O'Malley Interchange Grading, Drainage, Paving, Bridge and Illumination

- Constructed a grade-separated interchange at O'Malley Rd.
- Extended the 4-lane divided highway by constructing 2 northbound lanes between O'Malley Rd. and Dimond Blvd. (previous 2-lane highway was converted to southbound only)
- 4-lane highway was extended to approximately 1,000 feet south of O'Malley Rd.
- Removed all peat from under the mainline embankment
- Floated Brayton Dr. embankment over existing peat deposits

Previous Muck Excavation Limits

The as-built plans for these construction projects called for the removal of all peat from under the mainline embankment. The muck limits were set by a vertical line projected from firm bottom of excavation up to the toe of a 2:1 slope drawn from the finished shoulder to original ground. Our test holes placed along the shoulder and foreslope of the existing road confirmed the removal. Our test holes placed outside of the muck template indicated peat depths consistent with previous investigations often occurring under 2-5 feet of silty overburden (slope flattening material).

The interchange projects at O'Malley Rd. and Dimond Blvd. extended the muck removal as shown in the figure below.

Recommended Muck Excavation Limits

It is recommended that all the peat be removed from under the mainline embankment where widening is occurring. The following figure depicts the recommended peat removal limits. Table 2 describes the locations of the muck excavations and the anticipated firm bottom elevation at each location.

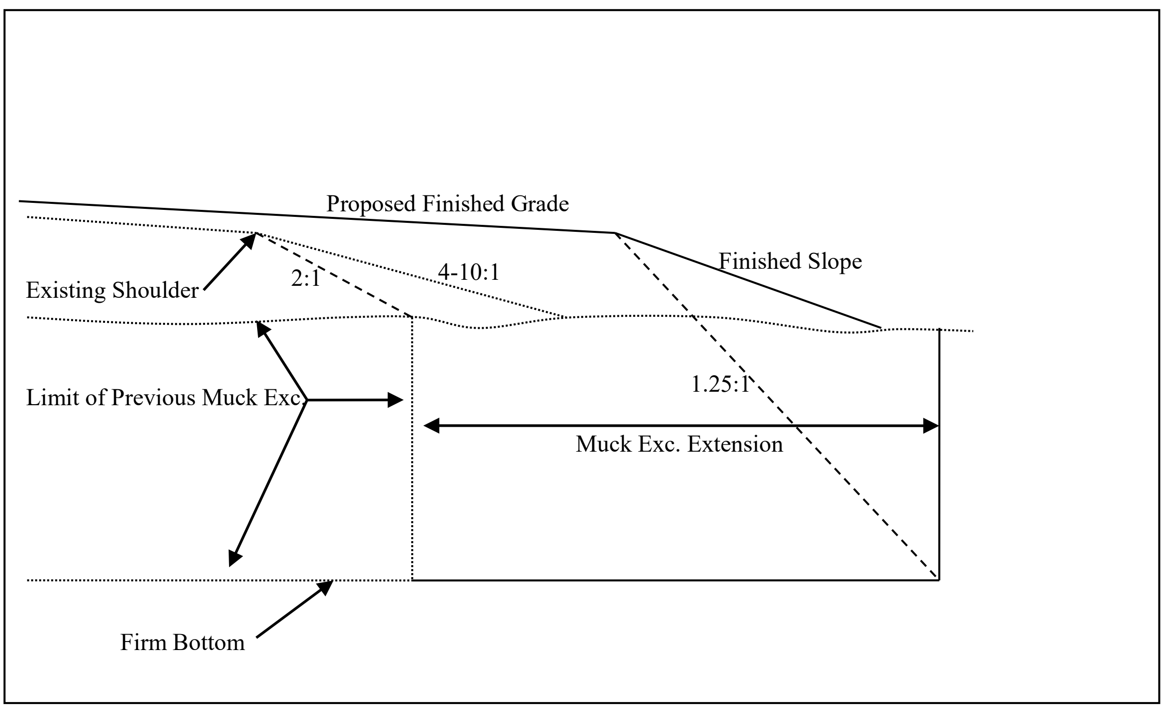

Table 2 Muck Excavation

Alignment	STATION FROM	STATION TO	EL Firm Bottom	NOTES
RAMP OM-4	2404+00	2406+00	151	Dig out under LT shoulder only for widening
RAMP SA-2	3205+00	3210+00	145	Dig out merges with BD-2 Dig out
RAMP SA-4	3407+00	3417+00	Varies	Over excavate 24 inches of ditch bottom material prior to placing embankment
RAMP DI-1	4108+00	4115+00	113	
RAMP DI-2	4203+00		126	
	4207+00	4209+50	123	No dig out under existing NB on ramp embankment (peat previously removed). End dig out at 4209+50
	4211+00	4213+50	121	Dig out 24 inches through existing pond. End dig out at 4213+50
RAMP DI-4	4400+00	4415+50	111	Remove organics from under the new widening and existing ramp embankment
HD-3	6300+00	6309+00		Over excavate 24 inches of ditch bottom material prior to placing embankment
HD-4	6400+00	6408+00	110	Extend dig out of Ramp DI-4. Substantial grade raise is planned. Dig out organics to prevent differential settlement. Transition out of muck exc along 4H:1V slope.
BD-2	5236+75	5242+35	145	Dig out merges with Ramp SA-2 dig out

Structural Sections Recommendations

Existing Seward Highway Embankment:
The existing subbase material does not consistently meet ADOT gradation requirements for nonfrost susceptibility. For this reason we are recommending rebuilding the existing roadway with a minimum of 12 inches of Select Material Type A. We recommend the following section for those areas that overlie the existing roadway.

- 2 inches Type VH HMA, Item 408(1H)
- 5 inches ATB, Item 306(1)
- 2 inches Crushed Aggregate Base Course, Item 301(1)
- 12 inches Select Material Type A, Item 203
- Separation Geotextile, Item 630(1)

Seward Highway Widening and Bridge Approach Embankments:
- 2 inches TypeVH HMA, Item 409(1)
- 5 inches ATB, Item 306(1)
- 2 inches Crushed Aggregate Base Course, Item 301(1)

- 48 inches Select Material Type A, Item 203*
- Select Material Type C as required
- * 48-inch Selected Material Type A layer should begin at the edge of the existing pavement and extend to the foreslope/ditch bottom.

O'Malley Rd:

- 2 inches Type VH HMA, Item 409(1)
- 4 inches ATB, Item 306(1)
- 2 inches Crushed Aggregate Base Course, Item 301(1)
- 12 inches Select Material Type A, Item 203*
- * 36-inch Selected Material Type A layer should begin at the existing curb and gutter and extend to the foreslope/ditch bottom or 1 foot beyond the back of adjacent sidewalk or pathway.

Dimond Blvd:

- 2 inches Type VH HMA, Item 409(1)
- 4 inches ATB, Item 306(1)
- 2 inches Crushed Aggregate Base Course, Item 301(1)
- 12 inches Select Material Type A, Item 203*
- * 36-inch Selected Material Type A layer should begin at the existing curb and gutter and extend to the foreslope/ditch bottom or 1 foot beyond the back of adjacent sidewalk or pathway.

Scooter Ave:

Due to the high groundwater table and frost susceptible soils the following insulated structural section is recommended

- 2 inches Type VH HMA, Item 409(1)
- 3 inches ATB, Item 306(1)
- 2 inches Crushed Aggregate Base Course, Item 301(1)
- 12 inches Selected Material Type A, Item 203
- 4 inches sand blanket
- 2 inches insulation board, Item 635(1) *
- 2 inches sand blanket
- 24 inches Selected Material Type A, Item 203
- Separation Geotextile, Item 630(1)
- *Insulation should extend a minimum of 12 inches beyond the adjacent sidewalk, pathway and truck apron

Frontage Roads and Ramps:

The current frontage roads and ramps are built on surcharge sections over peat deposits. The proposed improvements include widening for shoulders, curb and gutter and sidewalk. For the most part, the frontage roads maintain their horizontal and vertical alignments with the widening supported by the existing embankment.

Grade changes and realignments are planned at many of the on and off ramps. A 48-inch Select A layer should be installed under the widening. Similarly where grade changes are occurring, particularly when the profile is cutting into existing ground, a 48-inch Select A layer that is the full width of the frontage road or ramp is required. The areas that require the full width Select A layer are described in Table 1. A shoulder surcharge is recommended for a portion of Brayton Drive (BD-2). The purpose of the surcharge is to consolidate the peat layer that underlies the road and will support the widening required for the proposed new pathway. Areas where existing organic soils should be over excavated are described in the attached muck excavation table.

The following structural section is recommended for ramps and frontage roads:

- 2 inches Type II Class A HMA, Item 401(1)
- 2 inches ATB, Item 306(1)
- 2 inches Crushed Aggregate Base Course, Item 301(1)
- 12 inches (min) Selected Material Type A, Item 203*
- Geogrid, Stabilization, Class 1, Item 634(1)**
- Separation Geotextile, Item 630(1)
- * where new alignment diverges from the existing, 48-inch Selected Material Type A should be installed from the existing edge of pavement to the new foreslope/ditch bottom.
- **Geogrid installation according to Table 1

TABLE 1 Typical Section Exceptions (geogrid / insulation / full width Select A areas)

ALIGNMENT	FROM STATION	TO STATION	NOTES
Brayton Dr._BD-2	5205+00	5213+00	Install geogrid over separation geotextile
	5213+00	5221+00	3 ft. Surcharge over RT shoulder & pathway
	5236+75	5242+35	Recommended dig out will result in variable Select A layer thickness
Brayton Dr._BD-3	5300+00	5306+00	Insulated structural section (match Scooter Ave)
Homer Dr._HD-3	6300+00	6313+62	48-inch Select A layer due to grade change and new ramp alignment
Homer Dr._HD-4	6400+00	6408+00	Recommended dig out will result in variable Select A layer thickness
RAMP_SA-2	3200+00	3215+50	48-inch Select A layer due to grade change and new ramp alignment
	3215+50	3219+71	Insulated structural section (match Scooter Ave)
RAMP_SA-3	3317+25	3319+85 End	Insulated structural section (match Scooter Ave)
RAMP_SA-4	3400+00	3405+00	Insulated structural section (match Scooter Ave)
	3405+00	3422+00	48-inch Select A layer due to grade change and new ramp alignment

RAMP_DI-2	4200+00	4213+75	48-inch Select A layer due to grade change and new ramp alignment
RAMP_DI-4	4400+00	4415+50	48-inch Select A layer due to grade change and new ramp alignment
RAMP_OM-1	2104+00	2112+00	Install geogrid over separation geotextile

Asphalt Pathways:

- 2 inches Type II Class B, Item 608

- 2 inches Crushed Aggregate Base Course, Item 301(1)
- 18 inches (min) Selected Material Type A, Item 203*
- Separation Geotextile, Item 630(1)
- Geogrid, Stabilization, Class 1, Item 634(1)**
- *Select A layer should match adjacent roadway to provide drainage of the roadway section

Concrete Sidewalks:

- 4 inches Concrete, Item 608
- 2 inches Crushed Aggregate Base Course, Item 301(1)
- 18 inches (min) Selected Material Type A, Item 203*
- Separation Geotextile, Item 630(1)
- *Select A layer should match adjacent roadway to provide drainage of the roadway section

Please feel free to contact me with any questions regarding these recommendations.

APPENDIX D: Approved Environmental Document

New Seward Highway Rabbit Creek Road to 36th Avenue

Environmental Assessment
Volume I

Project Number: FRAF-CA-MGS-NH-0A3-1(27)/52503

U.S. Department of Transportation, Alaska Division of the Federal Highway Administration, and the Alaska Department of Transportation and Public Facilities

July 2006

ANC/TP5047.DOC/050810013

New Seward Highway Rabbit Creek Road to 36th Avenue

New Seward Highway, Municipality of Anchorage, Alaska

Final Environmental Assessment

Submitted Pursuant to 42 USC 4332 (2) (c)
(and where applicable, 49 USC 303) by the
U.S. Department of Transportation,
Federal Highway Administration,
and
State of Alaska Department of Transportation and Public Facilities

______________	____
Date of Approval	Alaska Department of Transportation and Public Facilities (DOT&PF)
______________	____
Date of Approval	Federal Highway Administration (FHWA)

The following persons may be contacted for additional information concerning this document:

Edrie Vinson, Environmental Project Manager, FHWA, Alaska Division Office, P.O. Box 21648, Juneau, Alaska 99802-1648; (907-586-7464)

Jerry Ruehle, Central Region Environmental Coordinator, DOT&PF, 4111 Aviation Drive, Anchorage, Alaska 99519; (907-269-0534)

The project proposes road improvements to New Seward Highway from Rabbit Creek Road to 36th Avenue. Two alternatives are being carried forward in the Environmental Assessment; one Build Alternative and a No-Build Alternative. The build alternative expands the existing divided four-lane to six lanes from O'Malley Road to 36th Avenue, provides pedestrian amenities, fencing and illumination full length of the corridor, noise barriers as warranted, and grade separations at 92nd, 76th, and 68th Avenues and International Airport Road. This project is part of the State Transportation Improvement Program. The total cost to construct the project is expected to be approximately $125 million.

Comments on this EA are due by (________) and should be sent to Edrie Vinson, Environmental Project Manager, Federal Highway Administration, Alaska Division Office, P.O. Box 21648, Juneau, Alaska 99802-1648.

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Abbreviations

AAC	Alaska Administrative Code
AASHTO	American Association of State Highway and Transportation Officials
ACMA	Alaska Coastal Management Act
ACMP	Alaska Coastal Management Program
ADA	Americans with Disabilities Act
ADEC	Alaska Department of Environmental Conservation
ADF&G	Alaska Department of Fish and Game
ADNR	Alaska Department of Natural Resources
ADNR	Alaska Department of Natural Resources
ADT	average daily traffic
AEC	Alaska Engineering Commission
AHRS	Alaska Heritage Resources Survey
AMATS	Anchorage Metropolitan Area Transportation Solutions
ANSI	American National Standards Institute
APE	Area of Potential Effect
ASTM	American Society for Testing and Materials
AWMP	Anchorage Wetland Management Plan
BMP	best management practice
Btu	British thermal unit
CAA	Clean Air Act
CERCLIS	Comprehensive Environmental Response, Compensation and Liability Information System
CFR	Code of Federal Regulations
cfs	cubic feet per second
CMP	Coastal Management Program
CO	carbon monoxide
CZMA	Coastal Zone Management Act

dBA	A-weighted decibel
DD	doubling of the distance
DOI	U.S. Department of Interior
DOT&PF	Alaska Department of Transportation and Public Facilities
EFH	Essential Fish Habitat
EO	Executive Order
EPA	U.S. Environmental Protection Agency
ERNS	Emergency Response Notification System
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
ISER	Institute for Social and Economic Research
LGQ	large-quantity generator
LOS	level of service
LRTP	Long-Range Transportation Plan
kg	kilogram
kHz	kilohertz
L_{eq}	energy-average of the A-weighted sound levels occurring during a 1-hour peak traffic period in decibels
LUST	leaking underground storage tank
µg/L	micrograms per liter
mg/L	milligrams per liter
MIS	major investment study
mL	milliliter
MOA	Municipality of Anchorage
mpg	miles per gallon
MS4	municipal separate storm sewer system
MSFCMA	Magnuson-Stevens Fishery Conservation and Management Act
NAAQS	National Ambient Air Quality Standards
NAC	noise abatement criterion (or criteria)
NEPA	National Environmental Policy Act

NFRAP	No Further Remedial Action Planned
NHPA	National Historic Preservation Act
NOAA	National Oceanic and Atmospheric Administration
NO_X	oxides of nitrogen
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
NRHP	National Register of Historic Places
OHA	Office of History and Archaeology
OPMP	Office of Project Management and Permitting
PAI	potentially affected interest
PLI	Public Lands and Institutions
PM	particulate matter
$PM_{2.5}$	particulate matter less than 2.5 microns in aerodynamic diameter
PM_{10}	particulate matter with a diameter of 10 microns or less
ppm	parts per million
RCRA	Resource Conservation and Recovery Act
SHWS	state hazardous waste sites
SIP	State Implementation Plan
SO_2	sulfur dioxide
SQG	small-quantity generator
SWPPP	Storm Water Pollution Prevention Plan
TCU	transportation, communication, and utilities
TIP	transportation improvement program
TNM	traffic noise model
TSAIA	Ted Stevens Anchorage International Airport
TSD	transportation, storage, and disposal
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UST	underground storage tank

VMT	vehicle miles traveled
VOC	volatile organic compound

Executive Summary

The Alaska Department of Transportation and Public Facilities (DOT&PF), in cooperation with the Federal Highway Administration (FHWA), is proposing road improvements to the New Seward Highway from Rabbit Creek Road to 36th Avenue. This project is part of the State Transportation Improvements Program and the *Anchorage Bowl 2025 Long-Range Transportation Plan* (LRTP) (Municipality of Anchorage [MOA], DOT&PF, and Anchorage Metropolitan Area Transportation Solutions [AMATS], 2005). These plans list the project as an upgrade from a controlled-access, divided, four-lane facility to a divided six-lane facility with grade separations at 92nd, 76th, and 68th avenues and International Airport Road. The DOT&PF is the state agency executing the environmental assessment for the FHWA and analyzing impacts associated with the proposed action to construct New Seward Highway improvements so that approval for federal funds may be obtained.

Purpose and Need

The purpose of the proposed action is to construct improvements to the New Seward Highway corridor, between Rabbit Creek Road and 36th Avenue, that will address current and future travel demand and mobility needs. The improvements provide additional capacity, connectivity, and safety enhancements.

Existing peak-hour congestion in the study area, the result of many years of steady growth, is expected to worsen, as indicated by the regional growth and economic development projections described in the current Anchorage Bowl comprehensive plan (*Anchorage 2020: Anchorage Bowl Comprehensive Plan,* prepared by MOA, 2001a) and LRTP (MOA, dot7PF, and AMATS, 2005). Upgrades and additional connections to New Seward Highway would provide needed capacity to meet the travel demands generated by planned growth in the region. Improvements would address the community and transportation needs listed below:

- Increase corridor capacity to accommodate past growth and future demand
- Improve system connectivity and linkage of existing roadways
- Enhance intermodal transportation
- Upgrade design features to meet industry standards and improve safety

Proposed Action and Alternatives Considered

Two alternatives are being carried forward in this environmental assessment; the Build Alternative and the No-Build Alternative. The total cost to construct the project is expected to be approximately $125 million and construction is expected to begin in 2009.

The proposed Build Alternative would remain a controlled-access facility with an additional lane in each direction (one north and one south) constructed between the existing mainline and the frontage roads (to the outside of the existing mainline lanes). Construction of the additional lanes within the depressed median was considered, but the advantages of retaining the depressed median in terms of safety, drainage, and snow storage, coupled with the fact that the existing right-of-way generally accommodates widening to the outside, led to the proposed configuration. Additional alternatives were considered but not advanced because of a combination of right-of-way impacts and failure to satisfy the purpose and need for the proposed project. Among those alternatives considered but not advanced were the dedication of additional lanes to high-occupancy vehicles; transportation system management and travel demand management strategies as a stand-alone alternative; and various configurations for mainline, interchange, frontage road, and arterial connection improvements.

Figure ES-1 details the proposed typical corridor cross section, including the mainline, frontage roads, and pedestrian and bicycle accommodations. Figures ES-2, ES-3, ES-4, and ES-5 illustrate the plan view of the proposed Build Alternative over the aerial base. The entire corridor from Rabbit Creek Road to 36th Avenue is and would remain a controlled-access corridor. Noise barriers and fencing throughout the corridor would be upgraded or installed as warranted, and continuous illumination would be added to augment the existing high-mast interchange lighting. Proposed Build Alternative improvements are described below, by segment.

Rabbit Creek Road to O'Malley Road. In this segment, the existing New Seward Highway mainline, which is four lanes (two each traveling north and south) with a center grassed median, would remain unchanged. Pedestrian and bicycle improvements would consist of separated multi-use pathways near the right-of-way boundary on the west and east sides of New Seward Highway from Tradewind Drive to O'Malley Road. At the DeArmoun Road pedestrian overcrossing, Americans with Disabilities Act (ADA) upgrades would include ramp access improvements.

O'Malley Road to Dimond Boulevard. In this segment, the New Seward Highway mainline would be widened from the existing four lanes to six lanes. The grass median would be retained. On the west side, the Homer Drive frontage road would be extended south from Dimond Boulevard to O'Malley Road, providing a one-way frontage road system from O'Malley Road to Tudor Road. A new multi-use path is proposed for the west side along the Homer Drive frontage road extension and along Brayton Drive on the east side.

The southbound ramp exiting from New Seward Highway to O'Malley Road would be widened to two lanes to accommodate the transition from three to two lanes on the mainline in the southbound direction. The northbound on-ramp also would be widened to two lanes to introduce an additional mainline lane in the northbound direction.

A half-diamond interchange constructed at 92nd Avenue would include slip ramps between the New Seward Highway mainline and the frontage roads. This grade-separated interchange would raise the New Seward Highway mainline on a bridge above 92nd Avenue. The work also would include extension of 92nd Avenue from Homer Drive to Brayton Drive. This portion of 92nd Avenue would be four lanes, providing a through lane in each direction and side-by-side left-turn bays between intersections with the frontage roads. In addition, 92nd Avenue would be reconstructed and extended as a two-lane road west to Old Seward Highway, where right- and left-turn bays would be incorporated for the turning movements.

Dimond Boulevard to Dowling Road. In this segment, the widened, six-lane New Seward Highway mainline would continue. Multi-use sidewalks or pathways would be included along Brayton Drive and Homer Drive frontage roads. Improvements at the Dimond Boulevard interchange would include ramp upgrades, channelization between ramp intersections, and bridge replacement. As part of the ramp upgrades, the southbound ramp exiting New Seward Highway would be expanded to two lanes and the ramp intersection would be relocated to align with the extension of Homer Drive from Dimond Boulevard to O'Malley Road. The work would require rechannelization of Dimond Boulevard to remove the eastbound left-turn pocket to Brayton Drive, where replacement access would be provided with the Sandlewood Place extension. Sandlewood Place on the east side of New Seward Highway would be reconstructed and extended between Dimond Boulevard and Lore Road (76th Avenue).

A new half-diamond interchange would join 76th Avenue with New Seward Highway. The improvement would incorporate a grade separation and would maintain the existing slip ramps to and from the north. New Seward Highway would be raised on a bridge over 76th Avenue to allow the extension of 76th Avenue to Brayton Drive. As it passes below New Seward Highway, 76th Avenue would consist of four lanes, providing a through lane in each direction and side-by-side left-turn bays between intersections with the frontage roads.

A new grade separation at 68th Avenue would raise New Seward Highway over 68th Avenue, but would not include ramps for highway access. The extension of 68th Avenue would consist of four lanes between Homer and Brayton drives, similar to 76th Avenue.

Dowling Road to Tudor Road. In this segment, the widened, six-lane New Seward Highway mainline would continue. Multi-use sidewalks or pathways would be included along both Brayton and Homer drives. At the Dowling Road interchange, the ramps would require reconstruction for the lanes added to the outside of the New Seward Highway mainline.

Extension of International Airport Road would connect Homer and Brayton drives. The International Airport Road roadway extension would consist of four lanes, providing a through lane in each direction and side-by-side, left-bays between intersections with the frontage roads. Between Homer Drive and Old Seward Highway, International Airport Road would be reconstructed to three lanes. As part of elevating the mainline over International Airport Road, the bridges over the nearby Campbell Creek for the mainline and frontage roads also would be reconstructed. Replacement of the Campbell Creek bridges would provide adequate clearance for a future trail extension along Campbell Creek under New Seward Highway.

Tudor Road to 36th Avenue. The existing six-lane New Seward Highway mainline in this segment would remain basically unchanged. Because the additional through lanes on the mainline match the existing auxiliary lanes south of the 36th Avenue intersection, the intersection would not require reconstruction. Roadway improvements at 36th Avenue may include minor channelization enhancements.

Bicycle and pedestrian improvements consist of a new multi-use separated pathway on the west side of the road, adjacent to the mainline, and ADA upgrades for the existing pathways at 36th Avenue and along Tudor Road.

At the Tudor Road interchange, improvements to the existing diamond interchange would include Tudor Road widening over New Seward Highway and channelization improvements to provide dual left-turn lanes serving westbound-to-southbound traffic. The addition of a left-turn lane between the ramp intersections would require reconstruction and widening of the Tudor Road bridge.

Proposed Transportation System Management and Travel Demand Management Components. The transportation system management elements of the proposed Build Alternative would include advanced traffic management focus at 36th Avenue and selected auxiliary lane treatment for the critical sections of the New Seward Highway mainline where bottlenecks have been identified.

The transportation system management elements and deployment of advanced traffic management at the signalized intersections where New Seward Highway ramps terminate and along the mainline are intended to improve traffic flow and reduce congestion. The key transportation system management improvements proposed for the New Seward Highway corridor are as follows:

- Modernization of the traffic signal control system at 24 intersections in the corridor
- Strategic traffic control focus at the intersection of New Seward Highway and 36th Avenue as a network hot spot
- Use of video traffic monitoring and incident management capabilities on the mainline and at ramp terminals and cross streets
- Access management on the frontage roads and use of these roads as reliever routes for excess congestion and incident conditions
- Provision of park-and-ride facilities near the New Seward Highway freeway

The initiatives implemented as part of a travel demand management program would include the following:

- Continuation of work with the AMATS and MOA to promote transit service, including vanpool operations
- Promotion of employer-based support and implementation of incentives for shifting travel times
- Encouragement of voluntary travel reduction
- Promotion of expanded use of telecommuting in normal business practices

Other Major Actions Proposed in the Area

The *2006-2008 State Transportation Improvement Program* (DOT&PF, 2006) identified the New Seward Highway, Potter to Rabbit Creek, project that would abut the proposed project (between Rabbit Creek Road and 36th Avenue) on the south end. In addition, the DOT&PF Needs List identified the New Seward Highway, 36th Avenue to 20th Avenue, as a prospective project that would abut this proposed project on the north end. And the LRTP (MOA, DOT&PF, and AMATS, 2005) identified a project to provide a controlled-access connection of the Glenn Highway and New Seward Highway through Anchorage.

Impacts and Mitigation

Probable social, economic, and environmental impacts that would result from alternatives being evaluated for improvements within the New Seward Highway corridor between Rabbit Creek Road and 36th Avenue are summarized below. Only those impact categories that are expected to require substantial mitigative measures are included in this executive summary.

Water Quality. Additional impervious surface area that would result from proposed New Seward Highway improvements would increase the amount of precipitation that runs off the surface rather than infiltrating through the vegetation and soil, which could result in a negative impact on receiving waters. Slightly faster flow rates and higher volumes of stormwater runoff from impervious surfaces could modify the geomorphologic characteristics of streams, possibly inducing erosion, increased sediment deposition and transport, and perhaps channel instability. Generally, the proposed project would increase the amount of impervious surface within the corridor by about 38 percent because of the addition of another lane in each direction, additional shoulder widths on the mainline and the frontage roads, and new sidewalks/separated shared-use pathways along the frontage roads.

Mitigation of water quality impacts associated with increases in impervious surface aim to retain or restore the hydrologic functioning of the landscape. The goal is to control stormwater flow and remove pollutants through the revegetation and maintenance of existing vegetation and flow regimes. The following are mitigation measures to be employed for that purpose:

- Grassed infiltration trenches to impound and treat stormwater
- Grassy filter strips adjacent to the highway lanes
- Grassed ditches for stormwater drainage rather than constructed, piped drainage
- Grassed drainage swales where feasible to provide some storm water detention and pretreatment before discharge to the storm drain system
- Depressed vegetated median between northbound and southbound lanes of New Seward Highway
- Avoidance of wetland fill where feasible

- Use of best management practices (BMPs) during construction
- Road and ditch maintenance

Wetlands. Wetland impacts (both temporary and permanent) are anticipated for the Build Alternative as described below.

- Creek-fringe wetlands, 0.66 acres eliminated, 0.50 acres temporarily disturbed
- Feeder wetlands, 0.25 acres eliminated, 0.41 acres temporarily disturbed
- Isolated extensive wetlands, 0.24 acres eliminated, 0.16 acres temporarily disturbed
- Isolated remnant wetlands, 0.44 acres eliminated, 0.28 acres temporarily disturbed

In total, 1.59 acres of wetlands would be eliminated and 1.35 acres of wetlands would be temporarily disturbed.

Regulations and guidelines associated with Section 404 of the Clean Water Act and Executive Order (EO) 11990 call for project proponents to take measures to avoid or minimize adverse impacts to wetlands. The following actions would be taken to avoid and minimize potential impacts to wetlands in the project corridor.

1. Design the project to avoid impacts

The design of the proposed New Seward Highway project would avoid impacts to wetlands to the extent feasible, with special design considerations in the vicinity of the most valuable wetlands in the area. The Campbell Creek bridges would be designed to avoid fill of the Class A creek-fringe wetland adjacent to Campbell Creek, including those along International Airport Road. The bridges would span the creek and part of its floodplain, and no piers would be needed within the creek. Although the preliminary design of the proposed project avoids impacts to some important wetlands, the opportunity to avoid wetlands is very limited within the New Seward Highway corridor. This corridor is constrained by existing development to the east and west. Because many wetlands that would be affected by the proposed project occur on both sides of New Seward Highway within the right-of-way, slight shifts toward either side of the proposed road alignments to avoid wetlands are not possible.

2. Incorporate measures to minimize adverse impacts

To minimize the extent of impact, steep embankment slopes (2 to 1) would be used where wetlands would be affected. The use of vertical walls or slopes steeper than 2 to 1 to minimize impact to roadside wetlands was also considered. Given the limited functions of the study area wetlands that would be affected, the lesser safety of vertical walls, the need for guardrails that complicate snow removal, and cost of construction, vertical walls were not considered practicable for most areas. Vertical walls would be considered at the North Fork and South Fork of Little Campbell Creek and at Fish Creek tributaries to minimize wetland encroachment at these crossings.

The runoff from the freeway and storm drains that currently outfalls into creeks and wetlands would be treated according to guidance in the *Alaska Highway Drainage Manual* (DOT&PF, 2004a) and to meet Alaska Department of Environmental Conservation (ADEC) criteria. The grassed median and drainage swales would receive, store, and filter snowmelt and stormwater runoff; therefore, they would continue to minimize the adverse impacts of the highway on water quality and surface water flows. The highway drainage design would incorporate all feasible measures to detain water on the site or in other designated areas and to avoid direct routing of storm water to creeks.

The project-wide measures discussed above apply to all wetlands within the study area (even those that are not under U.S. Army Corps of Engineers [USACE] jurisdiction), because the FHWA is also directed to use all practicable measures to protect wetlands under EO 11990.

3. Protect or restore sites that must be temporarily affected by the project

To protect the hydrologic, water quality, and vegetated habitat functions of wetlands that would be temporarily disturbed during construction of the proposed project, two methods would be employed:

1. Cover the wetland utilizing a geotextile and aggregate to allow construction vehicles to pass over them without disturbing the underlying wetland soil , then remove the protective cover when construction in the wetland is complete
2. After construction activities are done in the wetland, recontour the soil and revegetate with native plant species

4. Compensate for unavoidable impacts through preservation, restoration, or creation of wetlands

In areas where jurisdictional wetlands would be filled and functions lost or fragmented to the extent that wetland functions would be adversely affected, the losses would be compensated by preservation, restoration, or creation of wetland functions elsewhere, in-lieu-fee mitigation, or the purchase of mitigation credits from an approved wetland mitigation bank. A similar approach would be implemented for the compensation of non-jurisdictional wetlands.

The Anchorage Debit-Credit Method, developed by the MOA, USACE, U.S. Environmental Protection Agency (EPA), and U.S. Fish and Wildlife Service, would be used for determining the compensation for wetland losses that cannot be avoided or minimized. This quantitative tool for comparison of impacts and compensatory measures does not obviate the requirements of the Clean Water Act or the Section 404 Program. This tool does build upon and incorporate the various aspects of the Anchorage Wetlands Management Plan (MOA, 1996a), including the Anchorage Wetlands Assessment Method.

Floodplains. The Build Alternative does not increase flooding risks, and in the case of the South Fork and North Fork of Little Campbell Creek and Campbell Creek it would reduce flooding risks. The culverts crossing the New Seward Highway at the South Fork and North Fork of Campbell Creek are proposed for replacement with larger Tier 1 culverts that will accommodate the 100-year flow. The inlet and outlet areas of the South Fork and North Fork of Little Campbell Creek and the lengthened bridging of Campbell Creek to provide a floodplain under the bridges present opportunities to restore and preserve natural and beneficial floodplain values. In addition, restoration will include the associated wetlands affected by bridge construction activities, as well as the wetlands temporarily disturbed by construction activities for installation of the bridges. The proposed project is consistent with the MOA floodplain development requirements.

Waterbody Modifications. The Build Alternative would entail culvert replacement and extension, bridge construction, filling, bank reconstruction, and earth moving near streams and wetlands. Mitigation measures that would be incorporated include minimizing riparian fill and clearing at all streams, constructing channels that mimic natural channels where creeks must be realigned, implementing sound drainage design, and designing culvert extensions and replacements to accommodate floods and fish passage.

Fish. The Build Alternative would involve crossing three streams that bear fish. The direct effects of the project on all fish in the study area would be the same as the effects described for Essential Fish Habitat (EFH) and the managed fish species discussed in the next subsection.

Essential Fish Habitat. The Build Alternative would involve crossing the three EFH streams in the study area and would have effects on EFH. With implementation of the conservation measures proposed in the EFH Assessment (Appendix C), the long-term effects of the proposed project on EFH in project corridor streams would range from slightly adverse to moderately beneficial.

The new bridges over Campbell Creek at New Seward Highway would be substantially longer and higher than the existing bridges. They would span the creek and restore the floodplain under the bridge. The bridges would be reconstructed to include a flat floodplain area, and the banks under the bridges would be stabilized against erosion. The resulting long-term decrease in sediment input to the creek would represent a moderate benefit to EFH and the managed species.

In the long term, the project could contribute to slight degradation of water quality and change in the flow regime because of increased impervious area draining to the creeks. The drainage features of the proposed project would be designed to minimize these effects through the use of drainage swales and detention basins, and by avoiding direct storm water discharge to a stream.

The proposed project could have short-term and minor adverse effects on water quality and EFH during construction from sedimentation. The proposed project would require culvert extension, removal, and installation; minor channel reconstruction; or other in-stream work. A temporary increase in suspended solids might result from such construction activity, and changes to channel morphology could occur. The increase in turbidity might displace or harm fish and reduce the light available to aquatic plants. Impacts to EFH during construction would be minimized through implementation of stringent BMPs throughout the project area.

Wildlife. The Build Alternative would replace disturbed habitat with roads, bridges, pathways, and areas of restoration. Most wildlife species in the project area are highly mobile and consequently unlikely to be affected on an individual basis by the proposed actions. Wildlife would experience a loss of black spruce bog, scrub, and birch habitat, and there might be a slight loss of individual small mammals. Implementation of the Build Alternative would result in the loss of approximately 2.6 acres of wildlife habitat. Some of these areas are currently vegetated with shrubs and trees that provide food and shelter to birds and small mammals. The loss of habitat would include wetland areas that provide roosting, nesting, hiding, and foraging habitat for a variety of wildlife species, mainly shorebirds, waterfowl, and songbirds. Because the habitat that would be lost is currently degraded by its location next to New Seward Highway, it supports mainly disturbance-tolerant animals. The proposed project would shift the location of human noise and activity closer to other remaining habitats, displacing animals that are sensitive to human activity. Particularly during construction, animals might be displaced from the project vicinity.

Reconstruction of the Campbell Creek bridges would benefit wildlife that use the stream riparian corridor for travel. Appropriately designed underpasses have been shown to be effective crossing corridors for wildlife. The design species for the proposed project is the moose. The bridges would be approximately 143 feet long with 12-foot-high openings beneath for wildlife crossing. The openness ratio has been calculated at 5.0, compared to the openness ratio of 1.7 for the existing bridges. The grade separations provided at four other locations along the project corridor would also provide for safer and easier crossing of the mainline by wildlife.

Fences would be used to aid in funneling moose under the Campbell Creek bridges and reduce the number of moose struck on the highway. Fences between the mainline and the frontage roads could also effectively direct larger mammals to the grade-separated crossings of the mainline at 92nd, 76th, and 68th avenues and International Airport Road. The additional lighting planned for the project would also reduce wildlife collisions by allowing drivers a longer sight distance, permitting them to react more quickly to wildlife presence along the road corridor.

Coastal Zone. The proposed project would require development of land within the Preservation, Conservation, and Utilization environments of the MOA Coastal Management Program (CMP). Land already within the state right-of-way has been dedicated to public use and is consistent with the MOA CMP. Additional right-of-way acquisition for New Seward Highway improvements would also be dedicated to public use. The segment of highway from Rabbit Creek Road to O'Malley Road crosses through the Utilization Environment designated as urban residential, but does not require additional right-of-way. The highway segment from O'Malley Road to Dimond Boulevard does not pass through any CMP policy units. From Dimond Boulevard to Tudor Road, the highway passes through CMP policy units for the Preservation Environment (preservation freshwater wetlands) and Conservation Environment (river floodplain, marginal lands, parks and open space, and Class II waters of the North Fork of Little Campbell Creek, South Fork of Little Campbell Creek, and Campbell Creek Greenbelt). The proposed project as designed appears to be consistent with the policies and standards of the Alaska Coastal Management Program (ACMP).

The Build Alternative would improve the culvert structures at South Fork of Little Campbell Creek, North Fork of Little Campbell Creek, and Fish Creek. Culvert installation would include improvements to fish passage. A new bridge structure is proposed at Campbell Creek, and bridges over the frontage roads also would be included at this location. Bridge design would accommodate a bicycle and pedestrian path under the bridge on the north side of Campbell Creek, facilitating future trail and recreation area connections.

Ongoing coordination between DOT&PF and resource agencies would be maintained throughout the development process to ensure project design meets all regulatory requirements. Specific mitigation measures are discussed in more detail in the Floodplain, Wetland, and Water Quality subsections of this Executive Summary.

Air Quality. Air quality analysis modeling results for the no-build scenario indicated that the air quality in the study area is currently in compliance with required levels and is expected to continue to be in compliance into the design year of 2035. The air quality will also improve through the federally mandated reductions in vehicle exhaust emissions in newer and future vehicles that would more than offset contributions from increased traffic.

Air quality modeling results for the Build Alternative indicate that the maximum predicted carbon monoxide values for all years and scenarios are well below the National Ambient Air Quality Standards (NAAQS) of 35 parts per million (ppm) for the 1-hour averaging time. In addition all predicted 8-hour averages are below the NAAQS of 9 ppm, except the existing scenario in 2005. These results indicate that the project conforms with the Anchorage Transportation Improvements Program (MOA, 2003c), the purpose of the current EPA-approved Alaska State Implementation Plan, and the requirements of the Clean Air Act. Because the project conforms to Clean Air Act requirements, no mitigation is required or proposed. However, regular watering would be implemented to minimize dust created during construction.

Noise. Future (2035) traffic noise levels for the Build Alternative vary along the corridor and, in many locations, exceed the noise abatement criteria established by the DOT&PF *Noise Abatement Policy* (1996). Subsequent noise barrier analysis and a determination of technical feasibility and economic reasonability result in proposed mitigation in the form of six new noise barriers protecting residential neighborhoods.

Areas of Controversy or Unresolved Issues

Public and agency scoping efforts have identified no areas of controversy or any major unresolved issues with other agencies.

Other Federal Actions Required

Federal

- USACE Section 404 (for fill placement in wetlands)
- EPA general permit for construction activity, according to the National Pollutant Discharge Elimination System (NPDES)

State

- Alaska Department of Natural Resources (ADNR), Office of Project Management and Permitting (OPMP), fish habitat permit pursuant to Title 41 of the Alaska Statutes (for work in Furrow Creek, South Fork of Little Campbell Creek, North Fork of Little Campbell Creek, Campbell Creek, and Fish Creek)

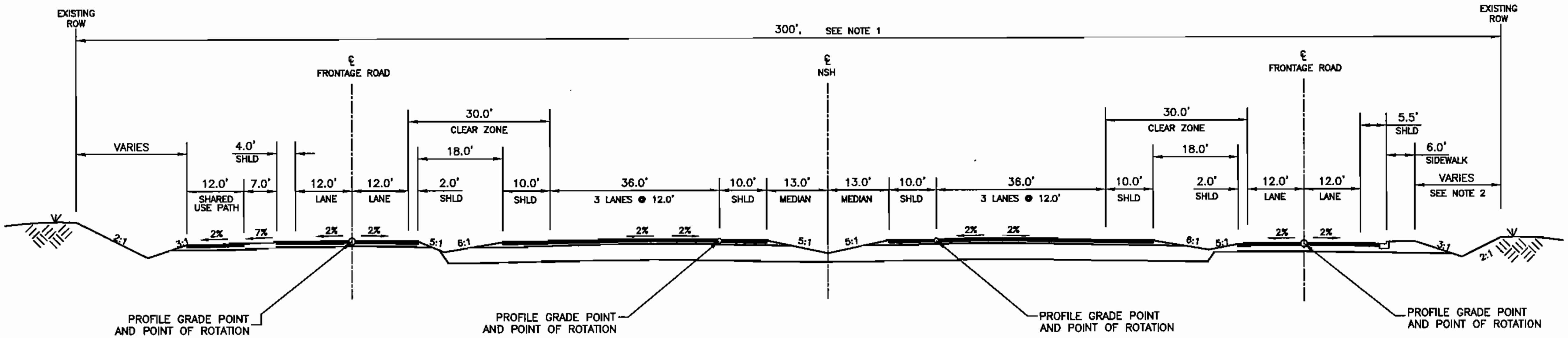
- ADEC Clean Water Act, Section 401 Certification (corresponding with USACE Section 404 permit application)
- ADNR, State Historic Preservation Office (SHPO), determination of No Historic Properties Affected letter (Appendix G)
- ADNR, OPMP, ACMP/MOA CMP, consistency determination (for work within the mapped 100-year floodplains of Furrow Creek, South Fork of Little Campbell Creek, North Fork of Little Campbell Creek, Campbell Creek, and Fish Creek)

Local

- Municipal noise permit for any work outside noise ordinance limits
- MOA Flood Hazard Determination (for work within the mapped 100-year floodplains of Furrow Creek, South Fork of Little Campbell Creek, North Fork of Little Campbell Creek, Campbell Creek, and Fish Creek)

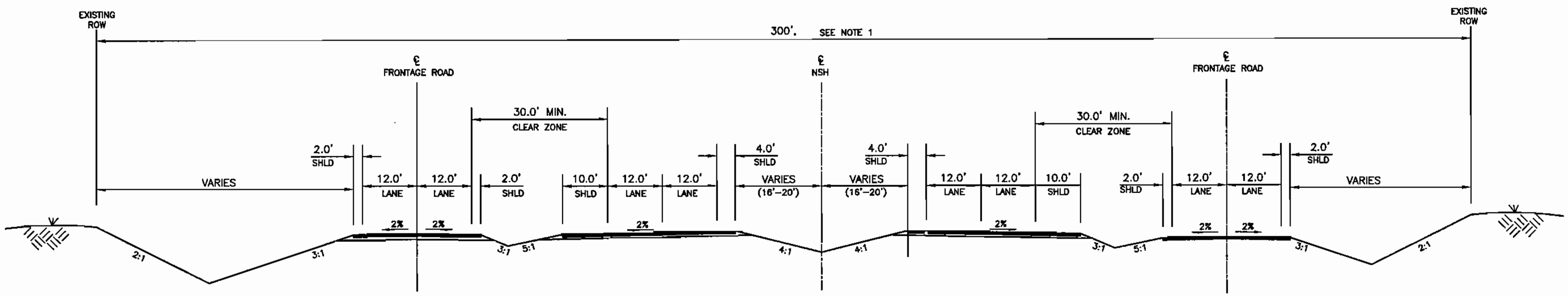
Local, State, and Federal

- Determination of conformity under Section 170(c)(4) of the Clean Air Act (for project emission levels)



BUILD ALTERNATIVE TYPICAL SECTION

NTS



EXISTING HIGHWAY TYPICAL SECTION

NTS

NOTES:

1. ROW WIDTH VARIES ALONG THE CORRIDOR, TYPICAL CORRIDOR WIDTH RANGES BETWEEN 280 – 320 FOOT INCLUDING THE MAINLINE AND FRONTAGE ROADS.
2. ADDITIONAL STRIPS OF RIGHT OF WAY ARE REQUIRED IN SOME LOCATIONS TO ACCOMMODATE THE FRONTAGE ROAD CONSTRUCTION LIMITS.

FIGURE ES–1
BUILD ALTERNATIVE
TYPICAL SECTION

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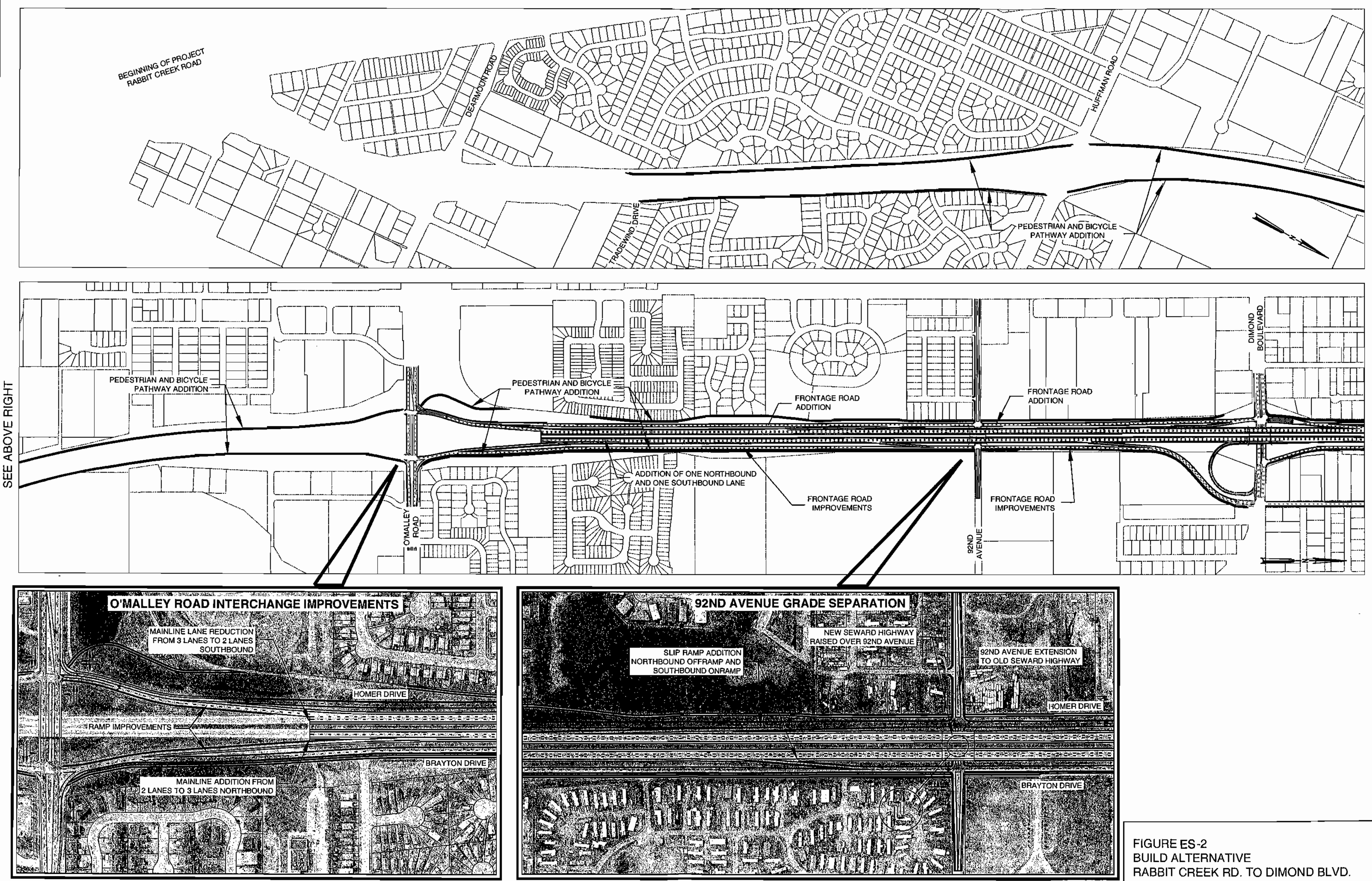


FIGURE ES-2
BUILD ALTERNATIVE
RABBIT CREEK RD. TO DIMOND BLVD.

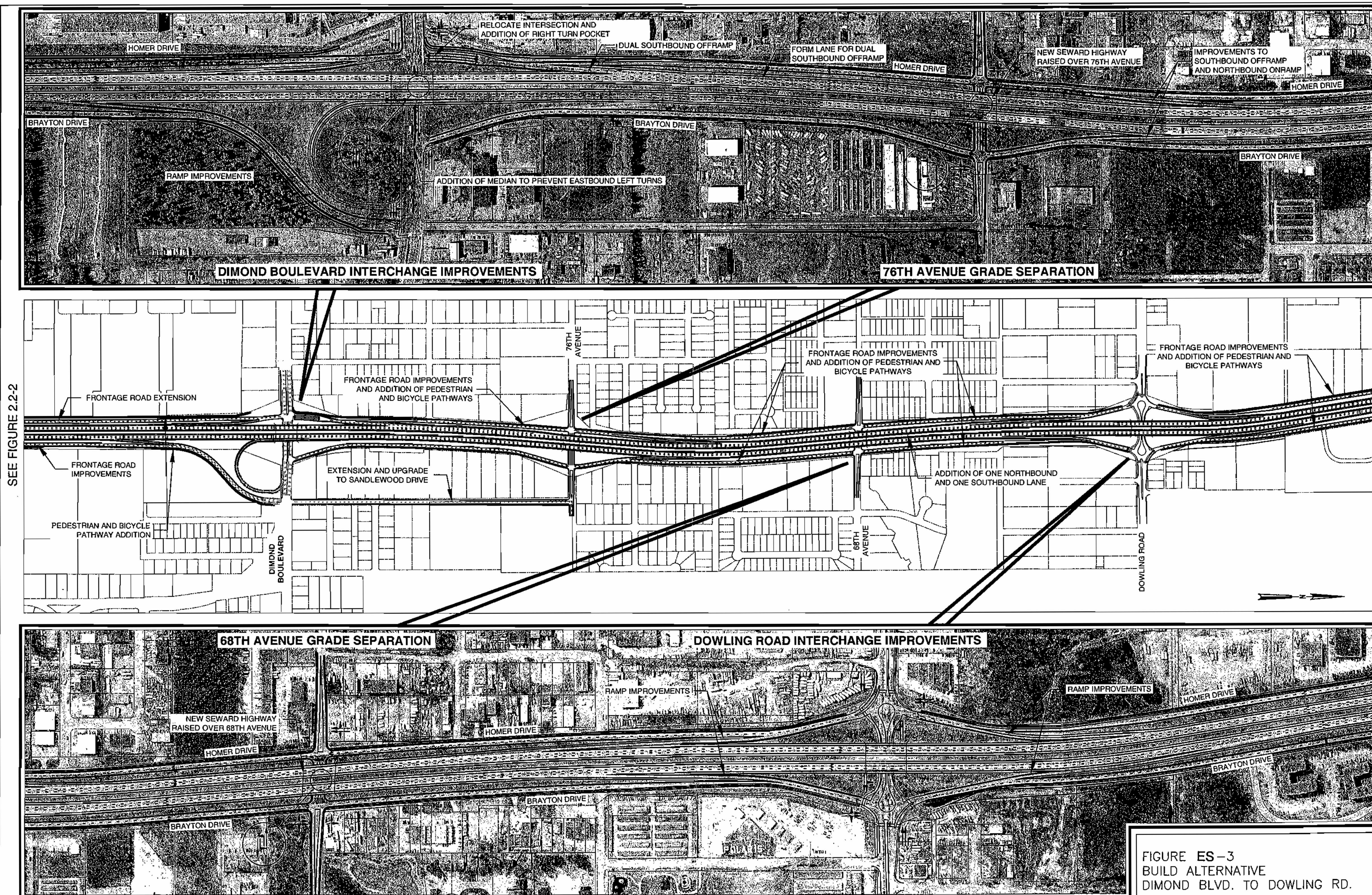


FIGURE ES–3
BUILD ALTERNATIVE
DIMOND BLVD. TO DOWLING RD.

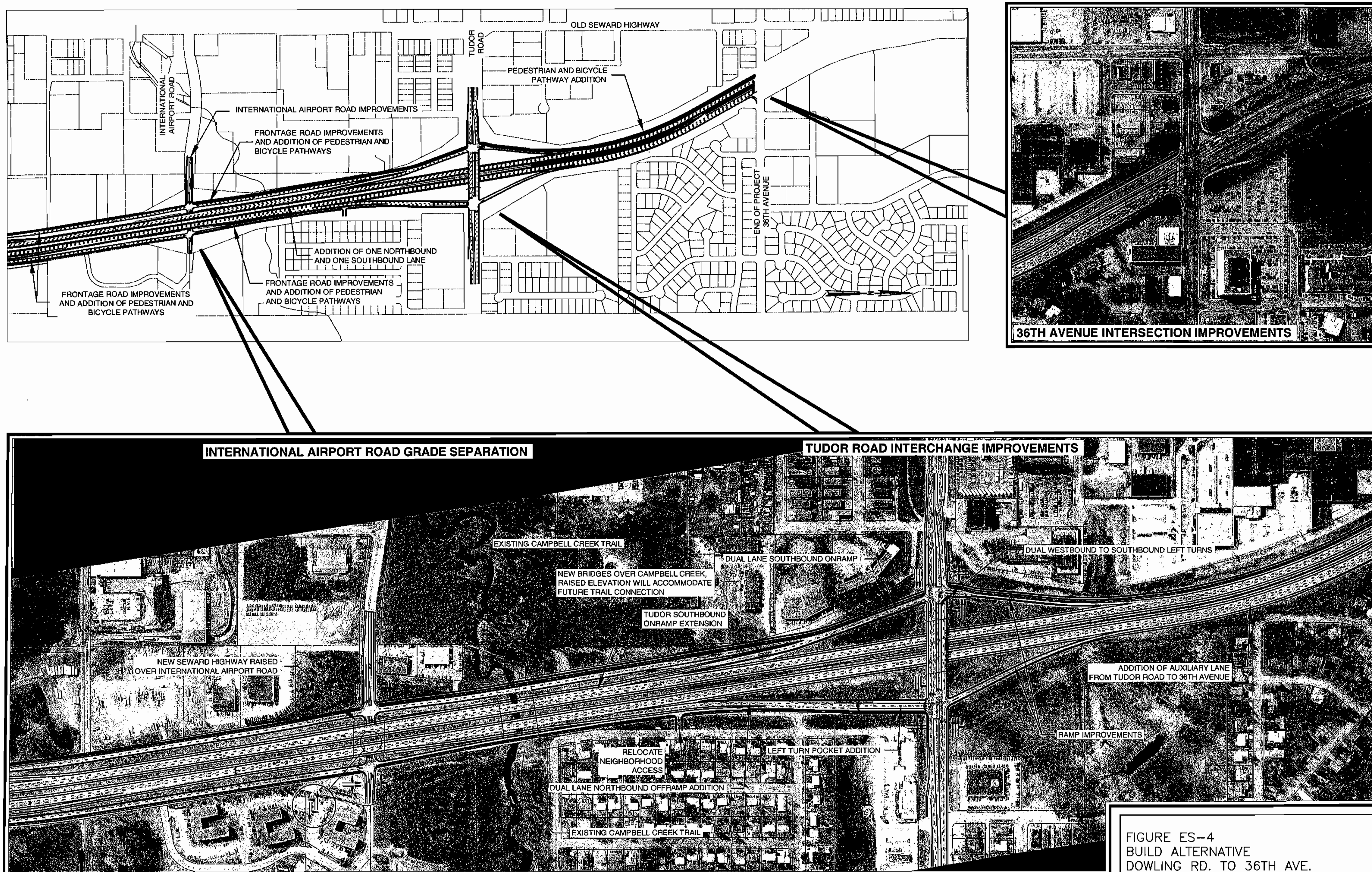
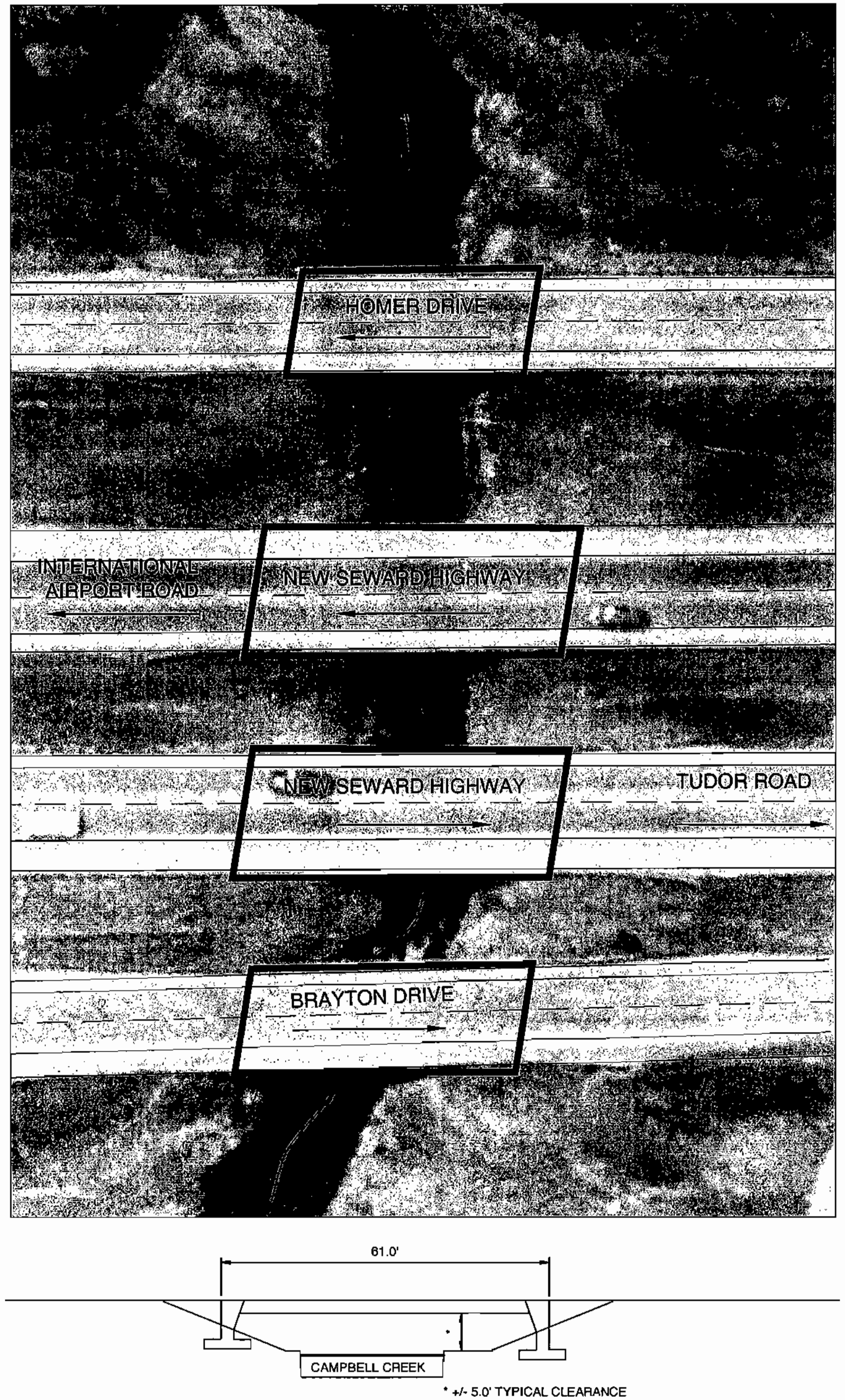
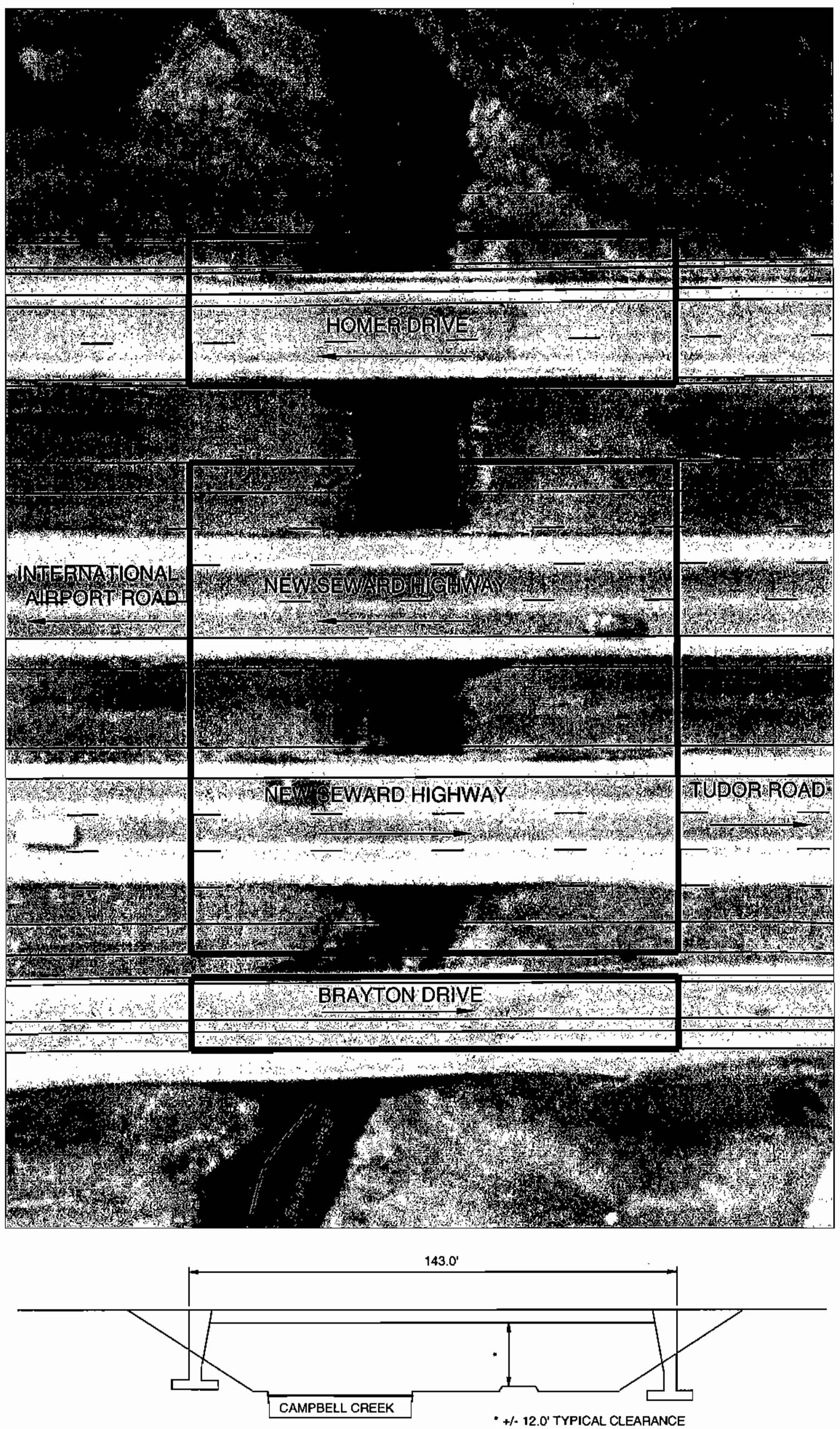


FIGURE ES-4
BUILD ALTERNATIVE
DOWLING RD. TO 36TH AVE.



EXISTING CONDITION



PROPOSED IMPROVEMENTS

FIGURE ES-5
CAMPBELL CREEK BRIDGES
EXISTING AND PROPOSED

CHAPTER 1

Purpose of and Need for Action

1.1 Corridor History

The original Seward Highway was constructed in 1952 as a major arterial access route from Seward, 126 miles south of Anchorage, to what is now downtown Anchorage. As development and the population in Anchorage expanded to the south, the need for a new north-south transportation corridor arose.

Construction of New Seward Highway—a 7-mile-long, four-lane divided highway with at-grade intersections that incorporated a new alignment between 30th Avenue (in Midtown) and Potter Marsh—began in 1967 and was completed in 1971. The bypassed section of roadway was named Old Seward Highway and functions as a commercial frontage road of New Seward Highway.

With the addition of interchanges on New Seward Highway constructed at Tudor Road, Dowling Road, Dimond Boulevard, O'Malley Road, Huffman Road, DeArmoun Road, and Rabbit Creek Road/Old Seward Highway, New Seward Highway is now a controlled-access facility from Rabbit Creek Road to the 36th Avenue at-grade intersection. Potter Marsh is the southern terminus of the divided-highway, controlled-access facility. From 36th Avenue north, the development density surrounding the New Seward Highway corridor changes. Road access includes commercial driveways as well as at-grade intersections with east-west roads.

A recent improvement to the New Seward Highway corridor between Rabbit Creek Road and 36th Avenue was the 2002 addition of a loop ramp at the Dimond Boulevard interchange, serving eastbound to northbound traffic. This upgrade allows free-flow traffic movements and eliminated a dual left-turn pocket with capacity limitations. Another improvement completed in 2004 provides tear-shaped roundabouts at the Dowling Road intersections with the New Seward Highway frontage roads and on/off ramps.

As the only roadway out of Anchorage to the south, New Seward Highway between Rabbit Creek Road and 36th Avenue is congested with local and regional traffic throughout the year. The central and southern portions of the Anchorage Bowl, as well as the Kenai Peninsula, have experienced significant growth in recent years and created corresponding increases in traffic volumes along the corridor.

New Seward Highway is a freeway, as defined in the Municipality of Anchorage (MOA) *Official Streets and Highways Plan* (1996b), and its efficient operation has a significant effect on transportation capacity and traffic flow. For funding purposes, the Seward Highway included in the study area is designated as an interstate highway by the Federal Highway Administration (FHWA). The roadway also is part of the National Highway System (NHS), a federal designation identifying importance to the nation's economy, defense, and mobility.

As a link in the Anchorage transportation system, New Seward Highway is important to Southcentral Alaska residents, commercial goods movement, and visitors. In recognition of that importance, Anchorage Metropolitan Area Transportation Solutions (AMATS), the metropolitan planning organization for Anchorage, determined that a major investment study, a comprehensive alternatives analysis, was warranted to assess options and needs. Completed in 2002, the major investment study examined the transportation demand and system performance of the New Seward Highway corridor from Rabbit Creek to 36th Avenue and developed alternatives to be advanced to a National Environmental Policy Act (NEPA) process in an effort to resolve existing and future mobility, congestion, and safety problems along the corridor (CH2M HILL, 2002). This proposed action is the result of that major investment study.

To provide details about conditions anticipated in 2035, the Institute of Social and Economic Research (ISER) of the University of Alaska Anchorage developed economic projections (ISER, 2003). A travel forecast scenario was generated based on data collected for the *Anchorage 2020: Anchorage Bowl Comprehensive Plan* (MOA, 2001a). The resulting 2035 economic and travel forecasts provided the foundation for further refinement of alternatives and the preliminary engineering analyses.

1.2 Purpose of the Action

The purpose of the proposed action is to construct improvements to the New Seward Highway corridor, between Rabbit Creek Road and 36th Avenue, that will address current and future travel demand and mobility needs. The improvements will provide additional capacity, connectivity, and safety enhancements.

New Seward Highway is the primary north-south traffic carrier for the Anchorage Bowl with an average daily traffic count, depending on the segment, ranging from 20,000 to 60,000 vehicles. This centrally located freeway provides important transportation functions for Southcentral Alaska residents, commercial goods movement, and visitors. The study area, the New Seward Highway corridor from Rabbit Creek Road to 36th Avenue, is shown in Figures 1.2-1 and 1.2-2. (Note: Foldout figures [11 by 17 inches] are included following the text for each chapter.)

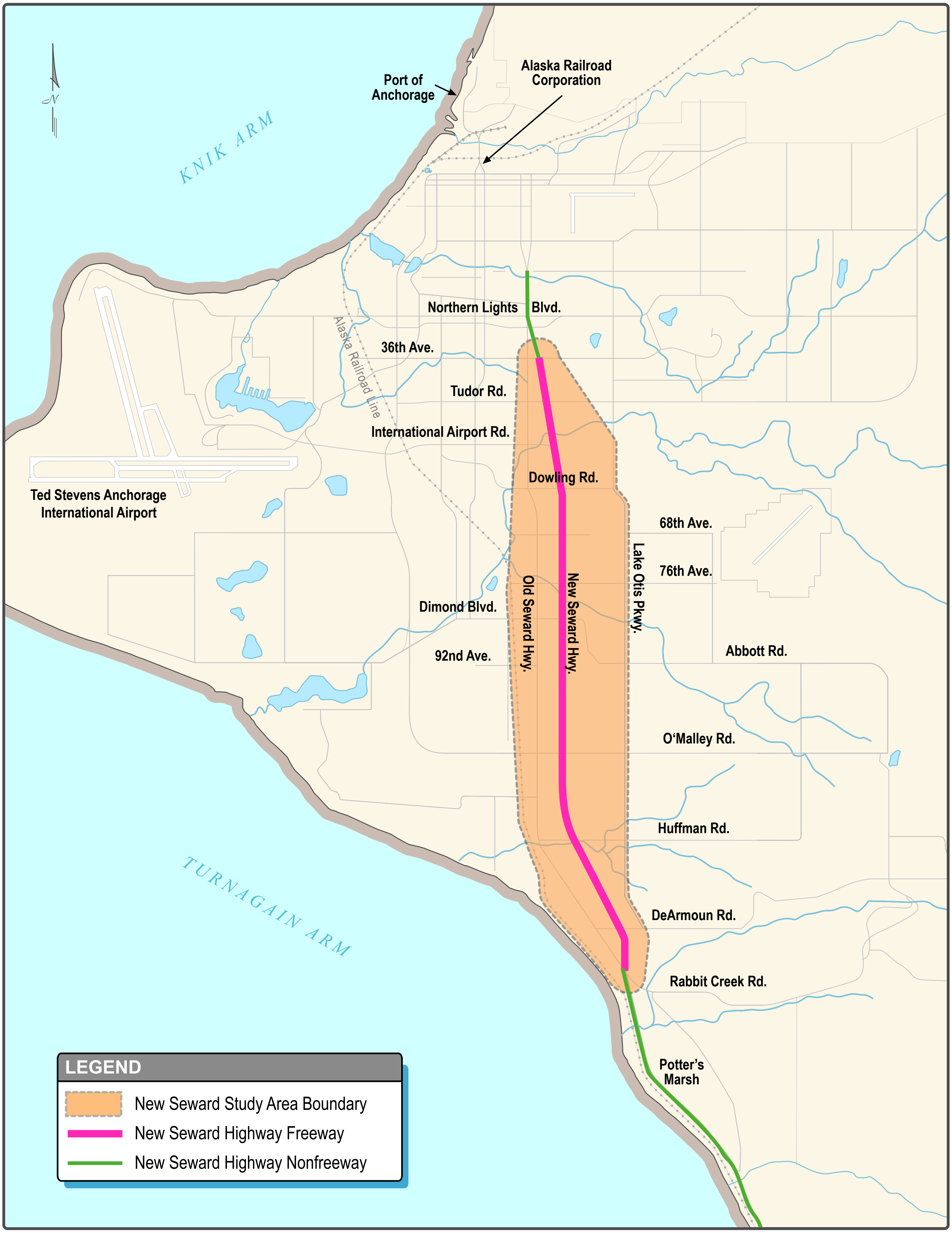


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FIGURE 1.2-1

New Seward Highway Corridor,
Rabbit Creek Road to 36th Avenue, Study Area

1.3 Need for the Action

Existing peak-hour congestion in the study area, the result of many years of steady growth, is expected to worsen as indicated by the regional growth and economic development projections described in the current Anchorage Bowl comprehensive plan (*Anchorage 2020: Anchorage Bowl Comprehensive Plan,* prepared by MOA, 2001a) and Anchorage long-range transportation plan (LRTP) (*Anchorage Bowl 2025 Long-Range Transportation Plan*, prepared by MOA, DOT&PF, and AMATS, 2005). Upgrades and additional connections to New Seward Highway would provide needed capacity to meet the travel demands generated by planned growth in the region. Improvements would address the community and transportation needs as discussed below.

1.3.1 Increase Corridor Capacity to Accommodate Past Growth and Future Demand

As a result of past growth, a significant portion of the New Seward Highway mainline already operates at or over capacity during morning and afternoon commutes. Additionally, many of the signalized intersections for the east-west crossing arterials along the corridor are over capacity during the morning and evening peak hours, and other north-south roads near the New Seward Highway corridor—Lake Otis Parkway and Old Seward Highway—are highly congested during peak hours.

The proposed action would be designed to increase level of service (LOS) to LOS C throughout the study area corridor, with LOS D being acceptable at high-volume intersections. Level of service is a measurement of roadway performance used for roadway segments and street intersections. It reflects how well the traffic demand is accommodated by available capacity and the relative ease of traffic flow on a scale of A to F. Free-flow traffic is rated LOS A, and at the other end of the spectrum, congested conditions are rated LOS F.

Table 1.3-1 summarizes the 2002 volume of traffic for segments of New Seward Highway within the study area. Inclusion of the LOS values identifies locations that are affected by congested traffic. Traffic volume taxes capacity of the New Seward Highway corridor segments between Dimond Boulevard and 36th Avenue during the afternoon commute periods and between 76th Avenue and Tudor Road during the morning commute. These traffic conditions are unstable, often deteriorating to stop-and-go conditions with extremely limited maneuverability. They are exacerbated by snow and ice during winter months.

TABLE 1.3-1
Mainline Levels of Service for New Seward Highway in 2002

New Seward Highway Segment	2002 ADT	AM Peak Hour Density,[a] LOS[b]	PM Peak Hour Density,[a] LOS[b]
Rabbit Creek Road to DeArmoun Road	14,678	6.0, LOS A	5.6, LOS A
DeArmoun Road to Huffman Road	23,001	9.3, LOS A	10.9, LOS A
Huffman Road to O'Malley Road	28,655	15.8, LOS B	16.6, LOS B
O'Malley Road to Dimond Boulevard	37,975	19.2, LOS C	21.5, LOS C
Dimond Boulevard to 76th Avenue	55,896	20.5, LOS C	27.4, LOS D
76th Avenue to Dowling Road	61,430	26.0, LOS D	29.5, LOS D
Dowling Road to Tudor Road	60,942	27.7, LOS D	36.8, LOS E
Tudor Road to 36th Avenue	48,504	16.3, LOS B[c]	29.9, LOS D

[a] Density = the number of passenger cars per mile per lane (Transportation Research Board, *Highway Capacity Manual,* Report 209, 2000)

[b] Values provided for the peak commute direction; AM = northbound and PM = southbound

[c] New Seward Highway transitions from a controlled access freeway to a major urban arterial at the 36th Avenue intersection. The availability of three lanes in each direction for this segment decreases the density of vehicles.

(shaded) = low level of service (LOS)

ADT = average daily traffic

Sources: CH2M HILL and DOT&PF, Central Region, Traffic Section, for 2005 traffic volumes

Low LOS at freeway ramp intersections with arterials along the corridor compounds congestion on the New Seward Highway freeway. Table 1.3-2 summarizes 2002 morning and evening peak-hour LOS performance for these intersections. Critical capacity deficiencies in intersection operation are evident at several intersections between O'Malley Road and 36th Avenue during the afternoon commute periods.

Population growth and economic expansion to the year 2035 are projected to increase regional travel demand by about 45 percent (CH2M HILL, 2003), further impairing transportation LOS to unacceptable levels over extended time periods.

TABLE 1.3-2
Signalized Intersection Levels of Service for New Seward Highway in 2002

Intersection	AM Peak Hour LOS	PM Peak Hour LOS
Brayton Drive northbound and Huffman Road	C	A
Homer Drive southbound and Huffman Road	A	B
Brayton Drive northbound and O'Malley Road	C	D
Homer Drive southbound and O'Malley Road	A	C
Brayton Drive northbound and Dimond Boulevard	A	B
Homer Drive southbound and Dimond Boulevard	A	E
Brayton Drive northbound and Dowling Road [a]	D	D
Homer Drive southbound and Dowling Road [a]	C	F
Brayton Drive northbound and Tudor Road	C	B
New Seward Highway southbound exit ramp at Tudor Road	C	F
New Seward Highway and 36th Avenue	C	F

(shaded) = low level of service (LOS)
[a] Dowling Road was under construction in 2002.
Source: CH2M HILL

Table 1.3-3 lists 2035 estimated daily traffic volumes and corresponding peak-hour LOS for each segment along the New Seward Highway freeway without improvements. Table 1.3-4 summarizes estimated 2035 morning and evening peak-hour LOS for signalized arterial intersections crossing the corridor. The LOS F values represent severe driver delays expected at each intersection without New Seward Highway improvements through the design year 2035.

Traffic congestion contributes to air quality problems. Vehicles delayed in traffic burn excessive fuel and emit more pollution than cars that are moving freely. Improvements to mitigate congestion along New Seward Highway would in turn have a positive effect on air quality along this route. Anchorage has relatively high levels of carbon monoxide pollution compared with most other cities. The 2005 LRTP (MOA, DOT&PF, and AMATS) noted that 80 percent of Anchorage's winter carbon monoxide problem comes from motor vehicles. Cold climate and strong temperature inversions exacerbate the carbon monoxide problem. The proposed project is in an area that was approved as a "maintenance area" for carbon monoxide by the EPA on June 23, 2004. More information is provided in Sections 3.2.7 and 4.3.7 of this document and in Appendix D.

TABLE 1.3-3
Projected Levels of Service for New Seward Highway Mainline in 2035 (Without Improvements)

New Seward Highway Segment	Estimated 2035 ADT	AM Peak Hour LOS (Northbound)	PM Peak Hour LOS (Southbound)
Rabbit Creek Road to DeArmoun Road	30,000	A	A
DeArmoun Road to Huffman Road	36,200	B	B
Huffman Road to O'Malley Road	54,100	D	B
O'Malley Road to Dimond Boulevard	60,000	F	C
Dimond Boulevard to 76th Avenue	80,600	F	D
76th Avenue to Dowling Road	88,800	F	D
Dowling Road to Tudor Road	91,700	F	F
Tudor Road to 36th Avenue	83,800	F[a]	F

= Low level of service (LOS)

[a] Freeway segment will be constrained by 36th Avenue intersection. Queues will result in intersection operation at LOS F.

ADT = average daily traffic

Source: CH2M HILL

TABLE 1.3-4
Projected Levels of Service for New Seward Highway Signalized Intersections in 2035 (Without Improvements)

Intersection	AM Peak Hour LOS	PM Peak Hour LOS
Brayton Drive northbound and Huffman Road	C	B
Homer Drive southbound and Huffman Road	B	B
Brayton Drive northbound and O'Malley Road	F	E
Homer Drive southbound and O'Malley Road	A	B
Brayton Drive northbound and Dimond Boulevard	D	C
Homer Drive southbound and Dimond Boulevard	B	F
Brayton Drive northbound and Dowling Road [a]	A[a]	A[a]
Homer Drive southbound and Dowling Road [a]	A[a]	A[a]
Brayton Drive northbound and Tudor Road	B	B
New Seward Highway southbound exit ramp at Tudor Road	D	F
New Seward Highway and 36th Avenue	F	F

= poor level of service (LOS)

[a] Reflects assessment of 2017 conditions in *Traffic Impact Analysis, Wal-Mart Store, #3813-00, Anchorage, Alaska*, by Lounsbury & Associates, Inc. (2005).

Source: CH2M HILL

1.3.2 Improve System Connectivity and Linkage of Existing Roadways

The lack of east-west arterial crossings and continuity along the New Seward Highway controlled-access facility intensifies traffic congestion and service problems. New Seward Highway bisects the city and carries more traffic than any other north-south corridor within Anchorage. Without east-west roadway connectivity across New Seward Highway, the pedestrian, bicycle, and motorized travel and circulation is disrupted in many locations.

Previous studies and analyses of recent origin-destination travel patterns show that New Seward Highway restricts efficient east-west traffic flow in the study area. The 2005 LRTP (MOA, DOT&PF, and AMATS) identified New Seward Highway crossings at 92nd Avenue, 76th Avenue, 68th Avenue, and International Airport Road as "missing links" within the transportation network. Discontinuous east-west routes tend to force circuitous routes and short trips on and off New Seward Highway, adding to congestion on New Seward Highway and existing east-west streets. These travel patterns and impacts were confirmed in the 2005 LRTP (MOA, DOT&PF, and AMATS, 2005).

Figure 1.3-1 illustrates these east-west travel barriers that lead to and create circuitous traffic patterns within the corridor. A number of east-west arterials are not continuous between Lake Otis Parkway and Minnesota Drive, two major north-south roadways that parallel New Seward Highway.

Improvements to New Seward Highway and its connectivity with east-west arterials are expected to improve mobility, in turn upgrading the functionality of the rest of the transportation network. The travel times required for reaching many destinations by vehicle, public transit, bicycle, and pedestrian modes also would be reduced by shortened travel distance.

1.3.3 Enhance Intermodal Transportation

The New Seward Highway corridor supports intermodal transportation—transport relying on more than one mode of travel—in Anchorage, the surrounding areas, and other parts of the state. This important highway link facilitates the movement of goods and people between marine, rail, and air connections. Major intermodal facilities connected by New Seward Highway include the Port of Anchorage, the Alaska Railroad, and the Ted Stevens Anchorage International Airport. These facilities receive and discharge freight, and conduct travel by visitors and local residents. Also contributing to mobility in Anchorage are public transit and facilities for pedestrians and bicyclists.

Improving the ability of New Seward Highway in the study area to connect sectors of intermodal transportation would increase mobility, serve regional growth, and enhance transportation efficiency and safety. Specifically, the connection of International Airport Road from Homer Drive on the west side of New Seward Highway to Brayton Drive on the east side would enhance the movement of people and goods to and from Ted Stevens Anchorage International Airport through access from both Dowling Road to the south and Tudor Road to the north.

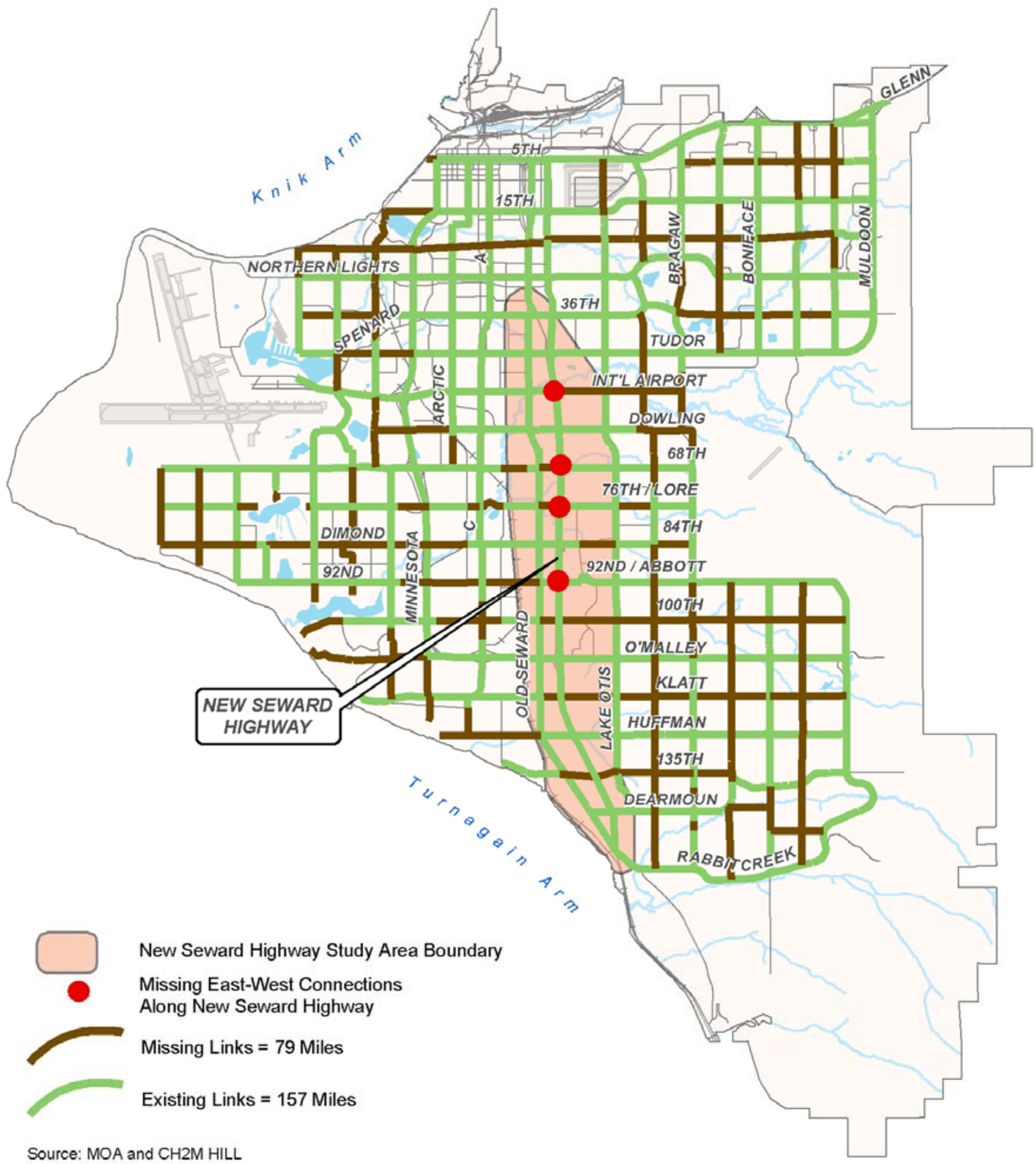


FIGURE 1.3-1
Missing Links

1.3.4 Upgrade Design Features to Meet Industry Standards and Improve Safety

New Seward Highway corridor design features need to be brought up to current standards. The deficient elements include structures, noise barriers, illumination, and roadway geometric design. In addition, freeway flow, interchange, and frontage road system improvements can promote safer travel.

Within the study area, freeway ramps are too closely spaced for efficient operation in some cases. In addition, the geometry of ramp connections to frontage roads can be designed more efficiently to reduce merging conflicts and queuing.

Most structures in the freeway corridor do not meet current standards for live-load ratings. Seismic design retrofits to pier columns and possibly the pier footings of multispan bridges are needed. Dimond Boulevard and Dowling Road undercrossings have less than the current roadway clearance standard of 16.5 feet. If the Campbell Creek bridge structures are raised for future extension of the Campbell Creek Trail, they will require complete reconstruction of abutments. Additionally, past studies have documented the need for continuous illumination throughout the study area (DOT&PF, 1999b).

The corridor frontage roads have narrow shoulders. In many areas, the structural section and pavement conditions have deteriorated to the extent that complete foundation reconstruction may be required. Another design concern is the lack of a continuous multiuse trail system and bicycle route. The MOA *Areawide Trails Plan* (1997) identifies the need for this route for the length of the corridor. The only existing pedestrian facility is a discontinuous, paved multiuse trail west of New Seward Highway between Huffman and O'Malley roads.

Design improvements on New Seward Highway are needed to reduce accidents and provide a safer transportation network. Table 1.3-5 summarizes vehicle accident data for 1999 through 2001 along the New Seward Highway corridor. The data show a total of 506 non-moose related accidents in the corridor and an increase in the accidents volume of 67 percent from 1999 to 2001. In addition, the number of moose-vehicle collisions doubled from 6 to 12 during the time frame analyzed. Fatalities reported in New Seward Highway were zero in 1999, two in 2000, and one in 2001.

Moose accidents doubled from 1999 to 2001 and continue to be a problem at certain areas such as O'Malley Road to Dimond Boulevard and at Dowling Road.

Reconstruction of New Seward Highway is needed to reduce the number of accidents. Updating the freeway and intersections to modern design standards, improving sight-distances, and providing new and improved signing, striping, and illumination would improve safety in the New Seward Highway corridor and reduce the number of accidents. Safety and capacity enhancements at 36th Avenue, in particular, can improve traffic flow and reduce the accidents at this highway transition area. In addition, safety measures, including fencing, can be implemented to reduce the number of moose-vehicle collisions in the New Seward Highway corridor.

TABLE 1.3-5
Vehicle Accident Data for the Study Area, 1999-2001

New Seward Highway Corridor Segment	Total 1999 Accidents (Moose Collisions)	Total 2000 Accidents (Moose Collisions)	Total 2001 Accidents (Moose Collisions)
Rabbit Creek Road to DeArmoun Road	0 (0)	1 (1)	1 (1)
To Huffman Road	6 (0)	7(0)	11 (0)
To O'Malley Road	9 (1)	9 (1)	10 (1)
To Dimond Boulevard southbound ramp	18 (1)	45 (1)	44 (5)
To 76th Avenue southbound ramp	4 (0)	7 (0)	13 (2)
To Dowling Road northbound ramp	3 (0)	11 (1)	22 (1)
To Tudor Road northbound ramp	26 (3)	25 (5)	37 (1)
To 36th Avenue intersection	59 (1)	67 (0)	71 (1)
Totals	**125 (6)**	**172 (9)**	**209 (12)**
Increase compared to 1999		38%	67%

Source: Alaska traffic accident data, 1999-2001 (DOT&PF, 2000b, 2002, and 2003a).

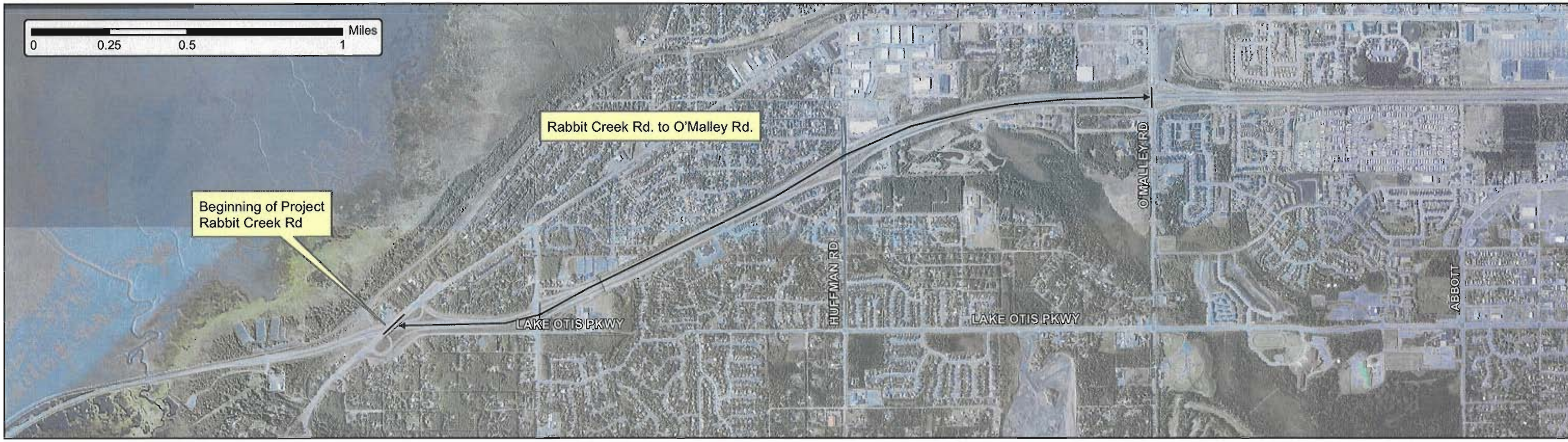


FIGURE 1.2-2
New Seward Highway Segments

CHAPTER 2

Alternatives

This chapter describes the alternatives development process for the New Seward Highway corridor from Rabbit Creek Road to 36th Avenue. It includes an overview of alternatives development from the reconnaissance study phase through preliminary engineering, descriptions of alternatives advanced and those dismissed from consideration, and the reasons for either advancing or dismissing the alternatives considered. The alternatives advanced are evaluated for their ability to meet the purpose and need discussed in Chapter 1.

2.1 Alternatives Development

2.1.1 Alternatives Development Overview

The following engineering efforts have contributed to development of potential alternatives to meet travel needs along the New Seward Highway corridor from Rabbit Creek Road to 36th Avenue:

- Reconnaissance Study—The Alaska Department of Transportation and Public Facilities (DOT&PF) published a reconnaissance study report for the New Seward Highway corridor in 1999 that analyzed potential improvements to the corridor between Huffman Road and 20th Avenue. The improvements considered included adding lanes to the mainline, interchange upgrades, and new east-west crossings along the corridor. The reconnaissance study report was intended to provide baseline information for improvements to the corridor in support of the National Environmental Policy Act (NEPA) process.
- Major Investment Study—The 1991 long-range transportation plan (LRTP) (prepared by the Municipality of Anchorage [MOA]) identified the New Seward Highway corridor as a candidate for a major investment study to provide a focused analysis of the corridor's transportation problems, along with a broader perspective on the options available to solve those problems.

  The major investment study identified and investigated the feasibility of alternative modal improvements ranging from guideway transit systems (systems that use a track or other structure to support and physically guide transit vehicles) to highway improvements. The Anchorage Metropolitan Area Transportation Solutions (AMATS) Policy Committee reviewed the results of the major investment study analyses and adopted its recommendations for more detailed analyses in October 2002. The major investment study findings are documented in the *New Seward Highway, Rabbit Creek Road to 36th Avenue, Scoping Summary Report* (CH2M HILL, 2002)
- Preliminary Engineering Report—In 2003, preliminary engineering began refining alternatives recommended by the major investment study for further consideration. Components examined in greater detail included additional mainline travel lanes,

interchanges, grade separations, ramp access, and cross-street connections (CH2M HILL, 2004).

2.1.2 Major Investment Study Alternatives Development

2.1.2.1 Alternatives Evaluation

The alternatives evaluation in the New Seward Highway major investment study progressively considered transportation modes, approaches to minimize reliance on automobiles, and highway system improvements. The evaluation focused on the following potential improvements:

- Light-rail transit
- Commuter rail
- Express bus service
- Transit
- Strategies for transportation system management and travel demand management
- High-occupancy vehicle lane
- Reversible lane
- East-west connectivity and circulation
- Mainline lane additions
- Interchange additions and expansions

2.1.2.2 Alternative Recommendations

On the basis of background and condition studies, public involvement input, and analytical evaluation findings, the major investment study concluded the following (CH2M HILL, 2002):

- As stand-alone concept alternatives, the light rail, commuter rail service, express bus on New Seward Highway, or bus transit will not resolve transportation needs in the project corridor, and were recommended to be dismissed from further evaluation.
- Highway improvements combined with strategies for transportation system and demand management are required to address travel demand and transportation plan performance objectives.
- Of the highway improvements considered, east-west grade separations and connections, mainline lane additions, interchange additions and expansions, and lane additions for high-occupancy vehicles were recommended for continued evaluation. The reversible lane concept was dismissed from further evaluation.

2.1.3 Preliminary Engineering Alternatives Development

2.1.3.1 Alternatives Evaluation

Preliminary engineering evaluation further developed information about the feasibility of components in the major investment study-recommended alternatives. Potential scenarios for interchanges, grade separations, arterial extensions, frontage roads, pedestrian and bicycle components, and mainline variations were examined. Analysis included updates of travel forecasts and operational modeling for peak-period travel conditions to refine information on performance metrics of the alternatives.

2.1.3.2 Alternatives Recommendations

During the preliminary engineering effort, the following alternatives were found to be the most reasonable solutions to satisfy the purpose and need of the proposed project:

- No-Build Alternative (through 2035) (required by NEPA)
- Build Alternative—mainline expansion with new grade separations at International Airport Road, 68th Avenue, 76th Avenue, and 92nd Avenue; interchange improvements at Tudor Road, Dowling Road, Dimond Boulevard, and O'Malley Road; and pedestrian and bicycle improvements along the corridor from DeArmoun Road to 36th Avenue

In addition, the Build Alternative includes strategies for transportation system management and travel demand management to improve the efficiency of operation on the New Seward Highway corridor. These alternatives are described in Section 2.2.

2.2 Detailed Description of Alternatives Considered and Advanced

The descriptions for the Build Alternative in Section 2.2.3 below are presented by segment, from the beginning (Rabbit Creek Road) to the end (36th Avenue) of the study area.

The following figures portray improvements in the Build Alternative:

- Figure 2.2-1, Build Alternative Typical Section (Note: Foldout figures [11 by 17 inches] are included following the text for each chapter.)
- Figure 2.2-2, Build Alternative, Rabbit Creek Road to Dimond Boulevard
- Figure 2.2-3, Build Alternative, Dimond Boulevard to Dowling Road
- Figure 2.2-4, Build Alternative, Dowling Road to 36th Avenue
- Figure 2.2-5, Campbell Creek Bridges, Existing and Proposed

2.2.1 Design Criteria Applied to the Build Alternative

Appendix B of the Preliminary Engineering Report (CH2M HILL, 2004) provides the design criteria for the mainline, frontage roads, ramps, and cross streets. The design criteria were established to conform to guidance provided in Chapter 11 of the *Alaska Preconstruction Manual* (DOT&PF, 2005) and the *Policy on Geometric Design of Highways and Streets* (American Association of State Highway and Transportation Officials [AASHTO], 2001).

Additional design details are provided in the following appendixes of the Preliminary Engineering Report (CH2M HILL, 2004):

- Appendix C, Mainline Plan and Profile Drawings for Build Alternative 1
- Appendix D, Cross-Street Plan and Profile Drawings for Build Alternative 1
- Appendix F, Cost Estimate and Implementation Plan Drawings

2.2.2 No-Build Alternative

The No-Build Alternative would maintain the existing four-lane divided highway from Rabbit Creek Road to 36th Avenue. No improvements to the mainline, interchanges, or frontage roads within the corridor would be performed. Although major facility improvements would not be made, maintenance of the facilities would require activities such as resurfacing, reconstruction of deteriorated shoulders on frontage roads, and illumination replacement and additions.

The No-Build Alternative does include consideration of the effects of projects expected to be built in the corridor during the next 30 years, as specified in the 2001 LRTP (MOA, 2001b), including the following arterial improvements:

- O'Malley Road—widening the segment between New Seward Highway and Lake Otis Parkway from two to four lanes with capacity improvements at major intersections
- Huffman Road—widening the segment between Old Seward Highway and Lake Otis Parkway to provide two travel lanes in each direction
- Old Seward Highway—widening to five lanes from O'Malley Road to Brandon Street

2.2.3 Proposed Build Alternative – Freeway Expansion with New Grade Separations and Improvements to Existing Interchanges

Figure 2.2-1 details the proposed typical corridor cross section, including the mainline, frontage roads, and pedestrian and bicycle accommodations. Figures 2.2-2, 2.2-3, and 2.2-4 illustrate the plan view of the proposed Build Alternative over the aerial base. The entire corridor from Rabbit Creek Road to 36th Avenue is and would remain a controlled-access corridor. Noise barriers and fencing throughout the corridor would be upgraded or installed as warranted, and continuous illumination would be added to New Seward Highway to augment the existing high-mast lighting at the interchanges. Proposed Build Alternative improvements are described below, by segment.

Rabbit Creek Road to O'Malley Road. In this segment, the existing New Seward Highway mainline, which is four lanes (two each traveling north and south) with a center grassed median, would remain unchanged. Minor safety and capacity enhancements may be incorporated at the Rabbit Creek, DeArmoun, and Huffman road interchanges.

The only frontage road in this segment, Brayton Drive on the east side, would remain unchanged.

Pedestrian and bicycle improvements would consist of separated multi-use pathways near the right-of-way boundary on the west and east sides of New Seward Highway from Tradewind Drive to O'Malley Road. At the DeArmoun Road Elementary School pedestrian overcrossing, Americans with Disabilities Act (ADA) upgrades would include ramp access improvements. (Details about pathway and pedestrian facilities are described in the 2003 *New Seward Highway Pathway and Pedestrian Facilities* report by Land Design North and CH2M HILL, provided in Appendix H.)

O'Malley Road to Dimond Boulevard. In this segment, the New Seward Highway mainline would be widened from the existing four lanes to six lanes. The grass median would be retained.

On the west side, the Homer Drive frontage road would be extended south from Dimond Boulevard to O'Malley Road, providing a one-way frontage road system from O'Malley Road to Tudor Road. On the east side, the Brayton Drive frontage road would be reconstructed to conform with the proposed typical section shown in Figure 2.2-1.

A new multi-use path is proposed for the west side along the Homer Drive frontage road extension and along Brayton Drive on the east side. Both pathways would be separated from the roadway as much as possible where right-of-way is available. In areas of limited space, the pathway would be adjacent to the roadway, separated only by curb and gutter.

This segment would include interchange improvements at O'Malley Road. The southbound ramp exiting from New Seward Highway would be widened to two lanes to accommodate the transition from three to two lanes on the mainline in the southbound direction. The northbound on-ramp also would be widened to two lanes to introduce an additional mainline lane in the northbound direction.

A half-diamond interchange constructed at 92nd Avenue would include slip ramps between the New Seward Highway mainline and the frontage roads. In the northbound direction, a slip ramp would allow traffic from New Seward Highway to "slip" onto Brayton Drive just south of 92nd Avenue. In the southbound direction, a slip ramp would allow traffic from Homer Drive to "slip" onto New Seward Highway just south of 92nd Avenue. This grade-separated interchange would raise the New Seward Highway mainline on a bridge above 92nd Avenue. The work also would include extension of 92nd Avenue from Homer Drive (west frontage road) to Brayton Drive (east frontage road). This portion of 92nd Avenue would be four lanes, providing a through lane in each direction and side-by-side left-turn bays between intersections with the frontage roads. (The turn lanes in this configuration are constructed inside the through lanes.)

In addition, 92nd Avenue would be reconstructed and extended as a two-lane road west to Old Seward Highway, where right and left turn bays would be incorporated for the turning movements.

Dimond Boulevard to Dowling Road. In this segment, the widened, six-lane New Seward Highway mainline would continue. Multi-use sidewalks or pathways would be included along Brayton Drive and Homer Drive frontage roads. The pathways would be separated from the roadways as much as possible where right-of-way is available. In areas of limited space, the pathways would be adjacent to the roadway, separated only by curb and gutter.

As part of new grade separations at 76th and 68th avenues, the existing frontage roads would be reconstructed to achieve the grade changes.

Improvements at the Dimond Boulevard interchange would include ramp upgrades, channelization between ramp intersections, and bridge replacement. As part of the ramp upgrades, the southbound ramp exiting New Seward Highway would be expanded to two lanes and the ramp intersection would be relocated to align with the extension of Homer Drive from Dimond Boulevard to O'Malley Road. The work would require rechannelization of Dimond Boulevard to remove the eastbound left-turn pocket to Brayton Drive, where replacement access would be provided with the Sandlewood Place extension.

Sandlewood Place on the east side of New Seward Highway would be reconstructed and extended between Dimond Boulevard and Lore Road (76th Avenue). The new road would be 30 feet wide with sidewalks on each side. The extension would provide continuity to the north for Brayton Drive and replacement access to the properties along Brayton Drive in conjunction with the removal of the uncontrolled eastbound left-turn pocket from Dimond Boulevard.

A new half-diamond interchange would join 76th Avenue with New Seward Highway. The improvement would incorporate a grade separation and would maintain the existing slip ramps to and from the north. New Seward Highway would be raised on a bridge over 76th Avenue to allow the extension of 76th Avenue to Brayton Drive. As it passes below New Seward Highway, 76th Avenue would consist of four lanes, providing a through lane in each direction and side-by-side left-turn bays between intersections with the frontage roads.

A new grade separation at 68th Avenue would raise New Seward Highway over 68th Avenue, but would not include ramps for highway access. The extension of 68th Avenue would consist of four lanes between Homer and Brayton drives, similar to 76th Avenue.

Dowling Road to Tudor Road. In this segment, the widened, six-lane New Seward Highway mainline would continue. Multi-use sidewalks or pathways would be included along both Brayton and Homer drives. The pathways would be separated from the roadways as much as possible where right-of-way is available. In areas of limited space, the pathways would be adjacent to the roadway, separated only by curb and gutter.

At the Dowling Road interchange, the ramps would require reconstruction for the lane added to the outside of the New Seward Highway mainline.

Extension of International Airport Road would connect Homer and Brayton drives. The International Airport Road roadway extension would consist of four lanes, providing a through lane in each direction and side-by-side, left-bays between intersections with the frontage roads. Between Homer Drive and Old Seward Highway, International Airport Road would be reconstructed to three lanes. As part of elevating the mainline over International Airport Road, the bridges over the nearby Campbell Creek for the mainline and frontage roads also would be reconstructed. Replacement of the Campbell Creek bridges would provide adequate clearance for a future trail extension along Campbell Creek under New Seward Highway.

Brayton Drive would be reduced to a single-lane frontage road between International Airport Road and Tudor Road to eliminate impacts to the adjacent neighborhood collector, Becharof Street.

Tudor Road to 36th Avenue. The existing six-lane New Seward Highway mainline in this segment would remain basically unchanged. Because the additional through lanes on the mainline match the existing auxiliary lanes south of the 36th Avenue intersection, the intersection would not require reconstruction. Roadway improvements at 36th Avenue may include minor channelization enhancements.

Bicycle and pedestrian improvements consist of a new multi-use separated pathway on the west side of the road, adjacent to the mainline, and ADA upgrades for the existing pathways at 36th Avenue and along Tudor Road.

At the Tudor Road interchange, improvements to the existing diamond interchange would include Tudor Road widening over New Seward Highway and channelization improvements to provide dual left-turn lanes serving westbound-to-southbound traffic. The addition of a left-turn lane between the ramp intersections would require reconstruction and widening of the Tudor Road bridge.

The current five-lane configuration of Tudor Road west to Old Seward Highway would be retained.

Proposed Transportation System Management and Travel Demand Management Components. The transportation system management elements of the proposed Build Alternative would include advanced traffic management focus at 36th Avenue and selected auxiliary lane treatment for the critical sections of the New Seward Highway mainline where bottlenecks have been identified.

The transportation system management elements and deployment of advanced traffic management at the signalized intersections where New Seward Highway ramps terminate and along the mainline are intended to improve traffic flow and reduce congestion. The key transportation system management improvements proposed for the New Seward Highway corridor are as follows:

- Modernization of the traffic signal control system at 24 intersections in the corridor—As a smart corridor, the New Seward Highway corridor would incorporate a system to optimize traffic signal system management. The signalized ramp intersections would be instrumented with state-of-the-art controller technologies, real-time video monitoring, automated data collection, real-time communications to a traffic management center, incident monitoring and management, and adaptive traffic controls responsive to specific traffic conditions. The MOA, which is responsible for all traffic signal operations in Anchorage, controls the traffic management system through its traffic management center.
- Strategic traffic control focus at the intersection of New Seward Highway and 36th Avenue as a network hot spot—Advanced traffic management and engineering initiatives implemented at this intersection would include advanced traffic signal timing and traffic engineering approaches consisting of signing, striping, and operation monitoring to maximize intersection throughput and improve safety.
- Use of video traffic monitoring and incident management capabilities on the mainline and at ramp terminals and cross streets
- Access management on the frontage roads and use of these roads as reliever routes for excess congestion and incident conditions
- Provision of park-and-ride facilities near the New Seward Highway freeway, initially at DeArmoun and O'Malley roads for ride-sharing participants and future bus service passengers

The initiatives implemented as part of a travel demand management program would include the following:

- Continuation of work with the AMATS and MOA to promote transit service, including vanpool operations
- Promotion of employer-based support and implementation of incentives for shifting travel times
- Encouragement of voluntary travel reduction
- Promotion of expanded use of telecommuting in normal business practices

2.3 Comparison of Alternatives with Purpose and Need

Table 2.3-1 illustrates which alternatives satisfy the purpose and need identified in Chapter 1.

2.4 Alternatives Considered but Not Advanced

The following alternatives examined during the preliminary engineering efforts were considered but not advanced. The evaluations and the reasons why the alternatives did not meet the purpose and need are summarized below.

2.4.1 High-Occupancy Vehicle Lane

By definition, all vehicles using a designated high-occupancy vehicle lane must have two or more occupants. The preliminary engineering analysis concluded that fewer than one-third of the trips would potentially have sufficient occupants to be eligible for high-occupancy vehicle lane use and that the majority of trips in the corridor were too short to make effective use of a dedicated high-occupancy vehicle lane.

Modeling showed that less than one-third of all 2035 northbound peak work trips on New Seward Highway at 36th Avenue originate south of O'Malley Road, and about 68 percent of the work trips originate between O'Malley and Tudor roads (approximately 50 percent between Dimond Boulevard and Tudor Road). Only a fraction of these trips would be eligible to use a high-occupancy vehicle lane.

The relatively short distance for which peak-period work trips are on New Seward Highway means that time saved by using a high-occupancy vehicle lane would be minimal. Additionally, the short freeway trip distances make it impractical for drivers to negotiate from their entry ramp across other lanes to a median high-occupancy vehicle lane and then weave back to the shoulder lane at their exit ramp location. Therefore, a high-occupancy vehicle lane would not attract sufficient volume to justify dedication of a lane exclusively for multioccupant vehicles rather than allowing use of the lane for all traffic.

TABLE 2.3-1
Comparison of Alternatives with Purpose and Need

Criteria	No-Build Alternative	Build Alternative	Features that Address Purpose and Need
Purpose			
Implement improvements that would provide additional capacity, connectivity, and safety enhancements	Does not satisfy	Satisfies with additional mainline travel lanes, grade separations, and interchange improvements	Wider mainline, east-west road connections, upgrades to meet current design standards
Addresses current and future travel demand and mobility needs for the New Seward Highway corridor	Does not satisfy	Satisfies 2035 travel forecast	Improved capacity accommodates demand generated by recent and projected growth and relieves congestion; incorporation of strategies for transportation system management and travel demand management further improves traffic flow
Need			
Increase corridor capacity to accommodate recent growth and future demand	Does not satisfy	Satisfies with additional mainline travel lanes	Additional mainline lane in segments north of O'Malley Road; ramp improvements enhance traffic flow; additional capacity provides LOS C on mainline and a minimum of LOS D at intersections in the design year
Improve system connectivity and linkage of existing roadways	Does not satisfy	Satisfies with new grade separations, roadway extensions, and interchange improvements	Interchange improvements at O'Malley Road, 92nd Avenue, Dimond Boulevard, 76th Avenue, and Tudor Road enhance system connectivity; overcrossings at 92nd, 76th, and 68th avenues and International Airport Road improve neighborhood connections and link existing roadways
Enhance intermodal transportation	Does not satisfy	Satisfies with the addition of pedestrian and bicycle facilities along the corridor	LOS C, improved highway travel time, increased number of access points, and east-west connections benefit travel to intermodal transfer points; improvements for transit, pedestrian, and bicyclists enhance travel by those modes
Upgrade design features to meet industry standards and improve safety	Does not satisfy	Satisfies by utilizing current design standards for improvements, including ramp and frontage road geometric upgrades	Improvements including illumination, noise barriers, fencing, roadway geometry, freeway ramps, interchanges, and clearance and seismic characteristics of structures; improvements to pedestrian overcrossing at Rabbit Creek Elementary School

2.4.2 Transportation System Management and Travel Demand Management

Transportation system management and travel demand management strategies, which include bus service, are designed to minimize congestion on the existing transportation network and to reduce the demand for travel, especially solo-driver travel. A wide range of congestion management strategies have been identified for Anchorage in the MOA's Congestion Management Program (MOA, 2000a) and could be implemented as part of New Seward Highway corridor improvements.

Several transportation system management strategies were considered as part of the transportation system management and travel demand management alternative:

- Signal system improvements
- Turn prohibitions
- Intersection improvements
- Improvements to bus routes and schedules
- Park-and-ride facilities

The traffic demand management programs in effect in Anchorage focus primarily on transit services, ride-sharing promotion, and employer outreach to support reduction of automobile commuting. For 2035, assumed transit service of 6-minute peak-period frequency and 12-minute mid-day frequency was tested, with results showing total transit ridership of 26,000 riders per day. In 2035 an estimated 1.6 million person trips are projected to occur every weekday; therefore, transit ridership findings demonstrate that transit services could represent a single-digit share of total travel, even with dramatic service increase and the supportive environment of the Anchorage Comprehensive Plan (MOA, 2001a) goals. Consequently, transit service has limited ability to contribute to the purpose and need for the proposed project.

Review of research across the nation demonstrates that the aggregate results from implemented traffic demand management strategies seldom exceed 5 percent of all travel. The travel demand management program initiatives identified as most effective for Anchorage were estimated to have the ability to reduce peak-period auto trips on New Seward Highway by less than 400 vehicles daily in the morning and evening peak periods, equivalent to less than one-quarter of a lane of traffic. Therefore, they are not a major instrument for addressing future travel demand and highway improvements.

Evaluation found that transportation system management and travel demand management programs alone could not accommodate the scale of travel demand growth through 2035 on New Seward Highway at a satisfactory level of service. At the same time, the use of transportation system management and travel demand management in conjunction with highway improvements was determined to be necessary to meet the purpose and need of the proposed action.

2.4.3 Roadway Improvements

A variety of configurations for mainline, interchange, frontage road, and arterial connection improvements were evaluated. Table 2.4-1 summarizes the options that were not advanced for further consideration. Additional information about these features is included in the *New Seward Highway, Rabbit Creek to 36th Avenue, Preliminary Engineering Report* (CH2M HILL, 2004).

TABLE 2.4-1
Roadway Improvement Options Evaluated and Not Advanced for Consideration

Corridor Location	Description of Scenario Evaluated	Advantages	Disadvantages	Remarks
O'Malley Road	System interchange between New Seward Highway and Minnesota Drive[a]; maintain diamond interchange between New Seward Highway and O'Malley Road	Full, three-level "Y" system interchange provides directional ramps and unimpeded traffic flow between New Seward Highway and Minnesota Drive.	Multiple structures required, high cost of >$100 million. Increases delays between O'Malley Road and Minnesota Drive due to additional signalized intersections.	System interchange not required to meet 2035 travel demand. Build Alternative does not preclude this scenario as a future improvement.
	Partial system interchange between the New Seward Highway and Minnesota Drive[a]; maintain diamond interchange between New Seward Highway and O'Malley Road	Provides directional ramps and unimpeded traffic flow between New Seward Highway (to/from south only) and Minnesota Drive	Multiple structures required; high cost of >$70 million. Increases delays between O'Malley Road and Minnesota Drive due to additional signalized intersections.	Partial system interchange not required to meet 2035 travel demand. Build Alternative does not preclude this scenario as a future improvement.
Klatt Road	Grade separation with New Seward Highway and extension from Old Seward Highway to Brayton Drive	Provides direct access from Klatt Road to New Seward Highway, improving access from Southport, Oceanview, and other subdivisions in southwest Anchorage.	Introduces impacts to and relocations of residential properties along Klatt Road between Old Seward Highway and New Seward Highway. Brayton Drive reconstruction to raise roadway to Klatt bridge elevation would introduce relocations along Brayton Drive due to grade differential and access elimination.	Option was dismissed from consideration due to low travel demand combined with residential impacts along Klatt Road and commercial impacts along Brayton Drive.

TABLE 2.4-1
Roadway Improvement Options Evaluated and Not Advanced for Consideration

Corridor Location	Description of Scenario Evaluated	Advantages	Disadvantages	Remarks
92nd Avenue	Extension from Brayton Drive to Abbott Road	Provides direct access from Abbott Road to 92nd Avenue, bypassing Dimond Blvd.	Introduces right-of-way impacts to a major developed commercial and residential area.	Option was dismissed from consideration due to requirement for additional right-of-way, relocations, and local street reconfigurations.
	Diamond interchange	Provides full freeway access to and from 92nd Avenue.	Requires removal of Dimond Blvd. interchange ramps to/from south. Precludes future system interchange ramps from Minnesota Drive.	Dimond Blvd. interchange ramps to/from south carry higher volumes than those forecasted for ramps to/from north at 92nd Avenue; therefore, a half-diamond interchange is recommended.
76th Avenue	Grade separation	Provides community access across New Seward Highway, reduces traffic on Dimond Blvd.	Existing mainline access to/from the south is eliminated; increases vehicle, pedestrian, and bicycle traffic on 76th Avenue.	Demand for mainline access from the south is high between Dimond Blvd. and Dowling Road; therefore, the half-diamond interchange is recommended.
International Airport Road	Diamond interchange	Improves access between New Seward Highway and International Airport Road.	Requires elimination of ramps to/from the north at Dowling Road and ramps to/from the south at Tudor Road.	Ramp access to New Seward Highway at International Airport Road does not justify a reduction of access to/from Tudor and Dowling Roads, both of which have a higher travel demand; therefore, a grade separation is recommended.

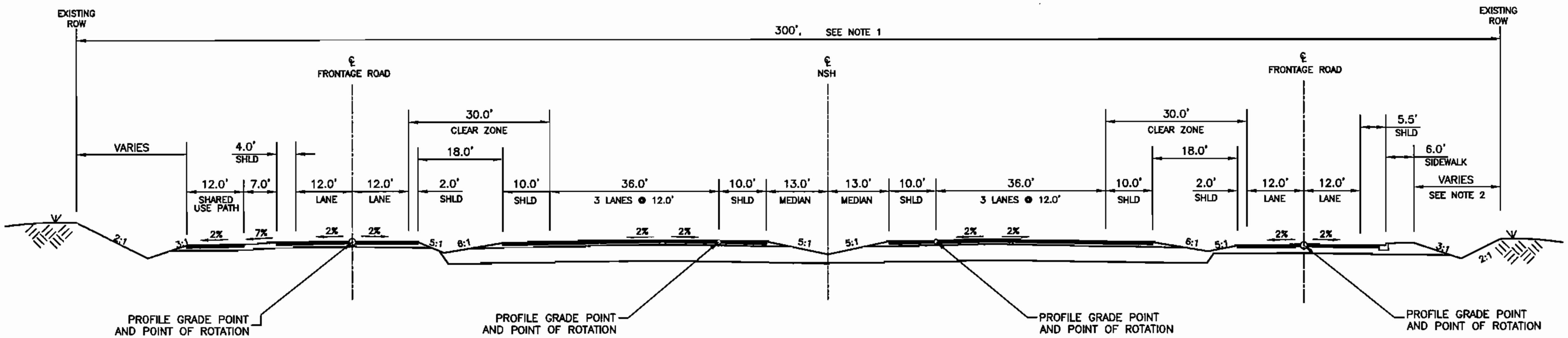
TABLE 2.4-1
Roadway Improvement Options Evaluated and Not Advanced for Consideration

Corridor Location	Description of Scenario Evaluated	Advantages	Disadvantages	Remarks
Tudor Road	Northwest quadrant loop ramp	Provides unimpeded flow for the major turning movement from westbound Tudor Road to southbound New Seward Highway.	Loop ramp requires large area and major right-of-way impact in northwest quadrant. Tudor Road over New Seward Highway requires down grade on minimum radius ramp.	Dual left turns provide adequate capacity for the westbound to southbound movement within existing right-of-way; therefore, the diamond interchange is recommended.
	Realignment of the freeway to the east in conjunction with the northwest quadrant loop ramp	Provides unimpeded flow for the major turning movement from westbound Tudor Road to southbound New Seward Highway	Loop ramp requires large area; mainline realignment introduces reverse curvature on mainline.	Dual left turns provide adequate capacity for westbound to southbound movement within existing right-of-way; therefore, the diamond interchange is recommended.
	Hook ramps in the northeast and southeast quadrants	Provides adequate distance between the two ramp intersections with Tudor Road to maintain traffic flow and eliminates the need to widen the Tudor Road bridge.	To accommodate the International Airport Road interchange, the southbound ramp for traffic entering New Seward Highway from Tudor Road and the northbound ramp for traffic exiting New Seward Highway at Tudor Road are removed.	Dual left turns provide adequate capacity for westbound to southbound movement within existing right-of-way; therefore, the diamond interchange is recommended.
	Flyover—westbound Tudor Road to southbound New Seward Highway	Provides unrestricted traffic flow on an elevated ramp structure from westbound Tudor Road to southbound New Seward Highway.	Poor ramp geometrics; not consistent with driver expectations; additional right-of-way needed in northeast quadrant.	Dual left turns provide adequate capacity for westbound to southbound movement within existing right-of-way; therefore, the diamond interchange is recommended.

TABLE 2.4-1
Roadway Improvement Options Evaluated and Not Advanced for Consideration

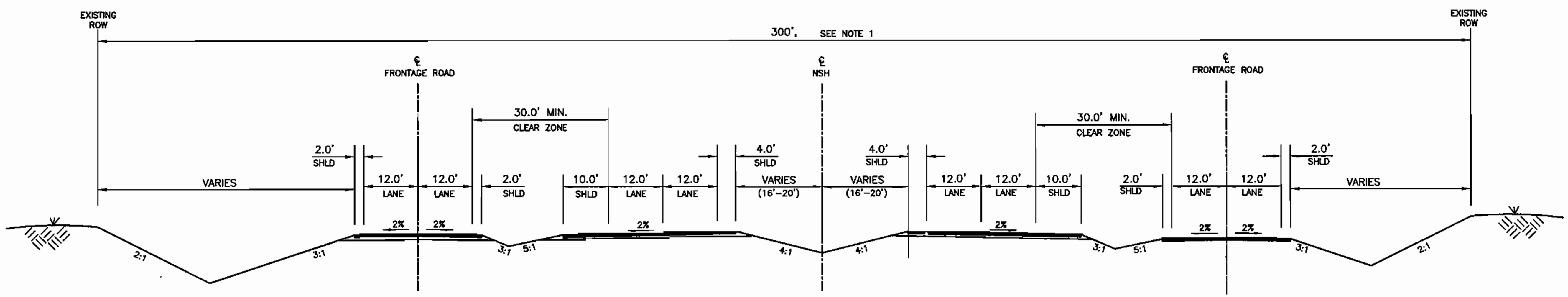
Corridor Location	Description of Scenario Evaluated	Advantages	Disadvantages	Remarks
	Single-point urban interchange	A single signalized intersection controls all turning; small interchange footprint.	Not consistent with driver expectations or mainline future expansion to eight lanes.	Operationally this interchange is very similar to a "tight diamond" configuration; however, the tight diamond is more consistent with other interchanges within the corridor and allows for future mainline expansion.
Frontage roads	Two-way traffic with roundabouts at ramp junctions	Improved local access; less out-of-direction travel.	Truck turn radii and pedestrian safety concern for roundabouts; does not provide continuous two-way operations through interchanges.	Because the two-way configuration would only serve local movements between interchanges, one-way operations are recommended to be maintained.
New Seward Highway mainline	Eight-lane freeway expansion	Provides additional northbound and southbound traffic capacity.	Requires lane expansion to the interior median.	Eight lanes are not needed to meet 2035 travel demand. Build Alternative does not preclude this option in the future.

[a] Minnesota Drive is a controlled-access four-lane divided highway that currently transitions to an arterial before reaching the Old Seward Highway and becoming O'Malley Road. The *Minnesota Drive Extension DSR* (DOT&PF, 1978) originally planned and purchased right-of-way for the extension of controlled access to New Seward Highway and a system interchange between the two facilities.



BUILD ALTERNATIVE TYPICAL SECTION

NTS



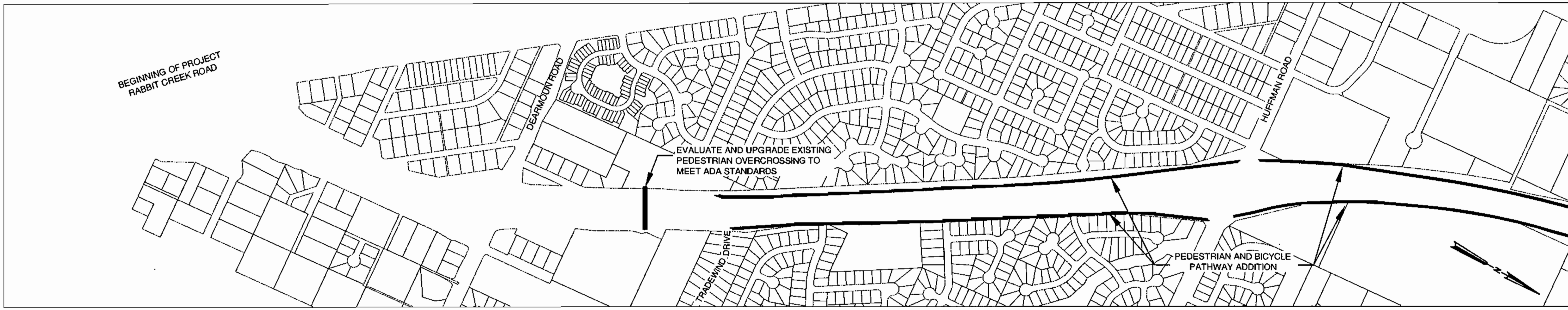
EXISTING HIGHWAY TYPICAL SECTION

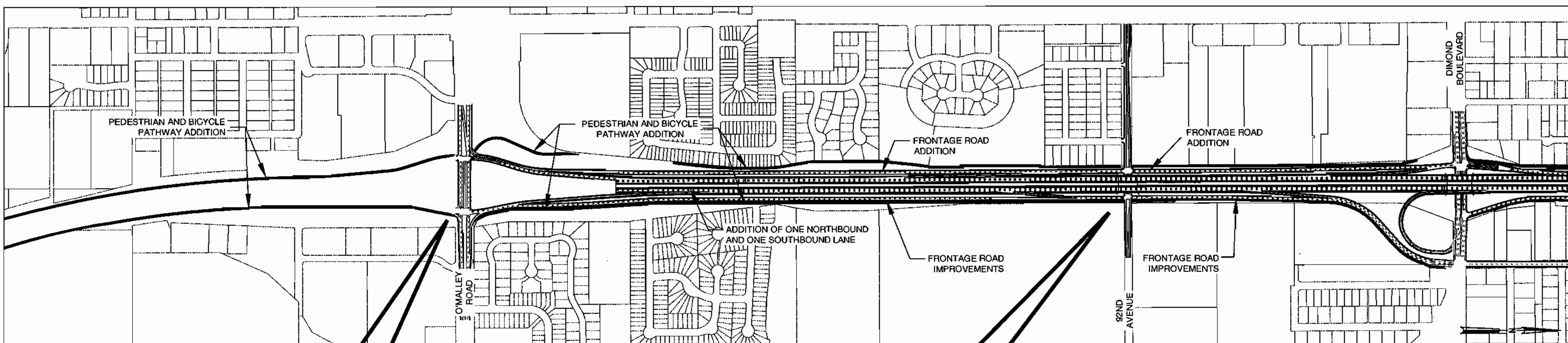
NTS

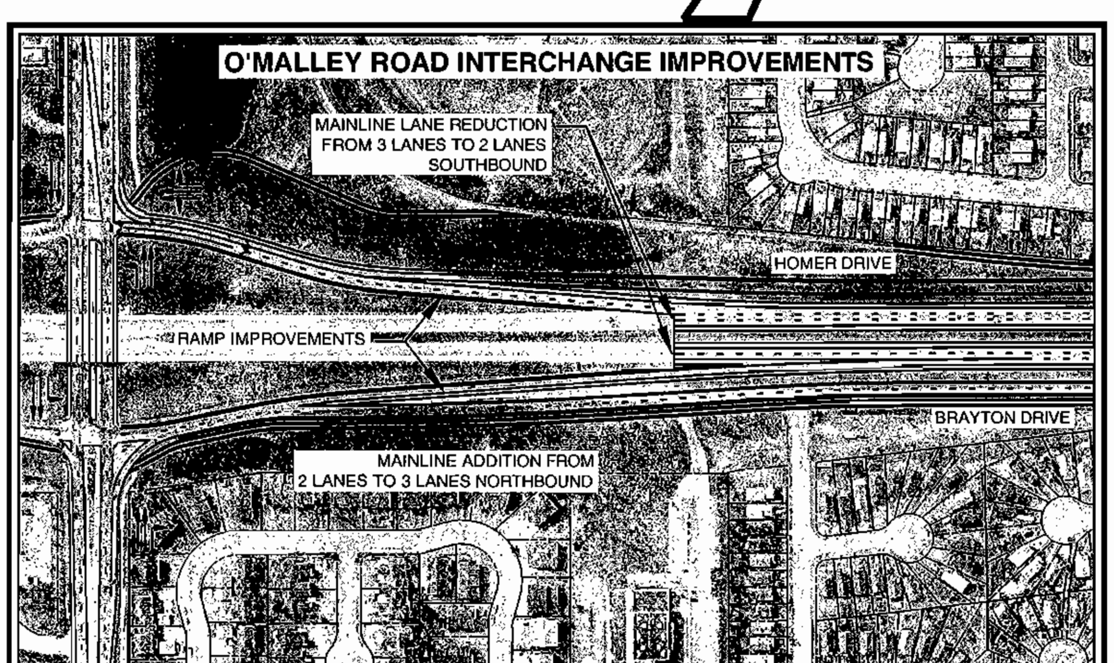
NOTES:

1. ROW WIDTH VARIES ALONG THE CORRIDOR. TYPICAL CORRIDOR WIDTH RANGES BETWEEN 280 – 320 FOOT INCLUDING THE MAINLINE AND FRONTAGE ROADS.
2. ADDITIONAL STRIPS OF RIGHT OF WAY ARE REQUIRED IN SOME LOCATIONS TO ACCOMMODATE THE FRONTAGE ROAD CONSTRUCTION LIMITS.

FIGURE 2.2–1
BUILD ALTERNATIVE
TYPICAL SECTION







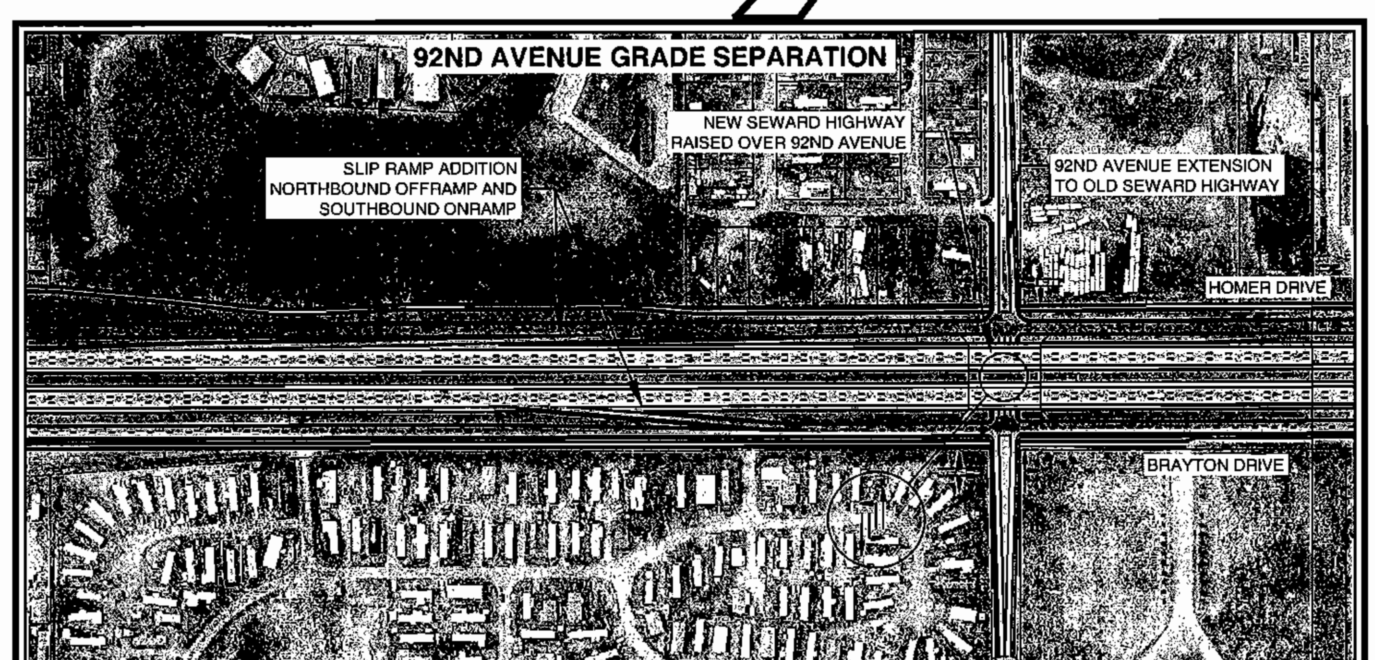


FIGURE 2.2-2
BUILD ALTERNATIVE
RABBIT CREEK RD. TO DIMOND BLVD.

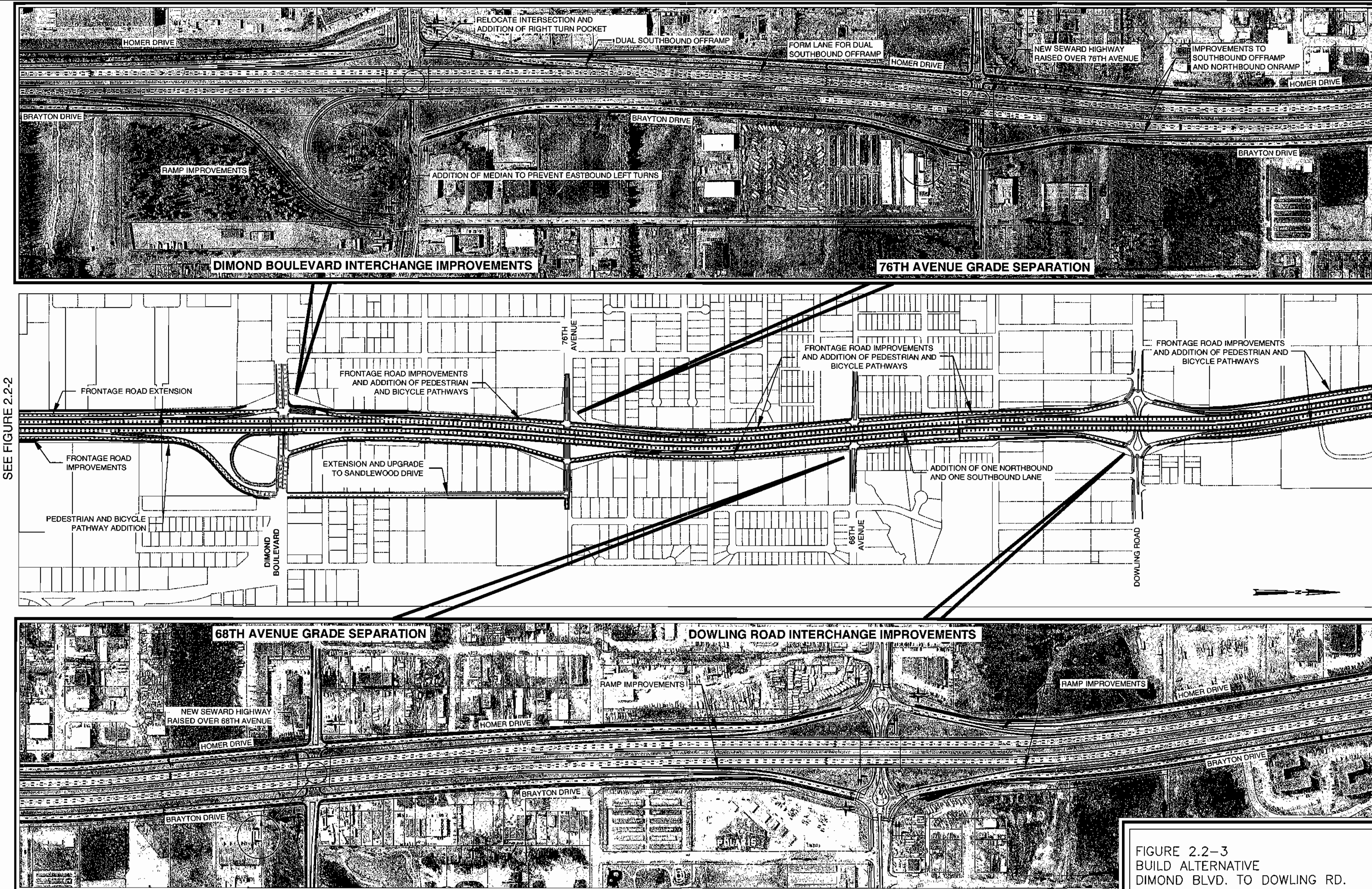
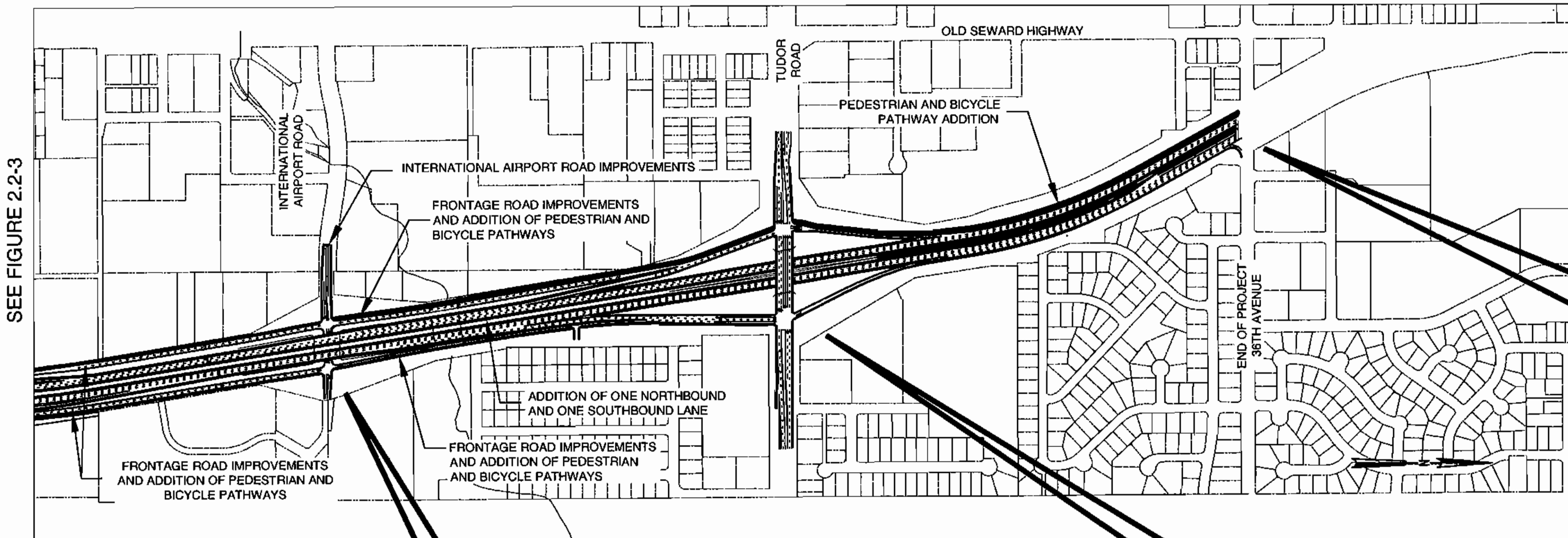
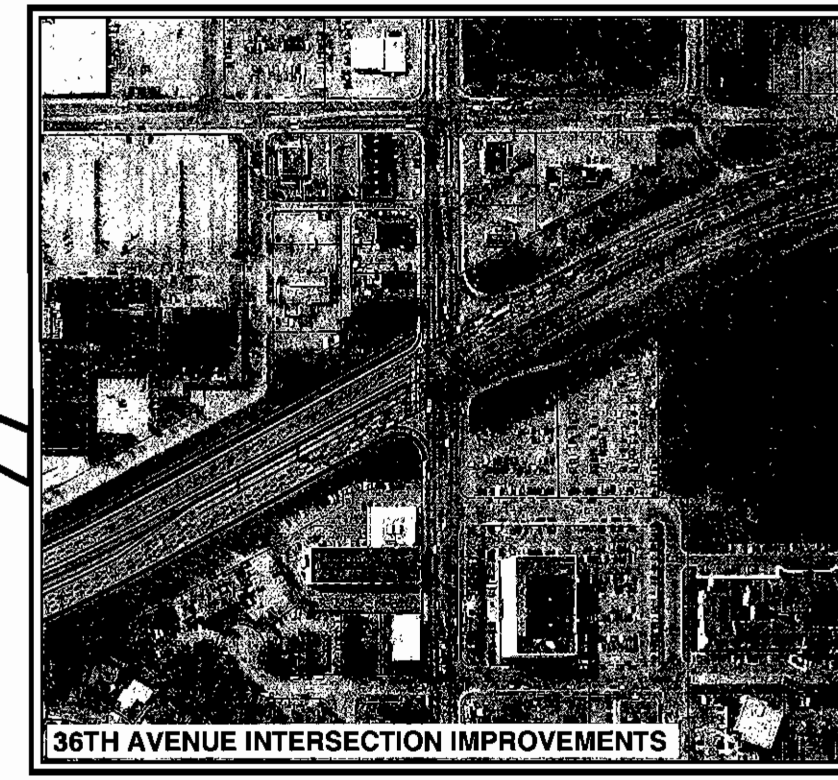


FIGURE 2.2–3
BUILD ALTERNATIVE
DIMOND BLVD. TO DOWLING RD.





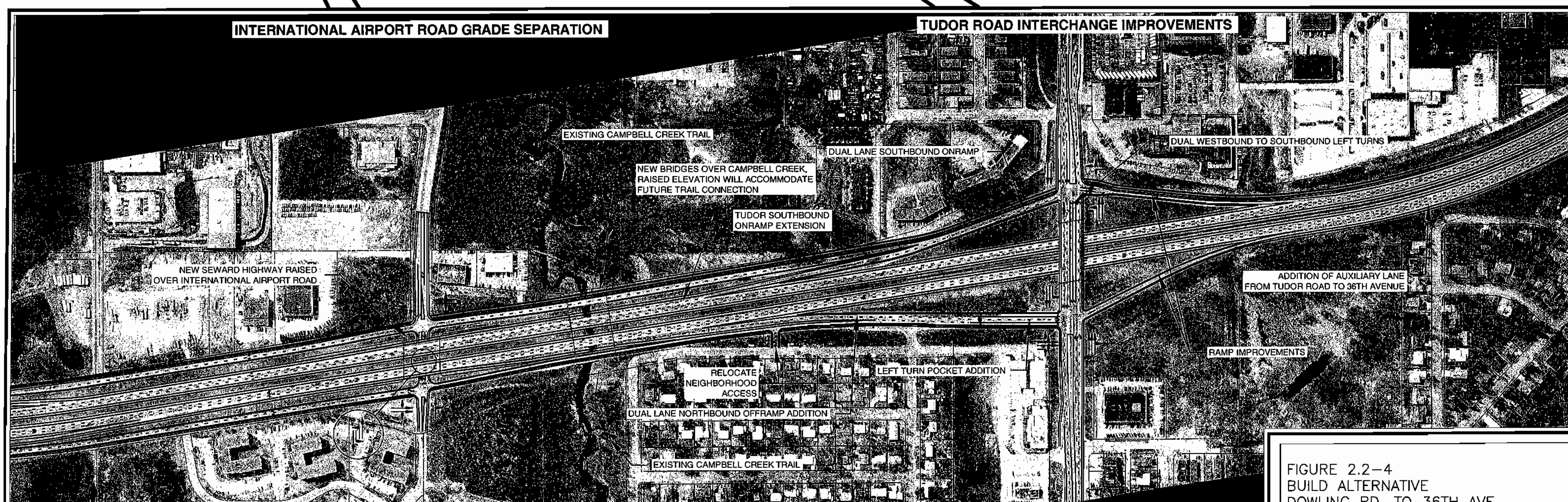


FIGURE 2.2–4
BUILD ALTERNATIVE
DOWLING RD. TO 36TH AVE.

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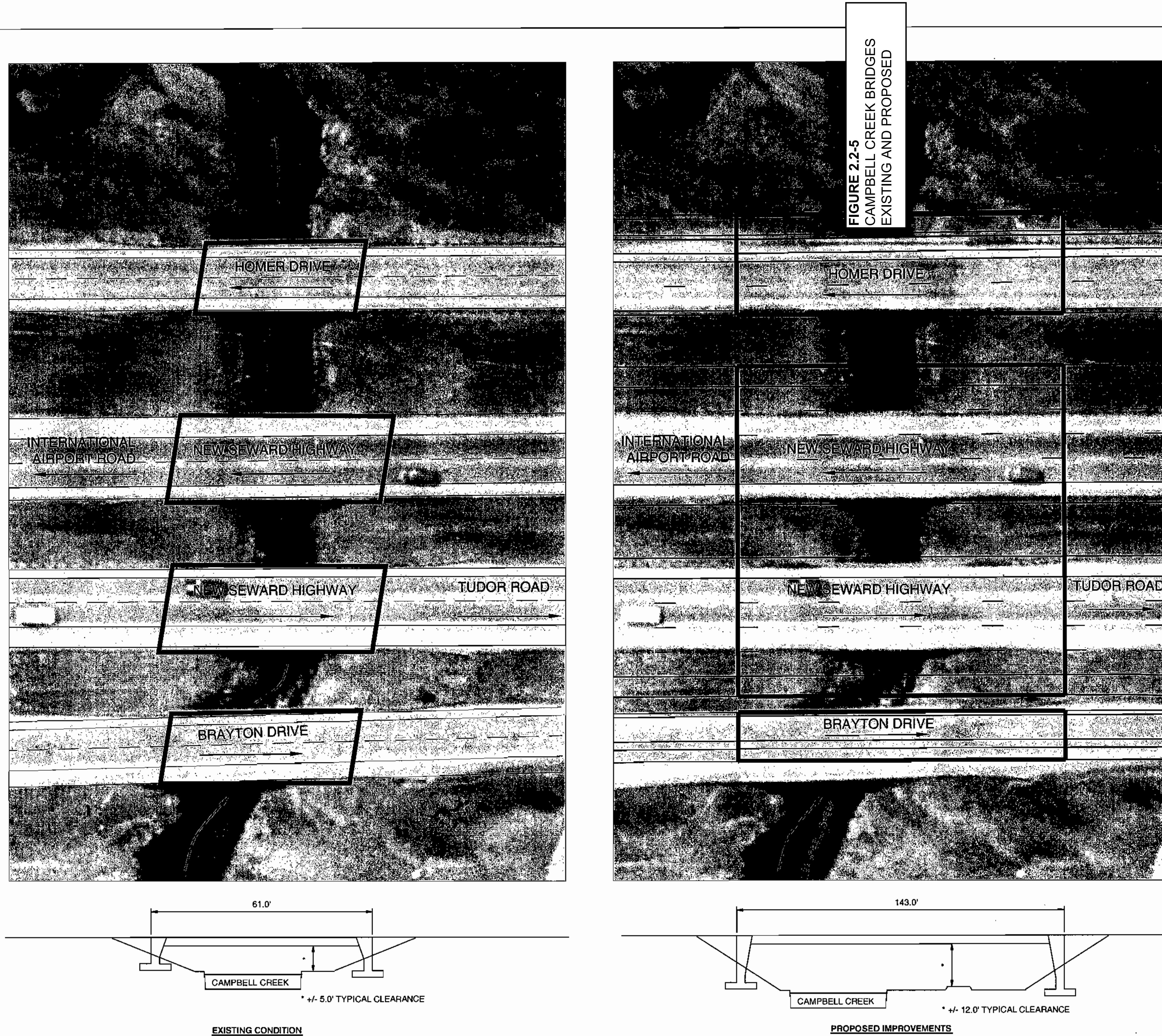


FIGURE 2.2-5
CAMPBELL CREEK BRIDGES
EXISTING AND PROPOSED

CHAPTER 3

Affected Environment

3.1 Overview of the Municipality of Anchorage and Study Area

3.1.1 The Municipality of Anchorage

The Municipality of Anchorage (MOA) encompasses nearly 2,000 square miles at the head of Cook Inlet in Alaska. More than 80 percent of Anchorage's 260,000 residents live within the Anchorage Bowl, which is bordered by Knik Arm to the northwest, Turnagain Arm to the southwest, Elmendorf Air Force Base to the north, and Fort Richardson Military Reservation and Chugach State Park to the east (see Figure 3.1-1). The majority of the MOA occupies a lowland plain at the base of the Chugach Mountains.

The climate of Anchorage is considered cold and semi-arid. The city receives an average of 15.8 inches of precipitation each year, which includes an average snowfall of 70 inches. Average monthly temperatures for the area range from 9°F in January to 65°F in July (Desert Research Institute, 2005).

The lowland plain on which the MOA lies is a relatively level area with some ridges and isolated small hills. Elevations on the plain increase from almost 100 feet at the coastal bluffs to about 500 feet near the base of the adjacent mountains. The low-lying plain is separated from the sea by steep bluffs that reach 150 to 200 feet in height. Only in narrow valleys along the primary drainages does the land approach sea level with a relatively flat gradient. One of the major drainages, Campbell Creek, crosses the New Seward Highway alignment.

Anchorage was founded in 1915 as the construction headquarters for the Alaska Railroad and in 1920 was incorporated as a city. The arrival of troops in Anchorage in 1940 marked the beginning of two decades of growth based on military expansion (MOA, 1996a). Although the Kenai oil boom of the 1950s led to statehood in 1959, Alaska's economy was dominated by the federal government, which accounted for half of the approximately 90,000 jobs in the state. The federal government (specifically, the military) remained the dominant source of employment for Anchorage residents until oil was discovered at Prudhoe Bay in 1968. The discovery of oil ushered in a new era of development in Alaska resulting from the large-scale activities necessary to develop the resources and the further expansion of the state tax base.

As a result of the ensuing oil boom, Anchorage's economy was altered fundamentally. Alaska's economy in the 1970s was dominated by construction of the trans-Alaska pipeline. Several years of very rapid economic growth coincided with pipeline construction. In 1975, Anchorage voters approved a charter that unified the former City of Anchorage and the Greater Anchorage Area Borough to become the MOA.

Anchorage is now headquarters to two-thirds of Alaska's largest businesses, including all of the major oil companies. The city is at the center of the Alaska's air, highway, rail, and water transportation networks. Anchorage International Airport is one of the busiest cargo airports in the United States.

One in four Anchorage jobs is with the federal, state, or local government. In addition, Anchorage has two major military installations, Elmendorf Air Force Base and Fort Richardson.

3.1.2 New Seward Highway Study Area

New Seward Highway is a four-lane, controlled-access facility from Rabbit Creek Road to the 36th Avenue at-grade intersection. This 7.1-mile portion of New Seward Highway has diamond interchanges at spacing of 1 to 1.5 miles. The entire Seward Highway, including the length in the study area (shown in Figure 3.1-1), is designated as an interstate highway by the Federal Highway Administration (FHWA).

New Seward Highway is the primary north-south traffic carrier for the Anchorage Bowl. This centrally located freeway provides important transportation functions for Southcentral Alaska residents, commercial goods movement, and visitors. It also connects other parts of Alaska north and south and provides a highway link to and from the state.

If the build alternative is selected for construction, New Seward Highway would be improved from Rabbit Creek Road (southern terminus of the project) north to 36th Avenue (northern terminus of the project). The proposed project would include improvements to the mainline roadway, frontage roads, pathways, and interchanges.

3.2 Water Quality

Water quality is regulated by the U.S. Environmental Protection Agency (EPA), under Sections 401, 402, and 404 of the Clean Water Act and the Alaska Department of Environmental Conservation (ADEC), under Title 18, Chapter 70, of the *Alaska Administrative Code* (18 AAC 70), Water Quality Standards. The MOA and DOT&PF have been issued an MS4 permit (Permit No. AKS-05255-8) under section 402 of the Clean Water Act for the municipal separate storm sewer system within the corporate boundary of the MOA to discharge from storm sewer system outfalls to receiving waters listed in the permit. This permit includes DOT&PF rights-of-way inside this boundary. All creeks discussed in this section are receiving waters included in this MS4 permit. See Appendix A of the *New Seward Highway, Rabbit Creek to 36th Avenue, Preliminary Engineering Report* (CH2M HILL, 2004).

Ground water in the area varies in depth and quality, and is extracted by using local wells. Both public and private systems supply drinking water from these wells. The MOA has incorporated wellhead protection requirements into *Anchorage Municipal Code*, Chapter 15.55, Water Wells. ADEC uses 18 AAC 80, Drinking Water, Sections 15 and 20, to provide wellhead protection requirements for public drinking water systems. There are no wellhead protection zones within the project corridor. No EPA sole source aquifers have been identified in the project area.

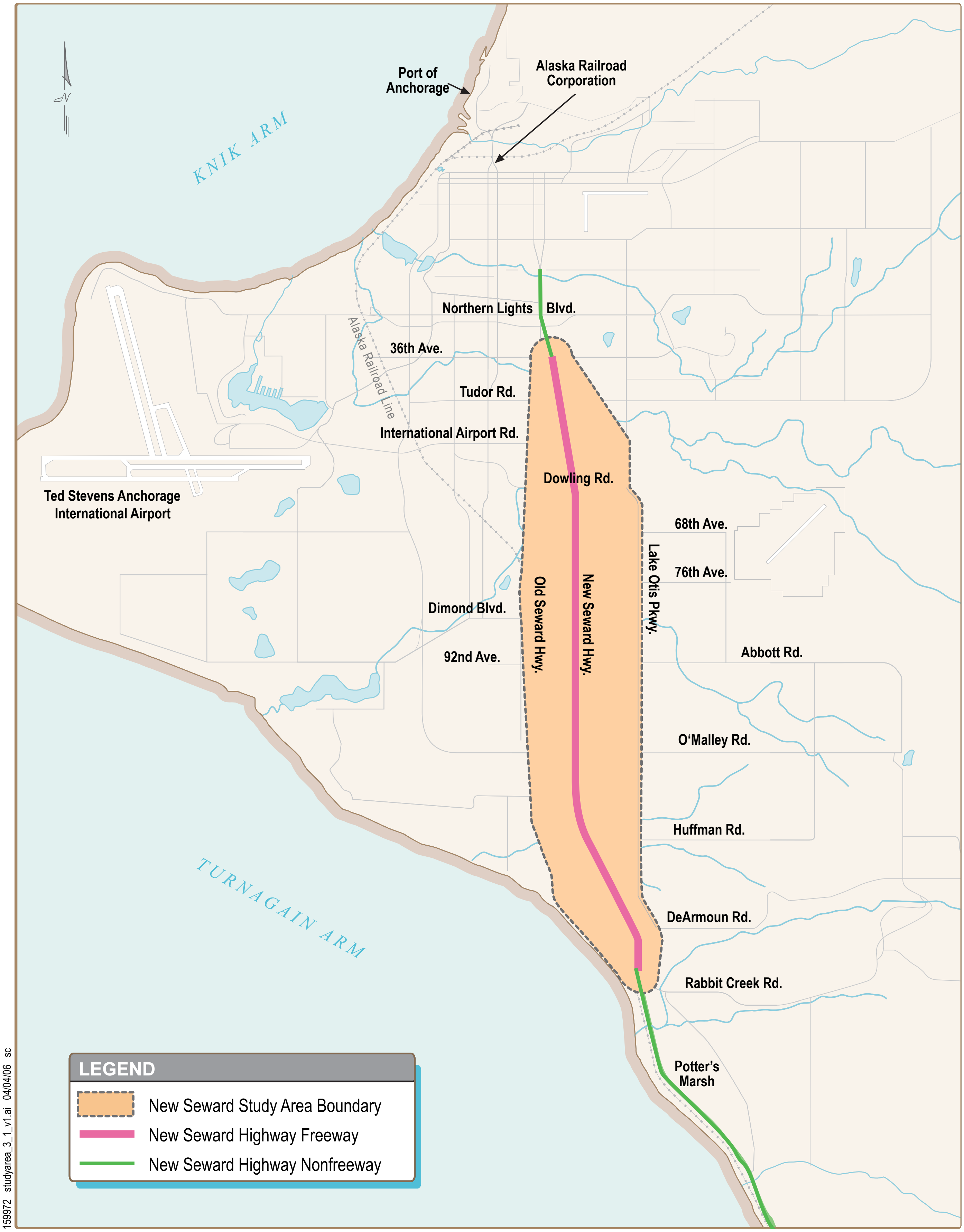


FIGURE 3.1-1

New Seward Highway Corridor, Rabbit Creek Road to 36th Avenue, Study Area

The remainder of this section describes the existing conditions for creeks crossing the New Seward Highway that would be affected by project construction. The creeks are the South Fork of Little Campbell Creek, North Fork of Little Campbell Creek, Campbell Creek, and Fish Creek. Furrow Creek is not included in this discussion (see below). The information on these creeks was identified through a review of current and historical data for water quality and quantity.

Furrow Creek is another creek that flows under New Seward Highway. This small creek crosses the highway at Huffman Road, south of the proposed lane and ramp additions and is contained in a buried storm drain system upstream and downstream of the project corridor. Because this existing storm drain system would not be expected to be affected by the proposed project and the proposed trail improvements would result in nominal additions to impervious surface and overland flow, the existing conditions of Furrow Creek were not evaluated.

In July 2003, select water quality parameters and flow were measured in each creek just upstream of the location at which it flows under New Seward Highway. Samples were collected during a period of dry weather so that baseline conditions could be established in each creek. Water quality studies of the Campbell Creek and Fish Creek drainage basins conducted by the U.S. Geological Survey (USGS) and MOA were also reviewed to obtain historical flow and water quality data in the vicinity of each creek crossing (James M. Montgomery Consulting Engineers, 1986 and 1987; USGS, 2003). Current and historical results were then compared to State of Alaska water quality criteria to assess the overall water quality. See Appendix A for tables with the water quality sampling data.

All of these creeks, except the main stem of Campbell Creek, are impaired water bodies. They are listed by the ADEC, in Category 5 of *Alaska's Final 2002/2003 Integrated Water Quality Monitoring and Assessment Report* (2003), which encompasses the 303(d) list of impaired water bodies. The impairment is for fecal coliform bacteria pollution, with the source being urban runoff. EPA approved Total Maximum Daily Loads (TMDLs) have been established by the ADEC for fecal coliform loading in each creek discussed in this section, except the main stem of Campbell Creek.

3.2.1 South Fork of Little Campbell Creek

Little Campbell Creek is a tributary to the much larger Campbell Creek that runs across the Anchorage Bowl from the Chugach Mountains to Campbell Lake and ultimately into Turnagain Arm. The creek flows through a 15-square-mile drainage area to its confluence with Campbell Creek at the Alaska Railroad crossing near Nathan Drive and 72nd Avenue (James M. Montgomery Consulting Engineers, 1986).

The South Fork of Little Campbell Creek is the primary stem of Little Campbell Creek, and the North Fork acts as the principal tributary of the creek. The South Fork Creek crosses New Seward Highway just south of 80th Avenue (Figure 3.2-1). The creek is conveyed westerly under New Seward Highway in a series of 54-inch culverts of corrugated metal pipe that span the main highway and the eastern and western frontage roads. West of New Seward Highway, the creek flows northwest until it joins with the North Fork of Little Campbell Creek just west of Old Seward Highway at 74th Avenue.

Water quality and flow data were collected during the July 2003 monitoring event directly upstream of the point where the South Fork of Little Campbell Creek crosses New Seward Highway (Figure 3.2-2). Specifically, water samples and flow measurements were obtained at the upstream end of the 54-inch corrugated metal pipe culvert that conveys the creek under Brayton Drive, a frontage road directly east of the highway (Figure 3.2-3). All water quality parameters measured during this event had concentrations within the limits established by current State of Alaska water quality standards, except for dissolved oxygen and fecal coliform. Dissolved oxygen was measured at 6.41 milligrams per liter (mg/L), slightly below the 7 mg/L minimum standard required for the growth and propagation of fish, shellfish, and aquatic life. Fecal coliform was measured at 270 colonies per 100 milliliters (mL), exceeding the water quality standard of 200 colonies per 100 mL for primary contact recreation.

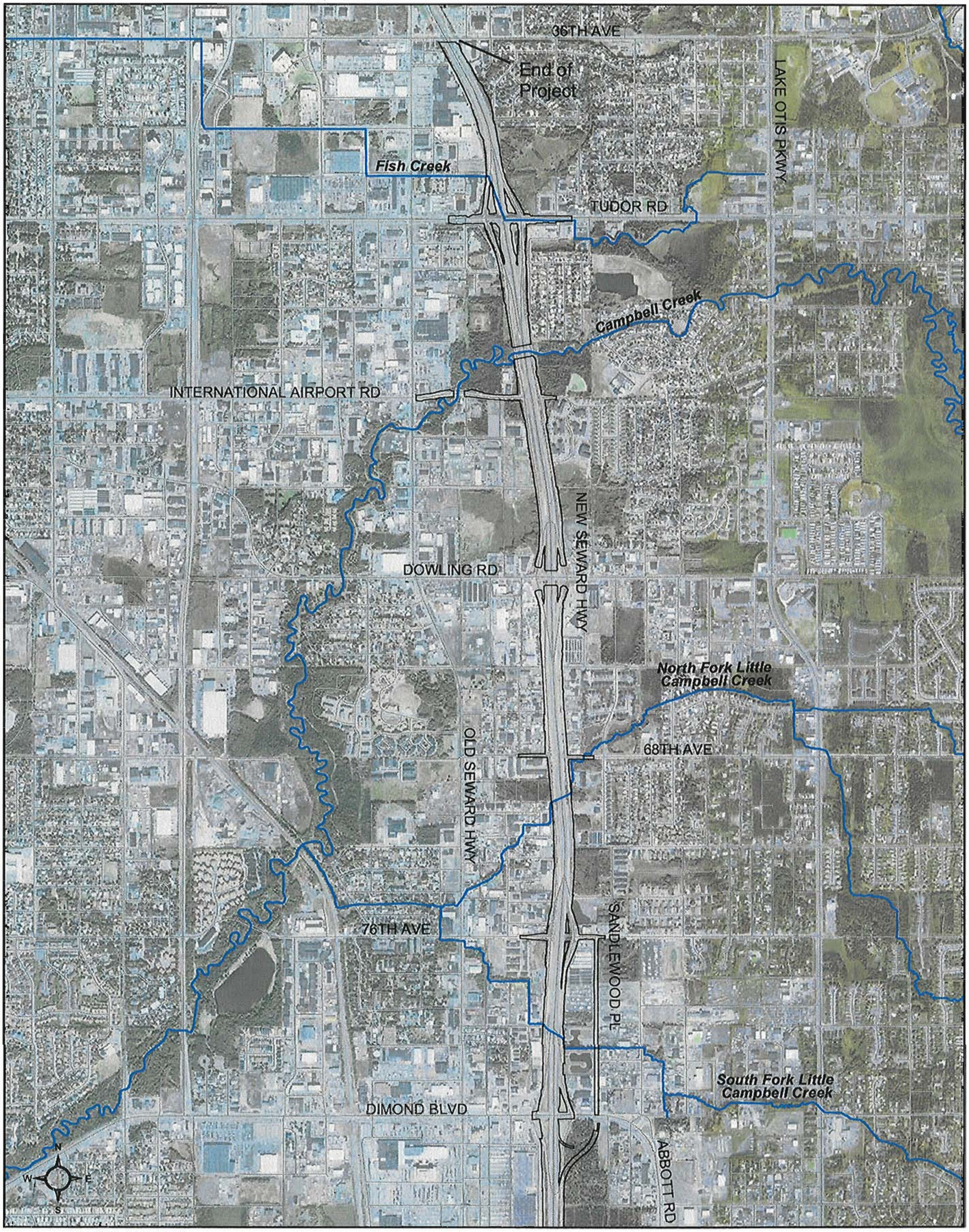
A flow rate of 0.4 cubic feet per second (cfs) was recorded in the South Fork of Little Campbell Creek at the time of sample collection. This flow, which is considerably less than the historical range of flows recorded in this reach of the creek, can be attributed to a period of unusually dry weather that preceded the sampling event. Two large sedimentation basins that discharge into the South Fork of Little Campbell Creek just upstream of the Brayton Drive culvert were observed to have no flow at their respective outfalls. Water marks on the inside wall of the 54-inch culvert where the samples were collected indicated that flow in the creek was considerably less than average.

Water quality and flow data were collected during a 1986 study upstream of the point where the South Fork of Little Campbell Creek crosses New Seward Highway (James M. Montgomery Consulting Engineers, 1987). These data were collected at USGS Station 15274530, which was in operation at an industrial park east of Dimond Boulevard and west of Lake Otis Parkway from May to September 1986 (Figure 3.2-2). When compared to current State of Alaska water quality standards, historical pH and fecal coliform concentrations were found to exceed standards for aquatic life and primary contact water recreation, respectively. The pH exceeded current Alaska water quality standards once by a tenth of a pH unit, and fecal coliform standards were exceeded on five occasions. Flow data collected during the 1986 study ranged from 0.8 to 3 cfs, with 3 cfs representing flow from a storm having a return interval of less than a year (James M. Montgomery Consulting Engineers, 1987).

Similar to findings for the North Fork of Little Campbell Creek, the water quality in the South Fork of Little Campbell Creek has not changed significantly since the 1986 water quality study was performed. A comparison of 1986 and 2003 water quality data indicates that pH, total suspended solids, and fecal coliform concentrations have remained relatively consistent through the years. The most significant change in water quality in the South Fork of Little Campbell Creek may be attributed to the concentration of dissolved oxygen in the creek; in 1986, the average dissolved oxygen concentration was 11.2 mg/L whereas the concentration measured in 2003 was 6.41 mg/L.

3.2.2 North Fork of Little Campbell Creek

The North Fork of Little Campbell Creek, which is the primary tributary to Little Campbell Creek, crosses New Seward Highway between 69th and 70th avenues (Figure 3.2.-1). The creek flows under the highway in a southwesterly direction through a combination of



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Proposed Footprint

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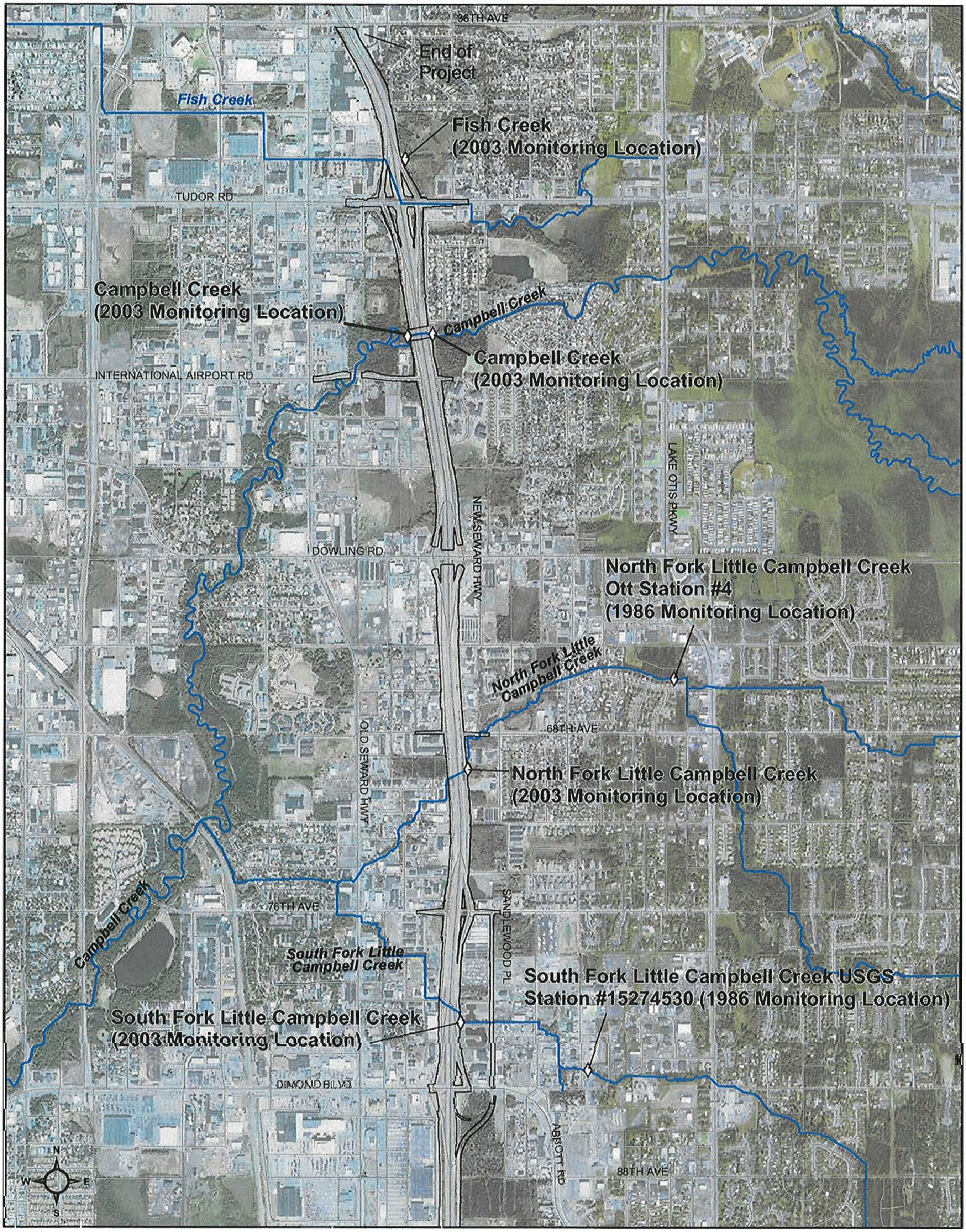
FIGURE 3.2-1
New Seward Highway Corridor Showing South and North Forks of Little Campbell Creek, Campbell Creek, and Fish Creek



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◊ Water Quality Monitoring Locations

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FIGURE 3.2-2
Monitoring Stations on South and North Forks of Little Campbell Creek, Campbell Creek, and Fish Creek

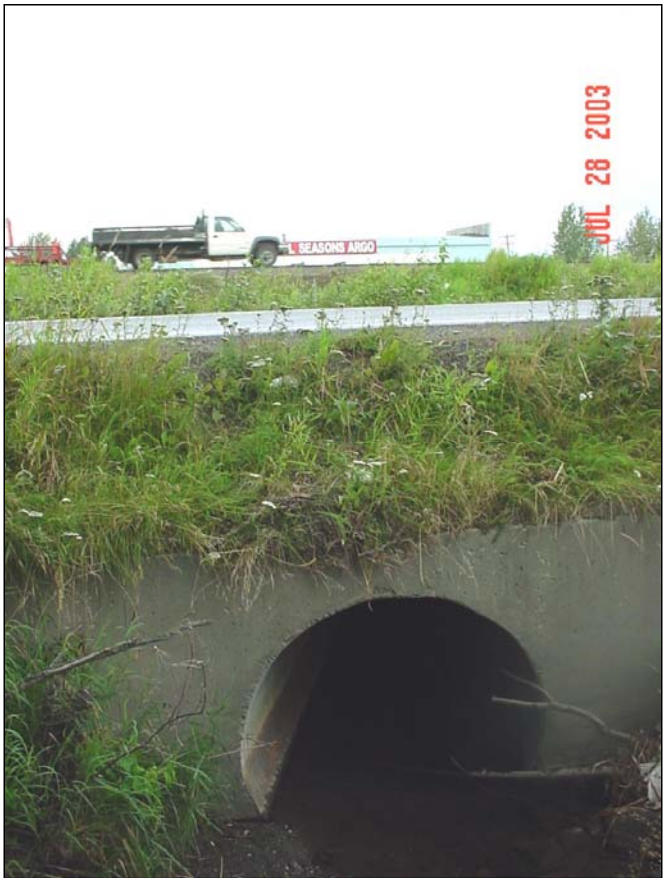


FIGURE 3.2-3
Photograph of Sampling Location on South Fork of Little Campbell Creek (July 2003)

FIGURE 3.2-4
Photograph of Sampling Location on North Fork of Little Campbell Creek (July 2003)

corrugated metal pipes and pipe arches. Thirty-six-inch corrugated metal pipes and 50-inch by 31-inch corrugated metal pipe arches laid in parallel are used to convey the creek under Brayton Drive and Homer Drive (frontage roads located on the east and west sides of New Seward Highway, respectively). Two 36-inch corrugated metal pipes that are also laid in parallel are used to convey the creek under the mainline of New Seward Highway. Once the North Fork of Little Campbell Creek passes under Homer Drive, the creek continues to flow southwest until reaching its confluence with the South Fork of Little Campbell Creek just west of Old Seward Highway at 74th Avenue.

Water quality and flow data were collected during the July 2003 monitoring event directly upstream of the point where the North Fork of Little Campbell Creek crosses New Seward Highway (Figure 3.2-2). Water samples and flow measurements were obtained at the upstream end of the 50-inch by 31-inch corrugated metal pipe arch that conveys the creek under Brayton Drive (Figure 3.2-4). Field measurements were not collected at the 36-inch corrugated metal pipe located next to the corrugated metal pipe arch because this culvert was partially blocked and appeared to have been without flow for some time.

Iron and fecal coliform concentrations exceeded the State of Alaska water quality standards for deleterious organic and inorganic substances and primary contact recreation, respectively. Iron was measured at 1,100 micrograms per liter (µg/L), exceeding the 1000 µg/L standard, and fecal coliform was measured at 210 colonies per 100 mL, slightly higher than the 200 colonies per 100 mL standard. The flow rate of 0.3 cfs measured at the time of sample collection appears to be within the range of historical flow rates recorded in this reach of the North Fork of Little Campbell Creek.

Historical water quality and flow data associated with the North Fork of Little Campbell Creek crossing at New Seward Highway were collected during a 1986 study (James M. Montgomery Consulting Engineers, 1986) at Ott Station 4 from July 16, 1986, to September 25, 1986 (Appendix A, Table A-2). Ott Station 4, which is the closest historical monitoring station upstream of the New Seward Highway creek crossing, was located just west of Lake Otis at East 66th Avenue and O'Brien Street, below the confluence of the north and south branches of the North Fork (see Figure 3.2-2). This monitoring station, as well as several others (including the station on the South Fork of Little Campbell Creek described in Section 3.2.1), was installed as part of the 1986 study that was designed to find specific sources of pollution to Little Campbell Creek.

When compared to current State of Alaska water quality standards, the historical pH, fecal coliform, and iron concentrations exceeded standards for aquatic life, primary contact water recreation, and toxic and other deleterious substances. The pH exceeded current Alaska water quality standards on five different occasions (average exceedance was 0.4 pH units below the lower limit of 6.5 units); fecal coliform standards were exceeded twice; and iron standards were exceeded three times. Flow data collected at Ott Station 4 during the 1986 study period ranged from 0.16 to 2.02 cfs (James M. Montgomery Consulting Engineers, 1987).

A comparison of 1986 and 2003 water quality data indicates that the water quality in the North Fork of Little Campbell Creek has not changed significantly in the last 17 years. Total suspended solids, dissolved lead, iron, fecal coliform, oil and grease, and nitrate concentrations in 2003 were very similar to concentrations measured in 1986. Specific conductance, pH, total dissolved solids, and hardness concentrations were found to be slightly higher than those measured in 1986, whereas chloride concentrations were almost double the amounts found during the 1986 study. Dissolved oxygen and dissolved zinc were the only parameters found to decrease in 2003, with the dissolved zinc concentration being considerably lower than those concentrations measured in 1986 (Appendix A, Table A-2).

3.2.3 Campbell Creek

Campbell Creek and its tributaries drain a large portion of the central and southcentral Anchorage area (Federal Emergency Management Agency [FEMA], 2002). The main stem of Campbell Creek is approximately 8 miles long and begins at the confluence of the North Fork and South Fork of Campbell Creek (located 1.8 miles upstream of New Seward Highway; see Figure 3.2-1). The creek crosses under the New Seward Highway Campbell Creek bridges north of International Airport Road, just south of Rakof Avenue. A large portion of the creek main stem is bounded on either side by parkland referred to as the Campbell Creek Greenbelt.

Water quality and flow data were collected on July 23, 2003, directly upstream of the Brayton Drive bridge crossing at Campbell Creek (Figure 3.2-2). When compared to other New Seward Highway creek crossings under investigation, Campbell Creek had the best overall water quality because none of the water quality parameters measured exceeded current State of Alaska water quality criteria. A flow rate of 52.2 cfs was recorded in Campbell Creek at the time of sample collection.

FIGURE 3.2-5
Photograph of Sampling Location on Campbell Creek (July 2003)

Historical water quality and flow data were collected at USGS Station 15274395 from August 1999 to August 2000 (USGS, 2003). This station was located approximately 100 feet upstream of the New Seward Highway crossing at nearly the same location on Campbell Creek where water quality and flow were measured in 2003 (Figure 3.2-5). Similar to the 2003 results, none of the water quality parameters measured from 1999 to 2000 exceeded current State of Alaska water quality standards. Flow measured in Campbell Creek as part of the 1999 to 2000 study ranged from 13 cfs (prior to breakup) to 101 cfs (summer rainfall event).

3.2.4 Fish Creek

Fish Creek, with headwaters near Tudor Road and Lake Otis Parkway, flows westerly, then northerly, before emptying into Knik Arm, a branch of Cook Inlet. The overall length of the creek is approximately 6.3 miles, not including the small feeder streams and drainages that discharge into the creek. Fish Creek has been diverted, relocated, buried, and channelized to accommodate urban development in Anchorage. Because of its swampy origins and numerous diversions, the creek channel is intermittent throughout a great part of its course (FEMA, 2002).

Directly upstream of New Seward Highway, Fish Creek flows above ground through a 13-acre undeveloped wetland area before being conveyed under the highway inside a 48-inch corrugated metal pipe (Figure 3.2-6). Water quality samples and flow measurements were not obtained from Fish Creek in 2003 because of the absence of flow

FIGURE 3.2-6
Stagnant Water at Inlet to New Seward Highway Culvert Crossing at Fish Creek (July 2003)

through the culvert. A period of dry weather that preceded the sampling event is likely the reason why flow was not observed in the culvert at the time.

A search of historical documents and records was performed to gather additional water quality and flow data for Fish Creek. This search revealed that neither stream gaging nor water quality data have been collected at Fish Creek in the past, and no flow records exist for the creek.

3.2.5 Highway Drainage

In general terms, the runoff from virtually all of the existing road drains to or is discharged through one or more of the following: (1) grassed roadside ditches, (2) median ditches and drainage swales to culverts, and (3) ditches or drop inlets to existing creeks that cross under the highway. Two of these creeks are piped through the highway in storm drain systems; the remaining three creeks cross under the highway in culverts or under bridges.

From the Rabbit Creek Road interchange to the DeArmoun Road pedestrian overcrossing the highway drains to the south using grassed ditches, swales, and the center median, with drainage discharging to open vegetated areas west of the road (see Figure 3.2-7). From the DeArmoun Road pedestrian overcrossing to the Huffman Road interchange, drainage from the road ditches and center median flows north, discharging into the underground Furrow Creek storm drain system, which flows west on the south side of Huffman Road. From Huffman Road to Klatt Road (approximately halfway to the O'Malley Road interchange), the drainage flows south to the underground Furrow Creek storm drain system. From Klatt Road to the O'Malley Road interchange, drainage from roadside ditches and the center median flows north to an underground storm drain system on the south side of O'Malley Road, then flows west along O'Malley Road to the mud flats of Turnagain Arm.

From the O'Malley Road interchange area to Dimond Boulevard, the drainage flows to an underground storm drain system with inlets at 92nd Avenue, North Goldenberry Avenue, and Goldenberry Avenue, all of which direct the flow west, eventually into Campbell Creek. From the Dimond Boulevard interchange to 76th Avenue, the highway drains north and south to the South Fork of Little Campbell Creek. From 76th Avenue to 62nd Avenue, the highway drains north, with drainage discharging to the North Fork of Little Campbell Creek. From 62nd Avenue to 46th Avenue, including the Dowling Road interchange, the drainage flows north through a combination of grassed swales, ditches, culverts, and underground piping, discharging to Campbell Creek. Campbell Creek crosses the project corridor in an open creek channel under four parallel bridges and discharges to Turnagain Arm. From 46th Avenue to and including the Tudor Road interchange, drainage flows north into Fish Creek. Fish Creek currently flows across the project corridor in an underground storm drain system. From the Tudor Road interchange to 36th Avenue, drainage flows north to a storm drain system at 36th Avenue that flows west along the north side of 36th Avenue, eventually to Fish Creek, and finally to Knik Arm.

3.2.6 Summary

Data collected for this environmental document have provided the following information:

- The South Fork of Little Campbell Creek, North Fork of Little Campbell Creek, and Campbell Creek have generally good water quality.
- Bacteria, as measured by fecal coliform, were detected in all of the creeks, which is typical in developed areas. The primary contact standard for water recreation of 200 colonies per 100 mL was exceeded in 47 percent of the surface water samples (historical and 2003 samples combined). Exceedances of the primary contact standard occurred at the South Fork and North Fork of Little Campbell Creek but not at Campbell Creek. Little Campbell Creek (north and south forks), Fish Creek, and Furrow Creek are all 303(d) listed streams for fecal coliform contamination from urban runoff. The established TMDLs can be found on the ADEC, Division of Water, web page for the current 303(d) list of impaired water bodies (2006).
- Water quality standards for growth and propagation of fish, shellfish, and other aquatic life in freshwater were not achieved for pH in 26 percent of the surface water samples collected. All but one of these exceedances occurred in the North Fork of Little Campbell Creek, which historically has had low pH.
- Iron concentrations in water samples collected from the North Fork of Little Campbell Creek exceeded water quality standards for toxic and other deleterious organic and inorganic substances in all cases. Iron concentrations have historically been elevated in this creek, although the source of iron has not been documented.
- Dissolved oxygen was near saturation in most of the surface water samples. However, the dissolved oxygen concentration in the South Fork of Little Campbell Creek measured in 2003 was slightly less than the 7-mg/L minimum concentration required in waters used by anadromous and resident fish.

3.3 Wetlands

The basic community growth and transportation patterns in the Anchorage Bowl were established before expansion of wetland regulation in 1976. Between 1950 and 1990, approximately 52 percent or 9,958 acres of Anchorage Bowl wetlands were filled (U.S. Department of Interior, 1993). Forty-two percent of these wetlands were filled before 1976, when U.S. Army Corps of Engineers (USACE) jurisdiction expanded into non-navigable waters. The rate of wetland fill decreased after 1976. The decline of wetland fill has been especially marked since the *Anchorage Wetlands Management Plan* (AWMP) (MOA, 1996a) became effective in 1983. Development that fragments and eliminates wetlands and disrupts natural hydrology has continued despite regulation, but at a slower pace.

Executive Order 11990 mandates that all federal agencies, when undertaking a major action such as issuing a permit or funding a project, must avoid and minimize harm to wetlands to the extent practicable. Additionally, under the authority of Section 404 of the Clean Water Act, the USACE regulates the discharge of fill material into wetlands and other water bodies that may directly or indirectly support interstate commerce.

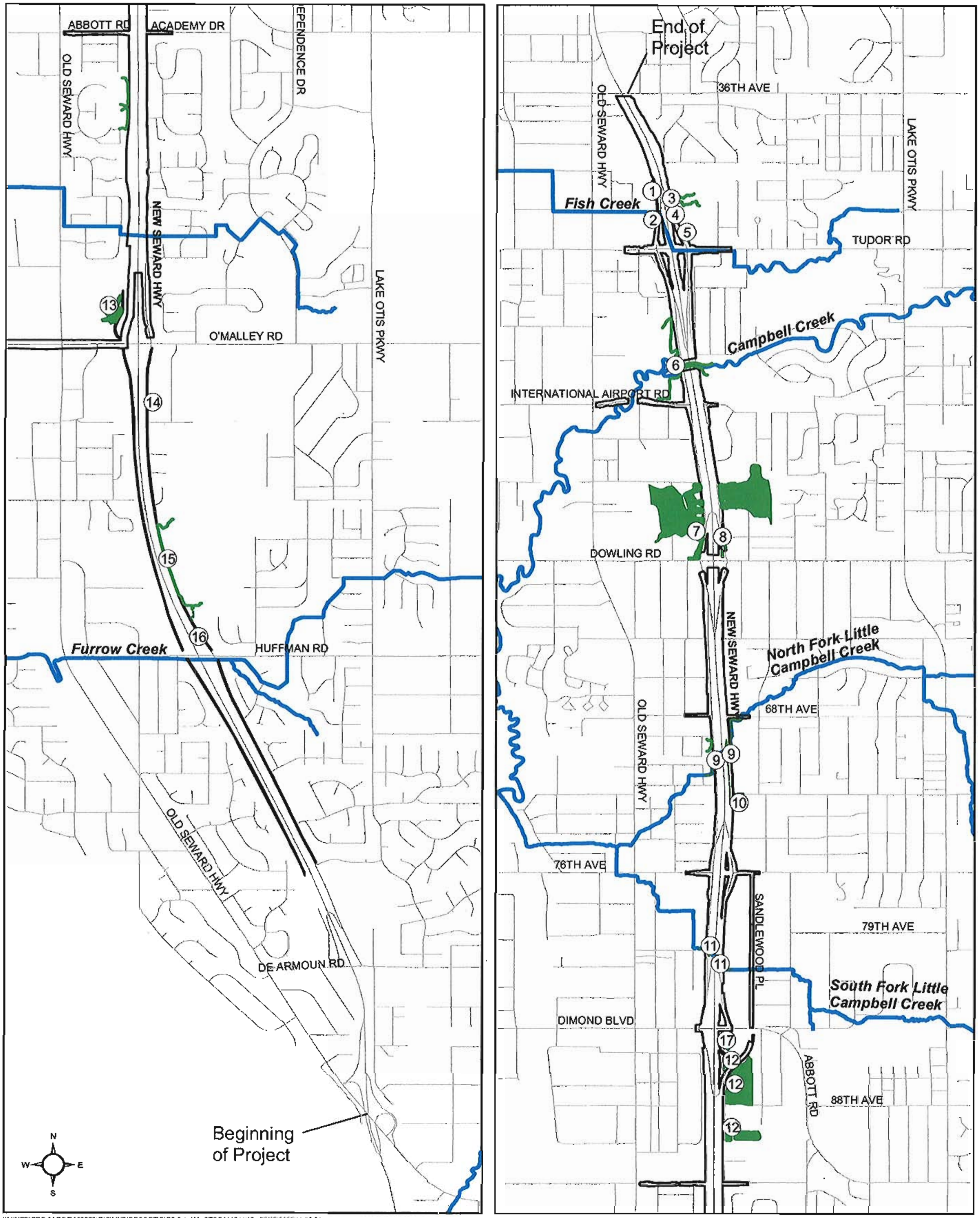
The USACE and EPA define wetlands as "those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support … vegetation typically adapted for life in saturated soil conditions" (Title 33, Part 328, *Code of Federal Regulations* [CFR] and 40 CFR 230). Under this definition, unvegetated water bodies are not wetlands. Wet ditches that are formed by human activity are also not typically considered wetlands, although they may provide many of the same functions as natural wetlands. Wetlands are an important part of the natural ecosystem, performing diverse functions depending on their size, type, and setting within the landscape. Wetlands provide valuable habitat to fish and wildlife; they may also regulate flow of water and runoff rates. Many wetlands detain runoff water, reducing the volume and velocity of floodwaters. This function protects water bodies from erosion. Wetland vegetation may also directly protect stream banks from erosion. As urban runoff water flows through a wetland, toxic substances are often trapped in wetland soils, cleaning the water (MOA, 1996a).

A site-specific wetland investigation performed for the proposed project is described in two reports prepared by HDR Alaska, Inc.: *New Seward Highway Rabbit Creek Road to 36th Avenue, Preliminary Wetlands Jurisdictional Determination* (2002) and *Wetlands Analysis* (2005). The USACE issued a jurisdictional determination for the project, based on the *New Seward Highway Rabbit Creek Road to 36th Avenue, Preliminary Wetlands Jurisdictional Determination* report, in February 2002. All of these reports can be found in Appendix B.

Study area wetland boundaries are shown in Figure 3.3-1. Additional detailed figures in Appendix B show all non-ditch wetlands within or abutting the highway right-of-way and those wetlands regulated by USACE.

3.3.1 Management Designations

The MOA classified its wetlands during development of the AWMP (MOA, 1996a). The class designation of "A," "B," or "C" wetlands was based on the functions each wetland is thought to perform and the values of those functions within the context of the Anchorage Bowl. Type A wetlands are designated for preservation, and are to be maintained in their natural state to the maximum extent practicable. Minor encroachments for roads, utilities, and trails along the fringes of these wetlands are to be considered if no other alternatives exist. Class B wetlands are slated for retention of their functions, in addition to allowing for economically viable use of the wetlands. Development in these wetlands is to be planned to preserve key functions. Class C wetlands are the least valuable of Anchorage wetlands. Development within them is to be allowed, as necessary, to permit community expansion. Most mapped wetlands along the project corridor are designated as Class B or C wetlands, although Class A wetlands occur near Campbell Creek. Many of the smaller wetlands identified during field investigation were not mapped in the AWMP (as discussed in Appendix B).



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Legend

Roads

Streams

③ Wetland Reference Number

Wetlands

Proposed Footprint

Wetland boundaries outside the project area are based on the Anchorage Wetland Management Plan of 1996. Wetland boundaries in the project area were verified specifically for the project.

FIGURE 3.3-1
Study Area Wetlands and Streams

0 500 1,000 2,000 3,000 4,000 Feet

3.3.2 Study Area Wetland Types and Functions

Individual wetlands within New Seward Highway right-of-way are described in detail in the wetland investigation reports (Appendix B). Human activity has altered all wetlands in the study area. Some wetlands abutting the existing frontage roads and ramps are still extensive. Other small wetlands within the project corridor represent remnants of once-extensive wetlands that have been filled, graded, and essentially isolated, over time, but still have the hydrology to maintain them as wetlands. Some study area wetlands exist along the fringes of creeks or as wetland drainage ways that lead directly to creeks. The general wetland types found in the project corridor are briefly described below.

Creek-Fringe Wetlands

The creek-fringe wetlands are located in various places throughout the study area along Furrow Creek and its tributary, South Fork of Little Campbell Creek, North Fork of Little Campbell Creek, Campbell Creek, and Fish Creek (Figure 3.3-1). All of these creeks are considered waters of the United States under the jurisdiction of the USACE. Wetlands 1, 4, 6, 9, 10, 11, and 16 are all creek-fringe wetlands. Most of these wetlands were once part of much larger wetland complexes.

Dominant vegetation in the creek-fringe wetlands includes water horsetail (*Equisetum fluviatile*), marsh five-finger (*Comarum palustre*), bluejoint reedgrass (*Calamagrostis canadensis*), and beaked sedge (*Carex rostrata*). Other species present include sweet gale (*Myrica gale*) and cattail (*Typha latifolia*). Standing water is prevalent throughout the wetlands because of their proximity to the creeks. Portions of the wetlands surrounding the creeks along the highway right-of-way were excavated and regraded during highway construction. Other extensive developments such as parking lots and commercial and residential buildings have also substantially altered many of the wetlands along creek edges.

Although many of the creek-fringe wetlands are small, they perform a number of functions beneficial to the creeks. They absorb runoff and provide areas for the creeks to flood, thus reducing flow volumes and velocities during periods of high rainfall and floods. Creek-fringe wetlands improve water quality by removing sediment from creek waters during floods and retain pollutants received from urban runoff.

Creek-fringe wetlands provide important habitat to fish and wildlife. Wetlands provide shade to the creek, which controls water temperature and provides cover to fish. Invertebrates and dead plant material provided by streamside plants are important food sources for aquatic organisms. Fallen and standing trees provide habitat for stream invertebrates. Roots, branches, and stems of stream bank vegetation also protect against erosion and provide stream bank structure.

Feeder Wetlands

Feeder wetlands are not located next to creeks, but feed into them from outlying areas north of Furrow Creek, south of the South Fork of Little Campbell Creek, and north of O'Malley Road (wetlands 12, 13, 15, and 17; see Figure 3.3-1). Although these wetlands have been changed by construction of highway ramps, frontage roads, and adjacent residential and commercial development, they continue to drain into nearby or distant creeks through culverts or more extensive storm drainage systems. Feeder wetlands have vegetation similar to that of the creek-fringe wetlands.

An important function of some feeder wetlands is to provide base flow to creeks. Feeder wetlands also capture and retain runoff, sediment, and other pollutants from adjacent urbanized areas, aiding in flood control and protecting creek water quality. The larger of these wetlands also provide habitat for a variety of wildlife species, but not for fish.

Isolated Extensive Wetlands

Two areas of extensive, but isolated, wetlands are located both west and east of the project corridor, north of Dowling Road (wetland 7 and the north part of wetland 8; see Figure 3.3-1). Vegetation in these wetlands is shrubby, with dominant plants including sweet gale, bluejoint reedgrass, common horsetail, dwarf birch (*Betula nana*), and willow. During field visits, these wetlands appeared to have saturated peat soil.

These wetlands have been fragmented and reduced in size by urban development and have been isolated from Campbell Creek. The surrounding area has been either developed for commercial and industrial uses or cleared. Like the creek-fringe wetlands, the isolated, extensive wetlands absorb precipitation and runoff, reducing the amount of water that flows to creeks during periods of heavy rain and snowmelt. They also capture pollutants in urban runoff. These isolated, extensive wetlands provide aesthetic value as green space within an urban environment and serve as wildlife habitat to species that can tolerate some human disturbance.

Isolated Remnant Wetlands

The remaining wetlands are isolated, remnant wetlands that exist in small pockets throughout the study area (wetlands 2, 3, and 5; the south part of wetland 8; and wetland 14; see Figure 3.3-1). These wetlands were once part of much larger wetland complexes, which have been altered to the point that they are now small and no longer substantially connected to other wetlands or creeks. Field investigation revealed that most of these wetlands have been previously disturbed by highway construction and many have been previously covered with fill. Their vegetation is disturbed, and is generally dominated by sweet gale, common horsetail (*Equisetum arvense*), marsh five-finger, bluejoint reedgrass, beaked sedge, and willows (*Salix* species).

Many functions of the isolated wetlands are limited because of their small size; however, isolated remnant wetlands retain sediment and other pollutants from local runoff and slightly reduce runoff to creeks that might occur if they did not exist.

3.4 Water Body Modifications

As noted above, the New Seward Highway crosses five creeks in the study area: Furrow Creek, South Fork of Little Campbell Creek, North Fork of Little Campbell Creek, Campbell Creek, and Fish Creek. The streams provide Anchorage with recreation and aesthetic beauty, as well as habitat for birds, fish, and other wildlife. Riparian woods and wetlands along these streams provide natural filtration of stormwater runoff and important storage during flood events. Figure 3.3-1 in the Wetlands section (3.3) shows the location of the study area streams.

Potential water body modifications include any alteration resulting from proposed improvements. This section describes characteristics of the study area creeks; water quality of the creeks that cross New Seward Highway is described in the Water Quality section (3.2).

3.4.1 Furrow Creek

The main stem of Furrow Creek flows in an open channel upstream of New Seward Highway. The creek drops into a storm drain immediately east of the project corridor south of Huffman Road, from which it flows west under the highway in the buried storm drain system for approximately a half-mile before being released into an open channel. A small tributary of Furrow Creek north of Huffman Road also flows in an open channel until it reaches the highway, where it is directed into a buried storm drain system. Flow measured immediately west of the project corridor during a 10-year flood event was approximately 246 cfs (URS Engineers, 1983).

3.4.2 South Fork of Little Campbell Creek

The South Fork of Little Campbell Creek originates in the Campbell Creek watershed and crosses New Seward Highway north of Dimond Boulevard. The creek is highly modified in the study area, passing under the project corridor and frontage roads in culverts. At its mouth, the creek drains approximately 8 square miles. Estimated peak discharge during a 10-year flood event is approximately 70 cfs at Hartzell Road, which lies east of and outside of the study area (FEMA, 2002).

The vegetation canopy cover is estimated to be greater than 75 percent in areas within and adjacent to the study area. The bed and stream bank material of the South Fork of Little Campbell Creek consists of sand and gravel. The bankfull width of the creek is 5 feet, which increases to approximately 9 feet during a 50-year recurrence interval flood (MOA, 2003a).

3.4.3 North Fork of Little Campbell Creek

The North Fork of Little Campbell Creek drains a sub-basin of the Campbell Creek watershed. The creek passes under New Seward Highway and its frontage roads in culverts located south of 68th Avenue, joining the South Fork of Little Campbell Creek approximately a half-mile downstream. At its mouth, the North Fork of Little Campbell Creek drains approximately 9 square miles and has a peak discharge during a 10-year event of 90 cfs (FEMA, 2002).

The North Fork of Little Campbell Creek is ditched or constrained in the study area by adjacent development and is moderately modified from its original state. The stream bank material consists of sand and gravel, and the bed material consists of gravel and cobbles. The North Fork of Little Campbell Creek is approximately 6 feet wide at the bankfull stage of the creek and 13 feet wide during a 50-year recurrence interval flood (MOA, 2003a).

3.4.4 Campbell Creek

New Seward Highway crosses Campbell Creek north of International Airport Road. Campbell Creek and its tributaries drain a large portion of the central and south-central Anchorage area and the western slopes of a portion of the Chugach Mountains. The Campbell Creek watershed is approximately 72 square miles (FEMA, 1990; MOA, 2001d).

The elevation of the watershed ranges from more than 5,000 feet to sea level. Campbell Creek is relatively intact along its length through Anchorage (MOA, 2001d).

Stream flow in Campbell Creek is highest during snowmelt runoff and large rain events (Curran, 2001). The peak discharge at the mouth of Campbell Creek during a 10-year flood event is approximately 840 cfs (FEMA, 2002). During a 28-year monitoring period, the highest average daily flow was 152 cfs in mid-June measured at a USGS gaging station north of Dimond Boulevard and west of the study area. The lowest daily average stream flow was 18 cfs in mid-March (USGS, 1999).

New Seward Highway and its two frontage roads currently cross over Campbell Creek by way of four low bridges. According to data collected by the MOA, Campbell Creek has a vegetation canopy cover of less than 10 percent where it flows through the study area. The stream bank material consists of predominantly silt and sand, and its streambed consists of gravel and cobbles. In the study area, the creek is approximately 39 feet wide at its bankfull stage and approximately 116 feet wide during a 50-year recurrence interval flood (MOA, 2003a).

Pedestrian trails along sections of Campbell Creek lie outside of the highway right-of-way. The Campbell Creek Greenbelt provides many opportunities for human recreation, including fishing, boating, and the use of nearby bike paths. Human recreational activities near the creek have resulted in areas of trampled banks and trash deposition.

3.4.5 Fish Creek

Fish Creek has a drainage area of approximately 5.6 square miles where it enters Knik Arm (FEMA, 2002). Because of urbanization, Fish Creek has been diverted, relocated, buried, and channelized. Alteration of the natural flow of the creek has lowered its base flows and increased its peak flows. According to a flood insurance study conducted by the Municipality of Anchorage (FEMA, 2002), the peak discharge of Fish Creek during a 10-year flood is approximately 67 cfs.

The headwaters of Fish Creek are near Tudor Road and Lake Otis Parkway. From the headwaters, the creek flows in an open channel for less than a mile to a location 900 feet east of New Seward Highway at Tudor Road, where it flows into a buried storm drain system. The creek is buried through the study area and for more than a mile downstream from New Seward Highway. A small tributary of Fish Creek enters the storm drain system north of Tudor Road and immediately east of the project corridor.

3.5 Fish and Wildlife

3.5.1 Fish

Three streams support anadromous fish (which migrate from the sea to freshwater for breeding) within the study area: the South Fork of Little Campbell Creek, North Fork of Little Campbell Creek, and Campbell Creek (Stream Nos. 247-60-10340-2020, 247-60-10340-2021, and 247-60-10340, respectively, according to the Alaska Department of Fish and Game (ADF&G) (Johnson et al., 2005).

Fish Creek supports anadromous fish only in its downstream reaches. Furrow Creek does not currently support anadromous fish (Johnson et al., 2005). See Figure 3.3-1 for the location of streams in the study area. Table 3.5-1 shows fish species known to be present in creeks within the study area. Other resident fish species may also be present.

TABLE 3.5-1
Fish Species that Occur in the Study Area

Creek	Chinook Salmon	Coho Salmon	Pink Salmon	Sockeye Salmon	Dolly Varden	Rainbow Trout
South Fork of Little Campbell Creek	X	X			X	X
North Fork of Little Campbell Creek	X	X			X	X
Campbell Creek	X	X	X	X	X	X

Source: Johnson et al. (2005), Seaberg (2003).

Furrow Creek

Furrow Creek does not support any fish species because of its channelization through storm drains and culverts (Seaberg, 2003). The stream is also difficult for anadromous species to access because of its small, divided, multiple channels that become poorly defined within a broad flat area at the mouth of the creek (ABR Inc. et al., 2001).

South Fork of Little Campbell Creek

The South Fork of Little Campbell Creek provides a home for chinook (*Oncorhynchus tshawytscha*) and coho (*O. kisutch*) salmon, Dolly Varden (*Salvelinus malma*), and rainbow trout (*O. mykiss*). Chinook salmon have not been documented to use the stream for spawning, but it is thought that they use the stream for rearing. Dolly Varden and rainbow trout spawn upstream from the study area. All the various species use the South Fork of Little Campbell Creek as a migration corridor (Johnson et al., 2005; Seaberg, 2003).

North Fork of Little Campbell Creek

Like the South Fork, the North Fork of Little Campbell Creek hosts chinook, coho, Dolly Varden, and rainbow trout. Both Dolly Varden and rainbow trout spawn upstream from New Seward Highway. Chinook and coho salmon use the North Fork for rearing (Johnson et al., 2005; Seaberg, 2003).

Campbell Creek

Campbell Creek is home to six salmonid species, including chinook, coho, pink (*O. gorbuscha*), and sockeye (*O. nerka*) salmon; Dolly Varden; and rainbow trout. The populations are predominantly natural and are augmented by planted stock. The anadromous species (all those mentioned above, except rainbow trout) enter Campbell Creek at various times during the summer and fall to spawn. The eggs, with the exception of rainbow trout, are incubated through the winter to hatch and emerge from the creek gravels in the spring (Seaberg, 1997; Johnson et al., 2005). The fish species use Campbell Creek for rearing for various periods. Spawning locations are generally upstream from rearing locations. Coho and sockeye salmon migrate past where New Seward Highway crosses Campbell Creek to spawn upstream. All the anadromous species use Campbell Creek to migrate to and from their spawning grounds.

Fish Creek

There is no documented use of Fish Creek by anadromous fish in or upstream from the study area. Dolly Varden live upstream in Fish Creek, but do not use the stream within the buried storm drain system in the study area (Seaberg, 2003).

3.5.2 Essential Fish Habitat

Streams that support anadromous fish are considered Essential Fish Habitat (EFH) under authority of the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA). The MSFCMA defines EFH as "waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." The MSFCMA directs federal agencies to consult with the management agency, National Oceanic and Atmospheric Administration (NOAA) Fisheries (formerly National Marine Fisheries Service, or NMFS), when any of their activities may have an adverse effect on EFH. According to the MSFCMA, adverse effect is "any impact which reduces quality and/or quantity of EFH" (NOAA Fisheries, 1997).

As described above, three streams support anadromous fish within the study area and qualify as having EFH: South Fork of Little Campbell Creek, North Fork of Little Campbell Creek, and Campbell Creek (NOAA Fisheries, 2003; Johnson et al., 2005). Use of these streams by anadromous fish is described above and in the Essential Fish Habitat Assessment in Appendix C. This assessment includes a description of the proposed action, analysis of the potential adverse effects of the proposed project on EFH and the managed species, and proposed conservation measures.

3.5.3 Wildlife

The proposed project is in a highly developed urban setting, which does not contain habitat that supports important wildlife populations. Most of the study area is either paved or mowed. The mowed area supports grass and other opportunistic herbaceous species. Along the edges of the highway right-of-way, pioneering trees and shrubs (willow, cottonwood, alder, paper birch) may provide cover for some species, and perhaps nesting spots for passerine birds. Many small wetlands are located within the right-of-way, generally consisting of ditches supporting grasslike plants and aquatic herbs. Some larger tracts of wetlands abut the right-of-way (see Section 3.3), as well as forested tracts of white and black spruce and paper birch trees such as the Campbell Creek Greenbelt. Other areas abutting the right-of-way are developing residential, commercial, and industrial lands that support only the most disturbance-adapted wildlife species.

Shorebirds, waterfowl, and songbirds can be found in drainage ditches and wetlands adjacent to and within the study area. Raptors such as goshawks (*Accipiter gentilis*) likely use riparian areas and greenbelt corridors that cross the highway for travel and feeding. In the summer and fall, migratory birds use the wetlands and drainage ditches for feeding. Songbirds likely use shrub lands and forested areas, including wetlands, for foraging, resting, and breeding.

It is unlikely that many mammal species would be found in the study area because suitable habitat and cover are lacking. Beavers (*Castor canadensis*) use Campbell Creek within the urban area. Coyotes (*Canis latrans incolatus*) and red fox (*Vulpes vulpes*) are active along the Campbell Creek corridor and probably cross over the highway and through culverts.

Moose (*Alces alces*) cross the highway on a more regular basis and have been involved in traffic collisions with vehicles. During the period 1999 through 2001, moose collisions doubled from 6 to 12 (DOT&PF, 2001a). Moose populations have been increasing in the Anchorage area since the 1970s, with approximately 200 to 300 animals in the Anchorage Bowl year-round. During the winter, Anchorage Bowl moose populations increase to 700 to 1,000 animals (ADF&G, 2000). Moose populations are concentrated in parks, greenbelts, and undeveloped open spaces (ADF&G, 2000). Willow and birch—species common in the highway corridor—are preferred forage. Moose also travel along major drainages such as Campbell Creek. Moose move any time during the day or night, but most movement occurs near dusk (DOT&PF, 1995).

3.6 Floodplains

This section describes the existing floodplain characteristics of the South Fork of Little Campbell Creek, North Fork of Little Campbell Creek, Campbell Creek, and Fish Creek (Figures 3.6-1 and 3.6-2). A flood insurance study of the MOA by the FEMA was the primary source of information for this discussion. The FEMA study was originally conducted in 1976, and was revised in 1984 and 2002 (FEMA, 2002). Additional information about the flow characteristics of each creek was obtained from water quality studies of the Campbell Creek and Fish Creek drainage basins conducted by USGS and the MOA (James M. Montgomery Consulting Engineers, 1986 and 1987; USGS, 2003). See the Wetlands section (3.3) for additional information.

Another creek that flows under New Seward Highway is Furrow Creek. This small creek crosses the highway at Huffman Road and is contained in a buried storm drain system upstream and downstream of the project corridor. Because no floodplain is associated with Furrow Creek in the vicinity of New Seward Highway, this creek was not included in this floodplain evaluation.

Water surface elevations associated with the 100-year flood, 500-year flood, and floodway area were the characteristics used to define the floodplain areas for the South Fork of Little Campbell Creek, North Fork of Little Campbell Creek, Campbell Creek, and Fish Creek. To provide a national standard without regional discrimination, FEMA adopted the 1 percent annual chance (100-year) flood as the base flood for floodplain management purposes (FEMA, 2002). FEMA uses the 0.2 percent annual chance (500-year) flood to indicate additional areas of flood risk in the community. The floodway is the channel of a stream, plus any adjacent floodplain areas, that must be kept free of encroachment so that the 100-year flood can be carried without substantial increases in flood heights. Minimum federal standards limit such increases to 1.0 foot as long as hazardous velocities are not produced.

A combination of factors, including the amount of snowpack, air temperatures, and the amount of sunshine and precipitation, can cause flooding in the Anchorage area. The sequence of events also affects the flooding potential. Additional factors that contribute to flooding include inadequately sized culverts, damaged culverts, culverts blocked by debris and ice, developments that encroach onto and obstruct the natural floodplains, and high-velocity flow (FEMA, 2002).

3.6.1 South Fork of Little Campbell Creek

The South Fork of Little Campbell Creek is the primary stem of Little Campbell Creek, which is a tributary to Campbell Creek. Figure 3.6-1 shows the 100-year flood, 500-year flood, and floodway boundaries of the South Fork of Campbell Creek in the vicinity of New Seward Highway. Water surface elevations associated with the 100-year and 500-year floods are 121.3 feet and 121.7 feet, respectively. Both of these floods would overtop Brayton Drive, but would not overtop New Seward Highway because the elevation of the northbound and southbound lanes is approximately 122.5 feet at this location.

3.6.2 North Fork of Little Campbell Creek

The North Fork of Little Campbell Creek is the primary tributary to Little Campbell Creek, and crosses New Seward Highway between 69th and 70th avenues. Figure 3.6-1 shows the 100-year flood, 500-year flood, and floodway boundaries of the North Fork of Campbell Creek in the vicinity of New Seward Highway. Water surface elevations associated with the 100-year and 500-year floods are 116.6 feet and 116.8 feet, respectively. Flood events of this magnitude would overtop Brayton Drive, but would not overtop New Seward Highway because the elevation of the northbound and southbound lanes is approximately 118.0 feet at this location.

3.6.3 Campbell Creek

The main stem of Campbell Creek is approximately 8 miles long and begins at the confluence of the South Fork and North Fork of Campbell Creek in Campbell Park at approximately East 48th Avenue and Piper Street (1.8 miles upstream of New Seward Highway).

The period of ice-free flow in Campbell Creek is typically from early May through late September or October (USGS, 1991). This period can be divided into three distinct flow regimes:

- In May, June, and early July, the predominant source of stream flow is the melting of the winter snowpack in the upper mountainous part of the basin.
- In late July and early August, the surface snowmelt contribution to stream flow declines, leading to reduced base flow. However, rainfall typical of this period results in peaks from storm runoff being added to the lower base flows.
- From late August until about the end of September, generally declining temperatures and the consequent beginning of "freeze-up" in the upper basin lead to further reduction of base flow. The largest rainstorms and corresponding highest peak flows of the year commonly occur during this period, however (USGS, 1991).

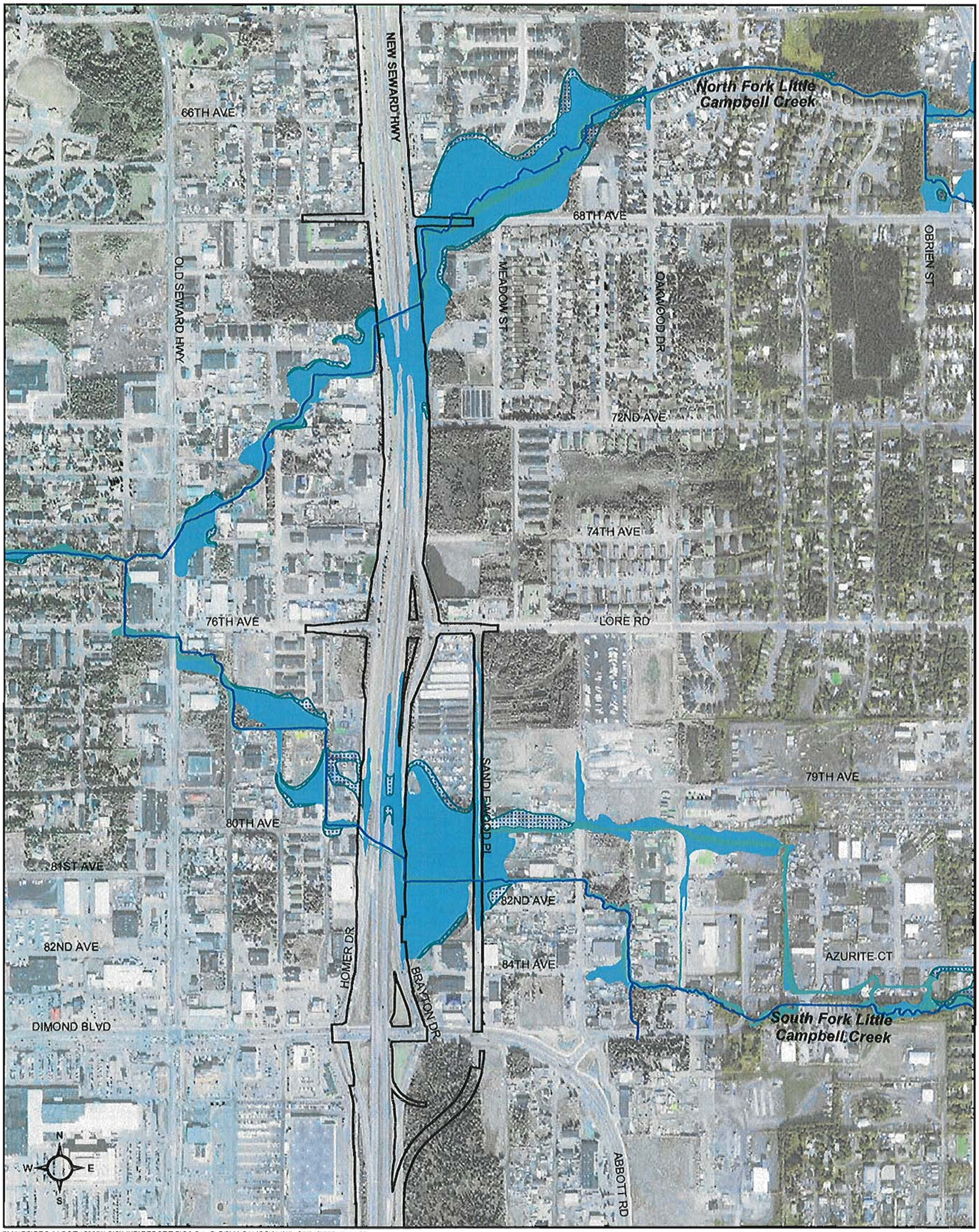

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FIGURE 3.6-1
Floodplain Boundaries of Little Campbell Creek

Legend

Floodplain

Floodway | 100 Year | 500 Year | Stream | Proposed Footprint

0 200 400 800 1,200 Feet

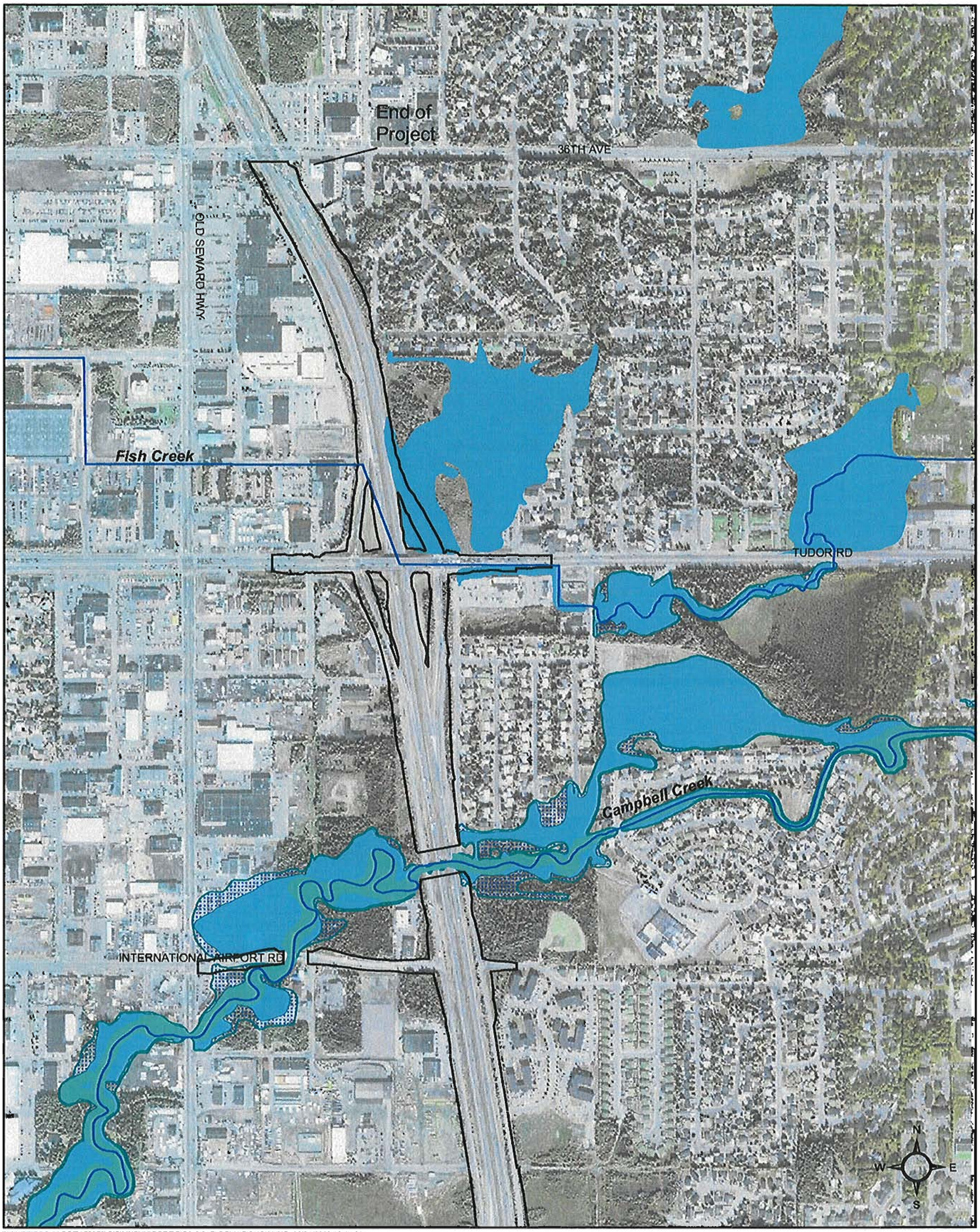

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FIGURE 3.6-2
Floodplain Boundaries of Fish Creek and Campbell Creek

Legend

Floodplain

Floodway · 100 Year · 500 Year · Stream · Proposed Footprint

0 200 400 800 1,200 Feet

Figure 3.6-2 shows the 100-year flood, 500-year flood, and floodway boundaries of Campbell Creek in the vicinity of New Seward Highway. Water surface elevations associated with the 100-year and 500-year floods are 118.3 feet and 119.1 feet, respectively (FEMA, 2002). The existing northbound and southbound bridge crossings of the highway at Campbell Creek appear to be able to accommodate both of these flood events because the bottom elevation of both bridges is approximately 120.4 feet. This floodplain is currently able to withstand a 100- or 500-year flood without affecting New Seward Highway or New Seward Highway bridges; however, Brayton Drive would be affected by both floods. The existing earth abutments under the bridges are subject to erosion from foot traffic, and they slope directly into the creek.

3.6.4 Fish Creek

Fish Creek has its headwaters in the vicinity of Tudor Road and Lake Otis Parkway. The creek flows westerly, then northerly, before emptying into Knik Arm. Section 3.2 provides additional information about Fish Creek. Figure 3.6-2 shows the 100-year and 500-year flood boundaries of Fish Creek in the vicinity of New Seward Highway.

No floodway was computed for Fish Creek because a floodway determination was not within the scope of the FEMA floodplain study (FEMA, 2002). Water surface elevation associated with both the 100- and 500-year floods is 115 feet. A flood of this magnitude would not inundate New Seward Highway at this location because the road surface elevation is approximately 118.5 feet.

3.7 Coastal Zone

The federal Coastal Zone Management Act (CZMA) of 1972, as amended, and the Alaska Coastal Management Act (ACMA) of 1977, as amended, regulate activities in Alaska coastal zones. The Alaska Coastal Management Program (ACMP) of 1979 implements the ACMA and CZMA and provides communities with the tools and funding to develop local coastal management programs that shape the nature of development within their coastal districts.

Under the ACMP, the MOA has drafted a Coastal Management Plan (MOA, 1979) that provides local guidance for state and federal governments to use in consistency reviews. The major goal of the MOA Coastal Management Plan is to effectively manage coastal resources while balancing the competing claims of environmental protection and urban growth. To address the potential conflicts between environmental protection and urban growth, the MOA Coastal Management Plan has broken down Anchorage's landscape into three environment designations, each subdivided into resource policy units. These units are described in detail in the MOA Coastal Management Plan. The three environmental designations and their associated resource polity units are shown in Figures 3.7-1 through 3.7-3 and summarized below:

- **Preservation Environment (I and II)**—These environments consist of geographic areas characterized by the presence of environmental or cultural features, or both, considered valuable in their undisturbed or original condition and that are relatively intolerant to human use. Such areas should be essentially free from development or capable of being restored to their natural condition, and they should be large enough to protect the value of the resource.

Resource Policy Units—Preservation Environment I units include potable surface waters, selected coastal and upland freshwater wetlands, tidal flats, salt water marshes, coastal habitats, historical sites, and archaeological sites. Preservation Environment II units include coastal cliffs and bluffs, hazardous lands, and coastal flood zones.

- **Conservation Environment**—This area consists of those lands and water areas having certain natural or institutional use limitations that require protection before their development. The purpose of this designation is park and flood protection and forestry management. Its intention is not to maintain the natural environment in a pure state, but rather that all activities and uses be carried out to produce minimal adverse impacts.

  Resource Policy Units—The Conservation Environment includes Class II waters for protection of anadromous fish propagation streams and water quality; recreational waters; scenic corridors, areas, and vistas; park and recreation areas; marginal lands; river floodplains; open space; and forestry management areas.

- **Utilization Environment**—This designation relates to those land and water areas of the coastal district suitable for development. Areas designated for utilization have the fewest constraints to development.

  Resource Policy Units—The Utilization Environment includes ocean waters for commerce, transportation, and industry; urban residential areas; urban development areas; urban waterfront; and rural areas.

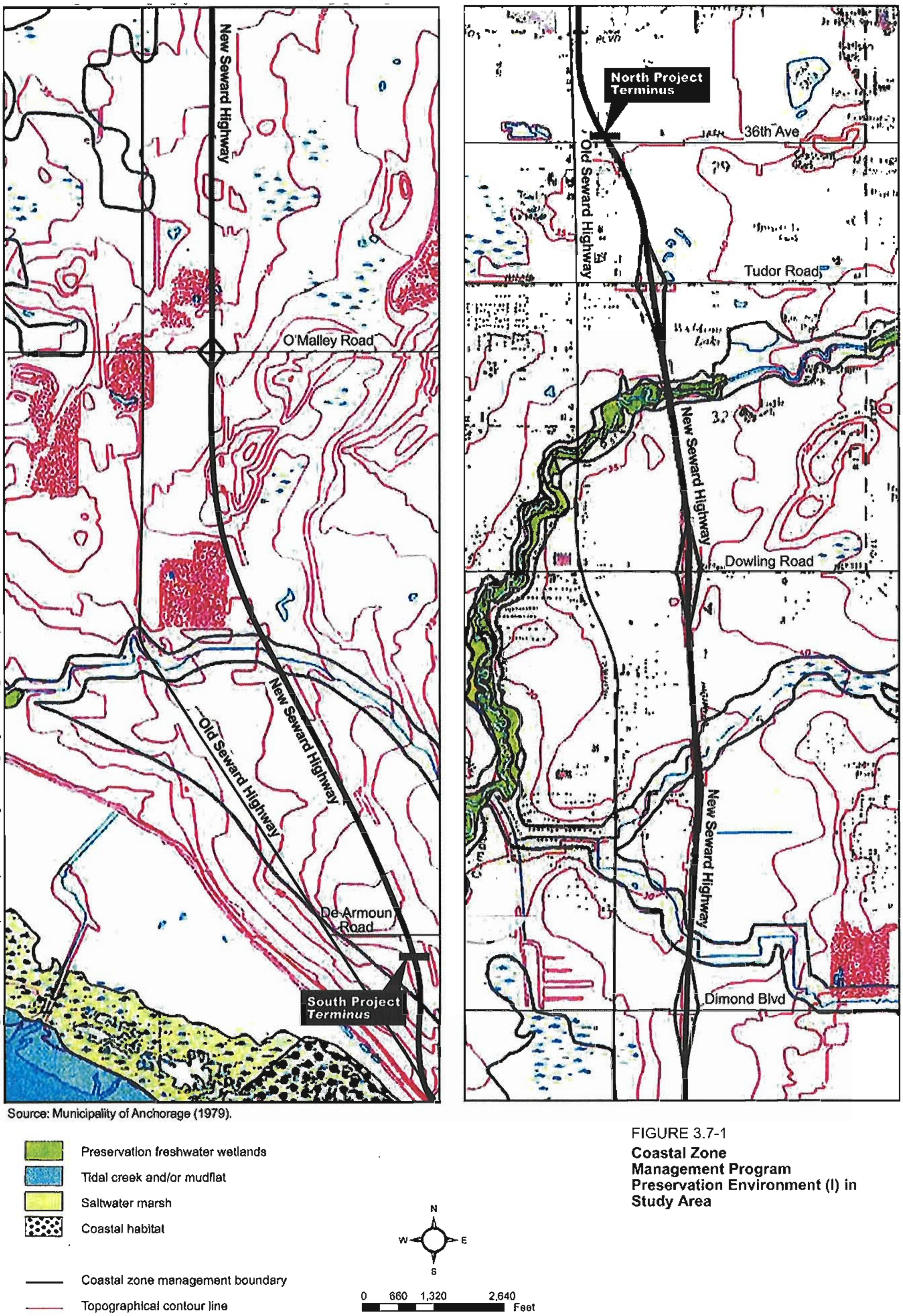
New Seward Highway lies within the MOA Coastal District and crosses through portions of all three environment designations (MOA, 1979).

The inland coastal boundary of the MOA includes all lands and waters within (1) a zone extending 1,320 feet inland, measured horizontally from the extent of the 100-year coastal flood; and (2) the 100-year floodplain or 200 feet from the center (whichever is greater) of each river and stream intersected by the 1,320-foot zone up to the 1,000-foot elevation contour. Although the alignment of the project corridor is mainly outside of the 1,320-foot coastal zone, it does cross several streams that intersect the inland zone boundary. These streams include Furrow Creek, South Fork of Little Campbell Creek, North Fork of Little Campbell Creek, and Campbell Creek.

The southern terminus of the project corridor passes through a Utilization Environment and associated resource policy units delineated as urban residential (Figure 3.7-3). It passes through this environment again just south of Huffman Road at Furrow Creek.

Just north of Dimond Boulevard at the South Fork of Little Campbell Creek, New Seward Highway passes through a Conservation Environment with resource planning units delineated as marginal lands, river floodplain, and Class II waters. South of 68th Avenue at the North Fork of Little Campbell Creek, the highway crosses through both Conservation and Utilization environments. Their associated resource policy units include river floodplain and development freshwater wetlands, respectively.

Finally, at the Campbell Creek Greenbelt crossing, the highway passes through both Preservation and Conservation environments. The resource policy units are delineated as freshwater wetlands in the Preservation Environmental and Class II waters, river floodplain, and marginal lands in the Conservation Environment.



Source: Municipality of Anchorage (1979).

Preservation freshwater wetlands

Tidal creek and/or mudflat

Saltwater marsh

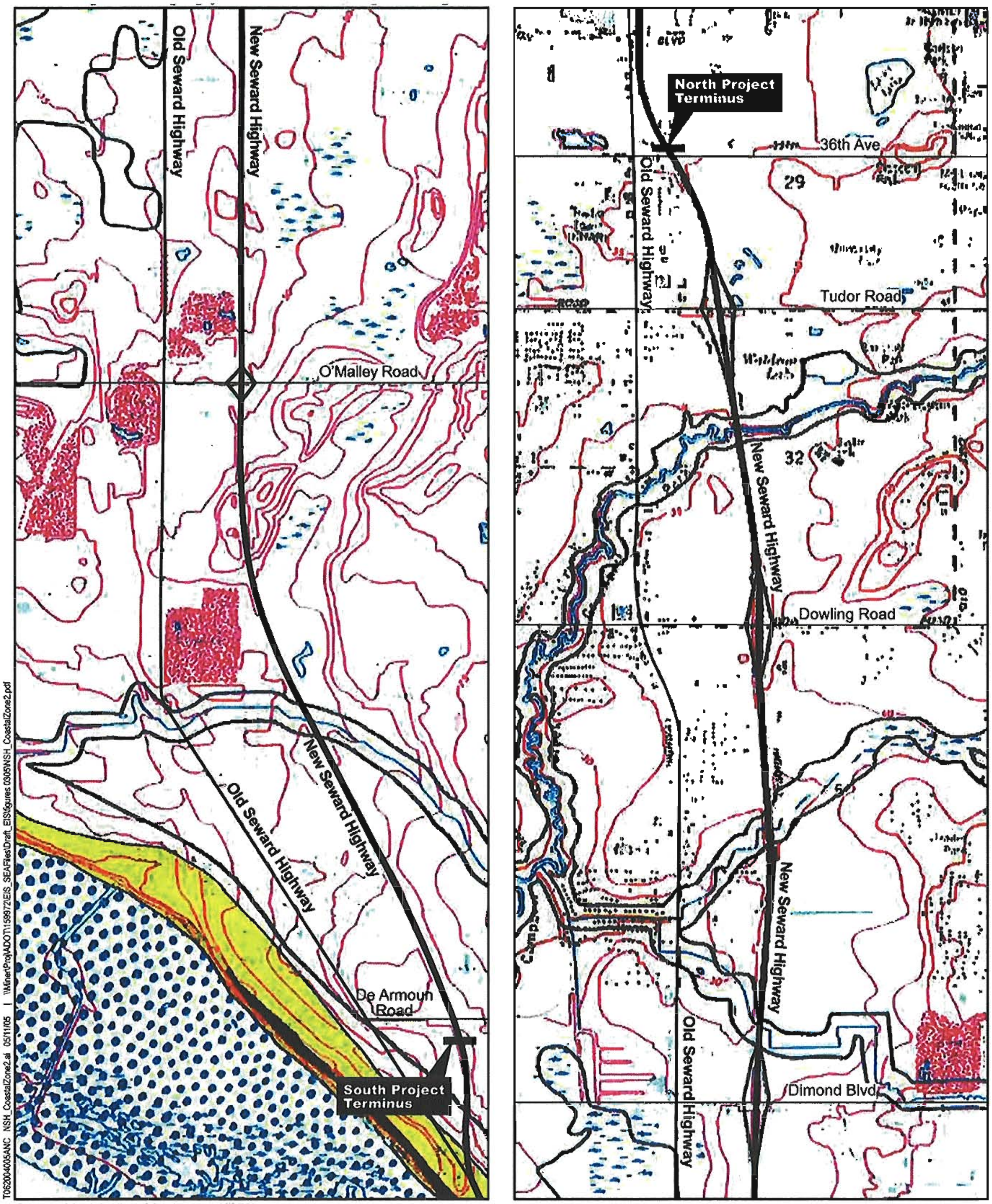
Coastal habitat

Coastal zone management boundary

Topographical contour line

FIGURE 3.7-1

Coastal Zone Management Program Preservation Environment (I) in Study Area



Source: Municipality of Anchorage (1979).

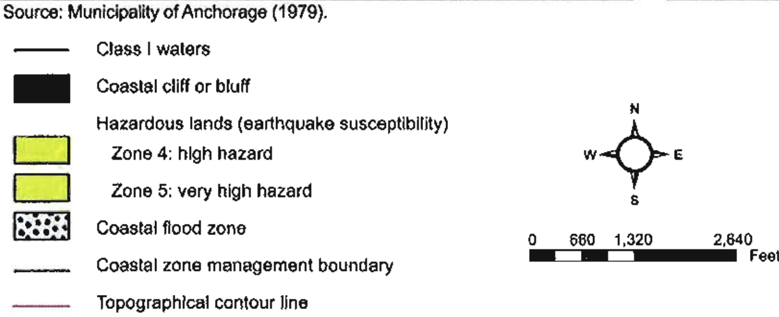
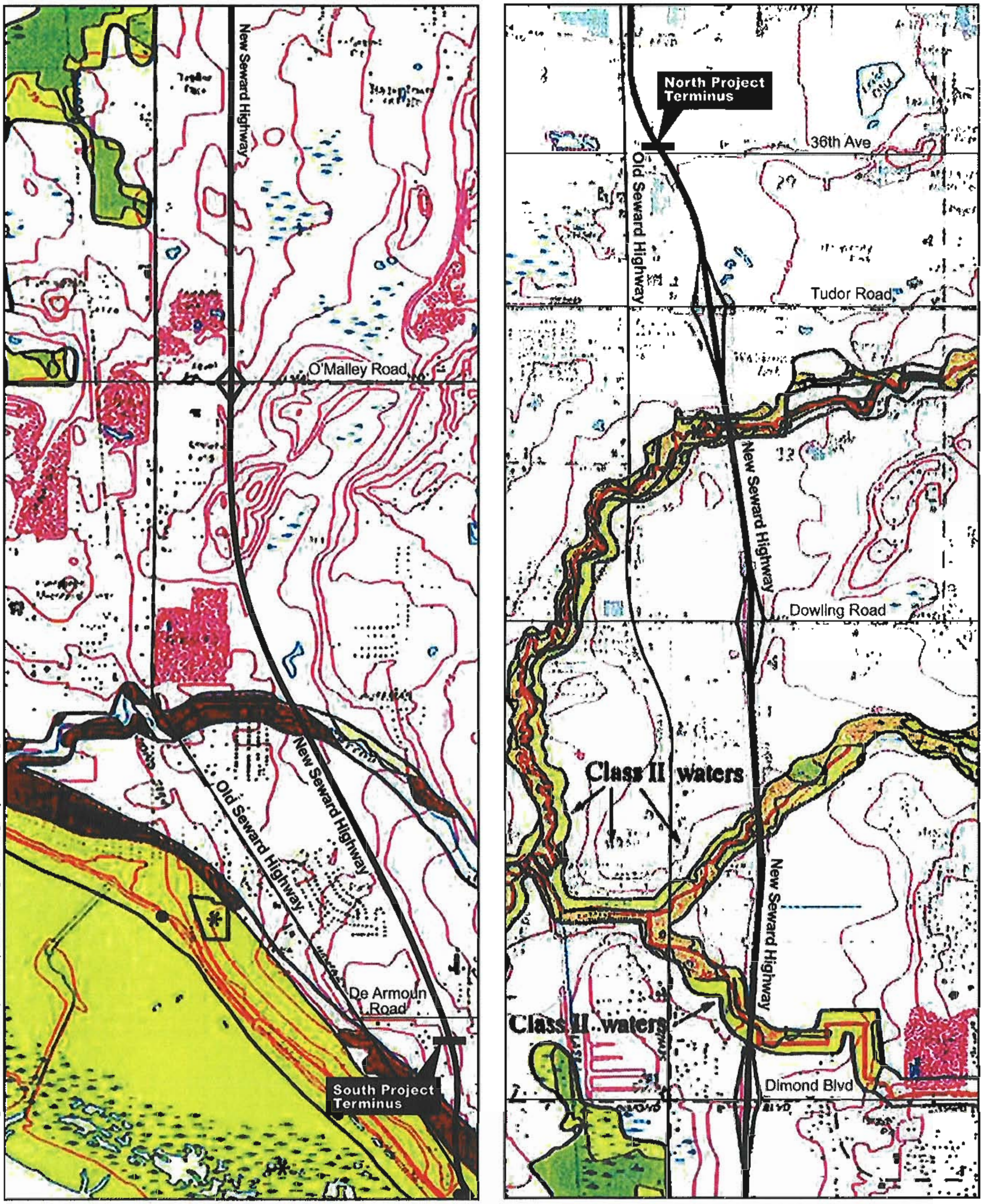


FIGURE 3.7-2
Coastal Zone Management Program Preservation Environment (II) in Study Area



Source: Municipality of Anchorage (1979).

Conservation

- Conservation freshwater wetlands
- River floodplain
- Marginal lands (includes moderate ground failure susceptibility)
- Class II waters
- Park/open space/recreation area
- Scenic vista

Utilization

- Development freshwater wetlands
- Urban residential
- Urban waterfront
- Class IV waters indicated by note
- Coastal zone management boundary
- Topographical contour line

N W E S

0 660 1,320 2,640 Feet

FIGURE 3.7-3
Coastal Zone Management Program Conservation and Utilization Environments in the Study Area

3.7.1 Federal Consistency

For federal agencies conducting activities affecting the coastal zone or development projects in the coastal zone, the consistency standard (15 CFR 930) is "consistent to the maximum extent practicable," as opposed to the much stricter standard for nonfederal applicants: "such activity will be conducted in a manner consistent with the program."

The federal consistency standard applies to activities within the coastal zone that could substantially affect the zone. Such effects could include changes in the manner in which land and water resources are used, limitations on the range of natural resource uses within the zone, and changes in the quality of coastal zone natural resources.

3.8 Air Quality

3.8.1 Climate

Anchorage lies primarily on a lowland plain at the base of the Chugach Mountains. The city enjoys a transitional climate because of the influences of Cook Inlet and the surrounding mountainous topography. Because of the moderating effects of the maritime and continental climates, Anchorage does not usually experience extreme weather conditions. Annual precipitation in the Anchorage area is 15.8 inches, including 70 inches of snow. Average monthly temperatures for the area range from 9°F in January to 65°F in July (Desert Research Institute, 2005).

Prevailing winds in Anchorage are from the southeast and southwest, depending on the season. Surface winds from September to April are predominantly from the north. Anchorage does not generally experience high winds, except for those resulting from localized channeling effects brought about by the surrounding mountains. During the winter, southerly winds channeling out of Turnagain Arm are usually more severe than the northerly winds that result from cold dense air mass movements.

Winds help disperse air pollutants and minimize air quality impacts; however, Anchorage occasionally experiences temperature inversions, which are stagnant air conditions that prevent the dispersion of pollutants. Temperature inversions can occur during the winter months when short periods of daylight and low sun angles result in reduced solar heating.

3.8.2 Regulatory Setting

The major airborne pollutants in the Anchorage region include carbon monoxide (CO), particulate matter (PM), ground-level ozone, and the ozone precursors, which are volatile organic compounds (VOCs) and oxides of nitrogen (NO_X). These regulated pollutants, along with sulfur dioxide (SO_2), are among those commonly referred to as criteria pollutants. National Ambient Air Quality Standards (NAAQS) identify criteria pollutant concentrations that must not be exceeded during specified time periods.

Primary air quality standards are defined to protect public health, and secondary standards are intended to protect the natural environment. Table 3.8-1 shows the primary and secondary NAAQS for the major airborne pollutants of concern in the study area. The

Alaska Department of Environmental Conservation (ADEC) has adopted state ambient air quality standards that are equivalent to the national standards.

TABLE 3.8-1
Federal and State Ambient Air Quality Standards

Pollutant	Primary	Secondary
Sulfur Oxides		
Annual arithmetic mean	0.03 ppm [a]	
24-hour average	0.14 ppm [b]	
3-hour average		0.50 ppm [b]
PM_{10} (Particulate matter less than 10 microns in aerodynamic diameter)		
Annual arithmetic mean	50 µg/m^3 [a]	50 µg/m^3 [a]
24-hour average	150 µg/m^3 [c]	150 µg/m^3 [c]
$PM_{2.5}$ (Particulate matter less than 2.5 microns in aerodynamic diameter)		
Annual arithmetic mean	15 µg/m^3	15 µg/m^3
24-hour average	65 µg/m^3 [d]	65 µg/m^3 [d]
Carbon Monoxide		
8-hour average	9 ppm [b]	
1-hour average	35 ppm [b]	
Ozone		
8-hour average	0.08 ppm [e]	0.08 ppm [e]
1-hour average	0.12 ppm [b]	0.12 ppm [b]
Nitrogen Dioxide		
Annual arithmetic mean	0.053 ppm [a]	0.053 ppm [a]
Lead		
Calendar quarter arithmetic mean	1.5 µg/m^3 [a]	1.5 µg/m^3 [a]

[a] Not to be exceeded.
[b] Not to be exceeded more than 1 day per calendar year.
[c] 99th percentile.
[d] 98th percentile.
[e] Not to be exceeded by the 3-year average of the fourth highest daily maximum 8-hour average concentration.
ppm = parts per million parts
µg/m^3 = micrograms per cubic meter

Existing air quality impacts along the project corridor are caused by emissions of air pollutants from motorized vehicles traveling in the project area. CO is the primary air pollutant associated with motorized vehicles. CO is a colorless, odorless, and poisonous gas produced by the incomplete burning of carbon in fuel.

The Anchorage area was classified as a CO nonattainment area because it did not meet the requirements of the NAAQS. On February 18, 2004, ADEC requested that EPA re-designate the Anchorage area as attaining the NAAQS for CO and submitted a plan for maintaining compliance. On June 23, 2004, EPA approved the maintenance plan submitted by ADEC and designated the area as attaining the NAAQS for CO. A portion of the MOA that includes the proposed project area is now considered a "maintenance" area for CO.

The Eagle River community, located approximately 10 miles north of downtown Anchorage, is currently designated as a nonattainment area for PM with a diameter of 10 microns or less (PM_{10}). The study area, which does not include the Eagle River community, is designated attainment or unclassified for all other regulated pollutants.

CO concentrations are currently measured at four locations in the Anchorage area. PM_{10} is currently measured at three sites and particulate matter less than 2.5 microns in aerodynamic diameter ($PM_{2.5}$) is monitored at two sites in the vicinity of the study area. Currently, ozone, NO_X, and SO_2 are not being monitored because past monitoring data showed concentrations well below the NAAQS. Pollutant concentration trends are shown in Table 3.8-2, which summarizes the maximum 8-hour concentrations for CO and the number of times the NAAQS has been exceeded in Anchorage from 1999 to 2003. The 1-hour CO standard has not been exceeded since monitoring began in the city. The PM_{10} NAAQS have been exceeded in recent years; however, the EPA determined those exceedances to be a result of natural events and has not designated the Anchorage area as nonattainment for PM_{10}.

TABLE 3.8-2
Ambient Air Monitoring Data – Carbon Monoxide

Monitoring Parameter	1999	2000	2001	2002	2003
Number of exceedances per year (8-hour NAAQS)	1	0	1	0	0
Number of violations per year (8-hour NAAQS)	0	0	0	0	0
Maximum 8-hour concentration	10.1	7.2	9.8	6.4	8.3

Source: MOA (2004).

3.8.3 Conformity Requirements

In Alaska, transportation projects located in maintenance and nonattainment areas are subject to conformity requirements imposed by the federal Clean Air Act (CAA) and the State of Alaska.

EPA regulations (40 CFR 51 and 93) implement the CAA. The CAA requires that transportation projects located in nonattainment and maintenance areas conform to the State Implementation Plan (SIP), the state's plan for meeting and maintaining compliance with the NAAQS. Conformity to a SIP means that transportation activities would not produce new air quality violations, worsen existing violations, or delay timely attainment of the NAAQS. The state has developed and adopted conformity requirements (18 AAC 50.700-50.735) similar to the federal rules. The New Seward Highway study area is located in the Anchorage CO maintenance area; therefore, project-level conformity analysis is required.

In June 2004, the EPA approved Anchorage being designated a maintenance area for CO, effective July 2004. For 20 years after the EPA approves the redesignation to maintenance, all significant transportation projects are required to have a demonstration of conformity. As a result, an air quality analysis was performed for the proposed project (see the June 2005 *Air Quality Analysis* report in Appendix D). The report indicates that the 1-hour NAAQS for CO of 35 parts per million (ppm) and/or the 8-hour NAAQS for CO of 9 ppm would not be met or exceeded for analysis years of 2015 and 2035.

The air quality analysis and the conformity document for the proposed project were coordinated with the interagency consultation group and will be coordinated with the public with the issuance of this environmental assessment, according to requirements of 18 AAC 050.715 and 18 AAC 050.720, respectively. A public review draft conformity document is available in Appendix D.

A final conformity determination will be prepared after this environmental assessment is made available for public review and public comments are received. The draft conformity document demonstrates that the proposed New Seward Highway project conforms to the state and federal implementation plans as required under Section 176(4) of the Clean Air Act, as amended in 1990. This draft conformity determination is based on the latest planning assumptions, and the use of the latest emissions model available. Interagency consultation and public involvement have occurred according to procedures outlined in state and federal conformity regulations. A current conforming transportation plan (*2004–2006 Statewide Transportation Improvements Program* [DOT&PF, 2006]) and transportation improvement program (*2004–2006 Transportation Improvements Program* [MOA, 2003c]) were in effect at the time of this project approval, and the project was identified in the conforming transportation plan and program. According to the hot-spot analysis, the project would not cause or contribute to any new localized CO violations in the CO maintenance area. The state implementation plan does not include PM_{10} control measures for Anchorage because the area is not designated as nonattainment or maintenance for PM_{10} (see Appendix D, Draft Conformity Document).

3.8.4 Air Quality Trends

Average CO concentrations have declined more than 50 percent since 1983. This reduction is primarily the result of improved motor vehicle control technology and new cold-air temperature CO emissions standards set by Congress in CAA amendments adopted in 1990. PM_{10} levels have declined significantly in the Eagle River area because of an ambitious road surfacing and paving program that began in 1987.

Over time, however, other factors may counteract the current downward emission trend. Each year more motor vehicles travel on the region's roadways, and people in the area are making more trips of greater distance. Recent studies have supported a growing concern for both fine particles and toxic air pollutants, which are emitted from both gasoline- and diesel-fueled vehicle exhaust. EPA has promulgated regulations that will require more stringent controls on diesel engines for trucks and buses and cleaner burning diesel (ultra-low sulfur) fuel.

3.9 Noise

Noise is often referred to as unwanted sound. All sound levels reported in this environmental document are in A-weighted decibels (dBA), unless otherwise specified.

A-weighted decibel levels are measured by using a sound-level meter that has metering characteristics and frequency weightings specified by the American National Standards Institute (ANSI) Specification for Sound Level Meters, ANSI S 1.4–1983. A-weighting, which emphasizes sounds between 1 kilohertz (kHz) and 4 kHz, is the most commonly used measure for traffic and environmental noise. Most community noise standards also use A-weighting because it provides a high degree of correlation with human annoyance and health effects. Table 3.9-1 shows the relative A-weighted noise levels of common sounds measured in the environment and in industry for various sound levels.

TABLE 3.9-1
Typical Sound Levels Measured in the Environment

Source Description	Decibels, dBA	Loudness
Military jet take-off Artillery fire Welding torch at 2 feet	130	Painful
Jet airliner at take-off	*120*	
Industrial punch machine Orchestra at fortissimo Rock band	110	Deafening
Jackhammer	*100*	
Large diesel vehicle Power mower Shouting	90	Very Loud
Freeway at 100 feet	*80*	
Automobile at 55 miles per hour Vacuum Cleaner Average radio or television	70	Loud
Normal conversation	*60*	
Dishwasher Quiet conversation Singing bird	50	Moderate
Suburban background noise	*40*	
Mosquito Silent home Whispering	30	Faint
North rim of Grand Canyon	*20*	
Rustle of leaves Slow breathing Acoustical testing laboratories	10	Nearly inaudible

The actual impact of noise is not a function of loudness alone. The time of day during which noise occurs and the duration of the noise are also important factors in how people react to noise. The noise descriptor used by the FHWA and DOT&PF for quantification of impacts is the peak-hour traffic (L_{eq}), which is the energy-average of the A-weighted sound levels occurring during a 1-hour peak traffic period, in decibels.

From the source to the receiver, noise levels and the frequency spectrum both change. The most obvious change is that noise level decreases the farther it is from the source. The manner in which noise decreases with distance depends on the following important factors:

- Geometric spreading from point sources and line sources
- Ground absorption
- Atmospheric effects and refraction
- Shielding by natural and manmade features, noise barriers, diffraction, and reflection

Sound from a small localized source (approximating a "point" source) radiates outward uniformly in a spherical pattern as it travels away from the source. The sound level decreases or drops off at a rate of 6 dBA for each doubling of the distance (DD).

Highway traffic noise is not a single, stationary point source of sound. Movement of many vehicles on the roadway makes the source of sound appear to emanate from a line (line source), rather than a point, when viewed over some time interval.

The type of the intervening surface between the source and receivers also affects sound propagation. Two primary site types are currently used in traffic noise models:

- **Hard sites—**These sites have reflective surfaces between the source and the receiver. Examples of hard sites are parking lots and smooth bodies of water. For hard sites, the change in traffic noise levels at distances (the drop-off rate) greater than 50 feet is approximately 3 dBA/DD for a line source (6dBA/DD for a point source).

- **Soft sites—**These sites have an acoustically absorptive ground surface such as soft dirt or grass. For soft sites, the change in traffic noise levels at distances greater than 50 feet is approximately 4.5 dBA/DD for a line source (7.5 dBA/DD for a point source).

Research has shown that atmospheric conditions can profoundly affect noise levels within 200 feet of a highway. Wind is the single most important meteorological factor within approximately 500 feet, and vertical air temperature gradients are more important over longer distances. Other factors such as air temperature, humidity, and turbulence also have significant effects.

Changes in noise levels are perceived by the human ear as follows: a 3-dBA change is barely perceptible, a 5-dBA change is readily perceptible, and a 10-dBA change is perceived as a doubling or halving of noise.

3.9.1 Noise Abatement Criteria

This environmental document evaluates noise impacts by using criteria contained in 23 CFR 772, Procedures for Abatement of Highway Traffic Noise and Construction Noise, and the DOT&PF *Noise Abatement Policy* (1996). Table 3.9-2 shows the FHWA design level and activity relationships used to determine the noise abatement criterion (NAC) for specific land uses (such as residential and commercial).

TABLE 3.9-2
FHWA Noise Abatement Criteria Adjusted for DOT&PF Noise Abatement Policy

Activity Category	Design Noise Levels L_{eq} hourly (dBA)	Description of Land Use Activity Category
A [a]	55 (exterior)	Tracts of land upon which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if they are to continue to serve their intended purpose. Such areas could include amphitheaters, particular parks or portions of parks, open spaces, or historic districts that are dedicated or recognized by appropriate local officials for activities requiring special qualities of serenity and quiet.
B [a]	65 (exterior)	Picnic areas, recreation areas, playgrounds, active sports areas, and parks, which are not included in Category A, and residences, motels, hotels, public meeting rooms, schools, churches, libraries, and hospitals
C	70 (exterior)	Developed lands, properties, or activities not included in Categories A and B above
D	--	Undeveloped lands
E	50 (interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums

Source: 23 CFR 772, Procedures for Abatement of Highway Traffic Noise and Construction Noise, FHWA, April 1992.

[a] Parks of Categories A and B include all such lands (public or private) that are used as parks, as well as those public lands officially set aside or designated by a governmental agency as parks on the date of public knowledge of the proposed highway project.

Activity Category A applies to locations that serve an important public need in which local officials recognize the importance of maintaining quiet surroundings. No Activity Category A land uses were identified within the project study area.

The Category B criterion in the FHWA and DOT&PF documents applies to residences, churches, schools, recreation areas, and similar use sites. Activity Category B land uses occur throughout the project corridor. The FHWA NAC for Category B land uses is 67 dBA L_{eq}. The FHWA and DOT&PF consider a traffic noise impact to occur if predicted noise levels for peak-hour traffic approach or exceed the NAC. The DOT&PF defines "approach" as noise levels within 2 dBA of NAC, meaning 65 dBA for Activity Category B.

Commercial and industrial land uses fall into Category C, for which the FHWA NAC is 72 dBA L_{eq}. Applying the DOT& PF definition of approach as within 2 dBA of the FHWA levels, the resulting DOT&PF criterion shown in Table 3.9-2 for Activity Category C is 70 BA. DOT&PF policy does not provide noise abatement for Activity Category C, unless it is necessary to protect adjacent sensitive areas (land use Categories A and B). There are no criteria for undeveloped land (Category D), which is found intermittently along the corridor. The above-described noise level criteria are determined at the exterior use areas of structures during peak-hour noise conditions.

Where there are no exterior activity areas or where exterior areas are shielded from the roadway so that there are no exterior impacts, the interior FHWA NAC (Category E) should be used. Polaris K-12 School and Aspen Apartments are among the Activity Category E land uses identified within the project study area.

The DOT&PF *Noise Abatement Policy* (1996) defines "substantial" as an increase of 10 dBA over existing noise levels. In addition to the criterion noise levels described above, the FHWA and DOT&PF consider a traffic noise impact to occur if predicted noise levels "substantially" exceed existing noise levels.

Therefore, noise abatement features must be considered for the proposed project if predicted noise levels for the design year result in a noise level increase of 10 dBA or more above existing noise levels or predicted noise levels equal or exceed 65 dBA L_{eq} for Category B land uses or 50 dBA interior noise levels where exterior use areas do not occur (Category E). DOT&PF policy does not provide noise abatement for Activity Categories C or D.

3.9.2 Existing Noise Environment

Vehicular traffic on New Seward Highway is the dominant source of environmental noise at noise-sensitive areas in the southern half of the study area between Rabbit Creek Road and Dimond Boulevard. Other environmental noise sources include occasional distant aircraft flights and some traffic on other local roadways.

Vehicular traffic on New Seward Highway is the dominant source of noise in the study area north of Dimond Boulevard; however, intermittent commercial jet departures from Ted Stevens Anchorage International Airport (TSAIA) also are prominent sources of noise. Throughout most of the project corridor, traffic on frontage roads and other local roadways is an insignificant contributor to overall noise exposure.

Several existing noise barriers and property line walls are currently located along the New Seward Highway corridor to protect outdoor areas of residences from traffic noise. All of these existing barriers are south of Dimond Boulevard and shown in Figures 3.9-1 through 3.9-4. They are as follows:

- An existing property line wall is located in the northwest quadrant of New Seward Highway and DeArmoun Road. This wall is approximately 250 feet long.
- A noise barrier, approximately 4,100 feet long, extends from the northern end of Bell's Nursery, west of New Seward Highway, along the existing highway right-of-way to Huffman Road.
- East of New Seward Highway, a property line barrier is located in the northeast quadrant of DeArmoun Road and New Seward Highway. The barrier is approximately 400 feet long.
- A noise barrier located east of New Seward Highway begins just south of Tradewind Drive on the west side of Brayton Drive and extends north approximately 2,600 feet, ending south of Jennifer Lane.

- North of Huffman Road and west of New Seward Highway is an existing barrier approximately 600 feet long and beginning south of East Klatt Road.
- North of O'Malley Road and east of New Seward Highway, two barriers protect most of the Southwood Manor Trailer Court. The southernmost barrier begins north of Donna Drive east of Brayton Drive and extends for approximately 500 feet. The second barrier begins south of Gelien Loop between Brayton Drive and New Seward Highway and extends 1,000 feet. This second barrier would need to be relocated under the Build Alternative because of the realignment of Brayton Drive to the west.

3.9.3 Traffic Noise

Measured Traffic Noise Levels

Measurements of short-term traffic noise levels and concurrent traffic counts were conducted at the exterior areas of representative residential locations in the study area and next to New Seward Highway between June 11 and June 14, 2003. The purposes of the noise level measurements were to document existing traffic noise levels and validate the use of the traffic noise model (TNM) (described below) to predict peak-hour traffic noise exposure. The study area was closely inspected to create an accurate model of the roadway and receiver locations. During the field inspection, site-specific features that could affect the acoustical conditions at each location (such as existing terrain features, building structures, existing barriers, intervening ground types, and roadway and receiver elevations) were noted.

At the time the measurements were taken, the weather was partly cloudy to clear skies, slight winds (varying between calm to 5 miles per hour), and temperatures ranged between 60^{o}F and 75^{o}F for the duration of the measurements. The roadway pavement was dry.

Noise levels were measured at 19 locations, as depicted in Figure 3.9-1 through 3.9-4 (included at the end of this chapter). The noise monitoring locations were selected because they were representative of the noise-sensitive areas in the study area. The results of the traffic noise level measurements at the individual monitoring locations are summarized in Table 3.9-3. (Although, not all measurements were collected during peak-hour conditions, traffic volumes and speeds were assessed during the measurement period and used to validate the model.) As shown in Table 3.9-3, noise levels at locations M3, M4, M9, M11, M16, and M17 (described in Table 3.9-2) approached or exceeded the NAC.

Existing Peak-Hour Traffic Noise Levels

Approximately 150 receiver locations were used for predicting peak-hour traffic noise levels throughout the study area. Some noise receiver locations coincide with or are close to the noise monitoring locations, and some receivers are at interim locations to provide full representation of noise-sensitive areas throughout the project corridor.

TABLE 3.9-3
Summary of Measured Traffic Noise Levels (June 11-14, 2003)

Monitoring Location	Land Use	Location Description	Noise Level (dBA)		
			L_{eq}	L_{min}	L_{max}
M1	Residential	14305 Lake Otis Parkway	56.6	45.2	68.7
M2	Residential	14210 Specking Avenue between East 142nd and East 144th Avenue	52.9	42.0	61.1
M3	Residential	13800 Specking Avenue north of DeArmoun Road	65.2	51.2	75.5
M4	School	Rabbit Creek Elementary School, west end of soccer field	66.7	48.0	68.5
M5[a]	Residential/Park	East side of Hamilton Park, next to children's play area	65.9	46.8	71.0
M6	Residential	Home at northeast corner of Steeple and Brayton Drives (frontage road)	60.0	47.4	72.9
M7	Residential	Between 12661 and 12670 Tanada Circle, end of cul-de-sac	57.3	48.9	63.1
M8	Residential	1321 Klatt Road, end of cul-de-sac	62.7	50.5	70.6
M9	Residential	Eagle Crest Apartments between Huffman and O'Malley Roads	65.8	58.9	71.2
M10	Residential	Lawn area between 1661 and 1671 Elcadore Drive	63.1	57.0	67.3
M11	Residential	10320 Thuja Circle, backyard facing New Seward Highway (Cedar Hollow Subdivision)	65.4	54.9	71.2
M12	Mobile Homes	Between mobile homes at 401 and 496 Jody Circle	61.7	54.9	69.7
M13	Residential	Near 1270 Surrey Circle, multi- and single-family homes west of New Seward Highway	57.2	51.8	62.5
M14	Mobile Homes	Between mobile homes at 103 and 105 Gross Circle, behind noise barrier	60.9	54.2	67.8
M15	Residential	New single-family homes east of New Seward Highway, south of Dimond Boulevard	64.3	53.1	73.7
M16	Residential	Alpine Apartments, near Building 5310	65.5	59.9	71.7
M17	Residential	4901 Becharof Street, east of New Seward Highway	68.7	61.5	76.4
M18	Residential	4554 Homer Drive, near the southbound Tudor Road on-ramp	62.6	57.8	70.0
M19	Residential	3919 Helvetia Drive, front yard of home	64.3	56.3	68.6

[a] Measured noise levels at monitoring location 5 include contribution from aircraft noise.

L_{eq} = Equivalent average noise level for the measurement period.
L_{min} = Minimum noise level during the measurement period.
L_{max} = Maximum noise level during the measurement period.

To calculate existing levels of peak-hour noise, existing volumes of peak-hour traffic, traffic speed, and percentages of automobiles, medium trucks, and heavy trucks were used in the TNM developed for the analysis. One step during noise modeling includes an evaluation of how well the noise levels measured in the field and those calculated by the TNM agree. This evaluation serves to validate the use of the model in predicting existing and future peak-hour traffic noise levels. Comparison of the measured noise levels to those predicted by the TNM, by using the traffic counts obtained in the field, showed that differences between measured and predicted noise levels at most monitoring locations were within ±2 dBA. For those cases, model results were used without adjustment to predict levels of peak-hour noise. At a few locations, modeled noise levels exceeded measured noise levels by 3 to 6 dBA. For those locations and nearby receivers, adjustments of 3 to 6 dBA were applied to predicted levels of peak-hour noise. Table 3.9-4 presents the predicted levels of peak-hour noise.

TABLE 3.9-4
Summary of Modeled Existing Noise Levels and Impact Assessment

Map ID	Land Use/FHWA Classification	Existing Level (dBA)	Noise Abatement Criteria
DeArmoun Road to Huffman Road			
M1	Residential/Category B	59	65
M2	Residential/Category B	58	65
M3	Residential/Category B	**69**	65
M4	Residential/Category B	**69**	65
M5	Residential/Category B	62	65
M6	Residential/Category B	61	65
M7	Residential/Category B	61	65
R1	Residential/Category B	60	65
R2	Residential/Category B	59	65
R3	Residential/Category B	62	65
R4	Residential/Category B	61	65
R5	Residential/Category B	60	65
R6	Residential/Category B	63	65
R7	Residential/Category B	**68**	65
R8	Residential/Category B	63	65
R9	Residential/Category B	**67**	65
R10	Residential/Category B	62	65
R11	Residential/Category B	59	65
R12	Residential/Category B	59	65
R13	Residential/Category B	62	65
R14	Residential/Category B	60	65
R15	Residential/Category B	**67**	65
R16	Residential/Category B	63	65
Huffman Road to O'Malley Road			
M8	Residential/Category B	60	65
M9	Residential/Category B	**69**	65

TABLE 3.9-4
Summary of Modeled Existing Noise Levels and Impact Assessment

Map ID	Land Use/FHWA Classification	Existing Level (dBA)	Noise Abatement Criteria
R17	Residential/Category B	61	65
R18	Residential/Category B	64	65
R19	Residential/Category B	**65**	65
R20	Residential/Category B	64	65
C1	Commercial/Category C	42	70
C2	Commercial/Category C	**65**	70
C3	Commercial/Category C	61	70
C4	Commercial/Category C	61	70
O'Malley Road to Dimond Boulevard			
M10	Residential/Category B	64	65
M11	Residential/Category B	**69**	65
M12	Residential/Category B	64	65
M13	Residential/Category B	59	65
M14	Residential/Category B	64	65
M15	Residential/Category B	**67**	65
R21	Residential/Category B	**68**	65
R22	Residential/Category B	64	65
R23	Residential/Category B	64	65
R24	Residential/Category B	63	65
R25	Residential/Category B	62	65
R26	Residential/Category B	**65**	65
R27	Residential/Category B	**68**	65
R28	Residential/Category B	**66**	65
R29	Residential/Category B	63	65
R30	Residential/Category B	**68**	65
R31	Residential/Category B	**69**	65
R32	Residential/Category B	**65**	65
R33	Residential/Category B	**70**	65
R34	Residential/Category B	**65**	65
R35	Residential/Category B	62	65
R36	Residential/Category B	**67**	65
R37	Residential/Category B	**72**	65
R38	Residential/Category B	**70**	65
R39	Residential/Category B	**72**	65
R40	Residential/Category B	**71**	65
R41	Residential/Category B	**74**	65
R42	Residential/Category B	**66**	65
R43	Residential/Category B	**69**	65
R44	Residential/Category B	63	65
R45	Residential/Category B	61	65

TABLE 3.9-4
Summary of Modeled Existing Noise Levels and Impact Assessment

Map ID	Land Use/FHWA Classification	Existing Level (dBA)	Noise Abatement Criteria
R46	Residential/Category B	**69**	65
R47	Residential/Category B	63	65
R48	Residential/Category B	**66**	65
R49	Residential/Category B	58	65
R50	Residential/Category B	**65**	65
R51	Residential/Category B	58	65
R52	Residential/Category B	64	65
R53	Residential/Category B	58	65
R54	Residential/Category B	63	65
RR1	Residential/Category B	**70**	65
RR2	Residential/Category B	**70**	65
RR3	Residential/Category B	**70**	65
RR4	Residential/Category B	**66**	65
RR5	Residential/Category B	**65**	65
RR6	Residential/Category B	**65**	65
R55	Residential/Category B	60	65
R56	Residential/Category B	63	65
R57	Residential/Category B	61	65
R58	Residential/Category B	**66**	65
R59	Residential/Category B	**66**	65
R60	Residential/Category B	**70**	65
R61	Residential/Category B	**67**	65
R62	Residential/Category B	**69**	65
R63	Residential/Category B	**69**	65
R64	Residential/Category B	60	65
R65	Residential/Category B	**67**	65
R66	Residential/Category B	**65**	65
R67	Residential/Category B	**65**	65
C5	Commercial/Category C	63	70
C6	Commercial/Category C	70	70
Dimond Boulevard to Dowling Road			
R68	Residential/Category B	63	65
R69	Residential/Category B	63	65
R70	Residential/Category B	63	65
R71	Residential/Category B	63	65
R72	Residential/Category B	6**7**	65
R73	Residential/Category B	64	65
R74	Residential/Category B	**65**	65
R75	Residential/Category B	**69**	65
R76	Residential/Category B	**66**	65

TABLE 3.9-4
Summary of Modeled Existing Noise Levels and Impact Assessment

Map ID	Land Use/FHWA Classification	Existing Level (dBA)	Noise Abatement Criteria
C7	Commercial/Category C	66	70
C8	Commercial/Category C	69	70
C9	Commercial/Category C	69	70
C10	Commercial/Category C	70	70
C11	Commercial/Category C	69	70
C12	Commercial/Category C	68	70
C13	Commercial/Category C	**71**	70
C14	Commercial/Category C	69	70
C15	Commercial/Category C	**72**	70
C16	Commercial/Category C	68	70
C17	Commercial/Category C	**70**	70
Dowling Road to 36th Avenue			
M16	Residential/Category B	**71**	65
M17	Residential/Category B	**69**	65
M18	Residential/Category B	**67**	65
M19	Residential/Category B	**70**	65
R77	Residential/Category B	**75**	65
R78	Residential/Category B	**75**	65
R79	Residential/Category B	**70**	65
R80	Residential/Category B	**66**	65
R81	Residential/Category B	**71**	65
R82	Residential/Category B	64	65
R83	Residential/Category B	**72**	65
R84	Residential/Category B	**68**	65
R85	Residential/Category B	63	65
R86	Residential/Category B	**71**	65
R87	Residential/Category B	**71**	65
R88	Residential/Category B	63	65
R89	Residential/Category B	**70**	65
R90	Residential/Category B	**67**	65
R91	Residential/Category B	64	65
R92	Residential/Category B	**67**	65
R93	Residential/Category B	**72**	65
R94	Residential/Category B	**65**	65
R95	Residential/Category B	**67**	65
R96	Residential/Category B	**73**	65
R97	Residential/Category B	**69**	65
C18	Commercial/Category C	68	70
C19	Commercial/Category C	**70**	70
C20	Commercial/Category C	68	70

TABLE 3.9-4
Summary of Modeled Existing Noise Levels and Impact Assessment

Map ID	Land Use/FHWA Classification	Existing Level (dBA)	Noise Abatement Criteria
C21	Commercial/Category C	**72**	70
C22	Commercial/Category C	68	70
C23	Commercial/Category C	65	70
C24	Commercial/Category C	67	70
C25	Commercial/Category C	**70**	70
C26	Commercial/Category C	69	70

Notes:
Bold numbers indicate locations where existing noise levels already exceed the noise abatement criteria

M12, M13, M17, and M18 have been adjusted based on the calibration.

As shown in Table 3.9-4, existing peak-hour traffic noise levels are predicted to exceed the NAC at the following locations:

- Two single-family homes west of New Seward Highway, just north of the Specking Avenue cul-de-sac, represented by receivers R7 and M3
- The west side of the soccer field at Rabbit Creek Elementary School, exterior areas of the Baha'i Faith structure, and a single-family home at the southeast corner of Brayton and Tradewind drives, represented by receivers M4 and R9
- Units in Eagle Crest Apartments facing New Seward Highway, located east of the highway and south of East 112th Avenue, represented by receiver M9
- The multifamily homes located along Elcadore Drive, east of New Seward Highway, represented by receivers R23, R24, and M10
- The homes in the Cedar Hollow Subdivision facing New Seward Highway, from the Cornerstone Church south of Thuja Avenue to north of Cedrus Court, represented by receivers R27, R28, R31, M11, R34, R35, R38, R39, R41, and R42
- The single-family homes along Thimbleberry Drive, west of New Seward Highway, represented by receivers R30, R32, R33, R36, R37, R40, and R43
- The mobile homes from Jody Circle north to Stacey Circle, east of New Seward Highway, represented by receivers M12, R52, R58, R59, R60, R61, R62, and R63
- The newly constructed single-family homes east of New Seward Highway, south of Dimond Boulevard, represented by receivers R65, R66, R67, and M15
- The Polaris school located at the southeast corner of the Dowling Road interchange, represented by receivers R75 and R76
- The first row of units in the Alpine Apartments, facing New Seward Highway south of Alpenhorn Avenue, represented by receivers R77, R78, M16, and R79
- The single-family homes along Becharof Street, east of New Seward Highway, represented by receivers R80, R81, M17, R83, R84, R87, R89, and R90

- Apartment structures along Homer Drive, south of Tudor Road, represented by receivers R86, M18, and R92
- The single-family homes along Saint Gotthard Street and Helvetia Drive, east of New Seward Highway and north of Tudor Road, represented by receivers R93, R94, M19, R95, R96, and R97

3.9.4 Airport Noise

Commercial jet aircraft departures from TSAIA are substantial contributors to the overall noise environment in the northern half of the project corridor. At receiver locations along the highway, noise levels created by jet aircraft departing TSAIA in a westerly direction overshadow traffic noise levels during aircraft single events. However, traffic noise remains the dominant source of steady noise in the ambient noise environment at locations along the corridor.

3.10 Social Characteristics

This section discusses social conditions and social groups in the New Seward Highway study area, and includes community council areas directly adjacent to the highway. The study area boundary conforms to the boundaries of geographic units for which data are available. The most relevant geographic units for this environmental document are community council boundaries and census blocks or tracts.

Because community council boundaries do not conform directly with census block group boundaries and often cut through them where their boundaries intersect, an automated method that relied on ArcMap was used. ArcMap is a computer program based on geographic information system (GIS) mapping. All census block groups that are either contained within or intersect community council boundaries were selected. Census block groups that were determined to have less than 50 percent of their area within the community council boundaries were removed from that selection. All statistical data from the selected block groups were combined and used to identify the applicable statistics for community council areas.

3.10.1 Community Character

Portions of 10 community council areas within the MOA comprise the New Seward Highway study area. Community councils are nonprofit, voluntary, and self-governing neighborhood groups that represent public opinion in that particular area (Anchorage Federation of Community Councils, 2006). Community council members include individuals, property owners, nonprofit organizations, and representatives of businesses operating within the council boundaries. Table 3.10-1 provides demographic information for the study area. In general, south Anchorage contains more affluent neighborhoods. Communities on the southern end of the study area have the highest percentages of owner-occupied homes, which correspond with the lowest percentages of minority populations and lower percentages of low- to moderate-income populations.

TABLE 3.10-1
Demographic and Housing Characteristics of the Study Area

	State of Alaska	Municipality of Anchorage	Rogers Park	Midtown	Tudor Area	Campbell Park	Taku/ Campbell	Abbott Loop	Bayshore/ Klatt	Huffman/ O'Malley	Old Seward/ Oceanview	Rabbit Creek
Population (%)												
White	69.3	72.2	83.7	55.9	73.4	67.3	71.2	70.9	75.8	88.0	86.6	91.5
Black	3.5	5.8	3.0	6.2	5.6	6.3	5.1	5.4	3.1	1.2	1.2	0.6
American Indian, Alaska Native	15.6	7.3	4.0	14.0	6.9	9.4	6.6	7.0	6.1	3.0	4.4	2.8
Asian	4.0	5.5	4.2	12.5	5.9	5.6	6.7	7.1	5.9	3.8	2.1	1.2
Hawaiian and other Pacific Islander	0.5	0.9	0.2	0.7	0.2	1.5	0.8	0.6	0.4	0.1	0.4	0.0
Some other race	1.6	2.2	1.3	4.6	2.2	3.5	2.5	2.3	2.2	0.6	0.9	1.0
Two or more races	5.5	6.1	3.6	6.1	5.7	6.4	7.1	6.7	6.5	3.3	4.4	2.9
Hispanic or Latino	4.1	5.7	3.6	8.8	4.8	8.9	6.5	6.0	5.6	2.5	4.4	2.4
Over 65	5.7	5.5	14.6	7.7	8.1	4.5	4.9	3.1	3.9	3.9	5.0	3.9
Under 18	30.4	29.1	24.9	20.9	27.0	25.4	27.4	32.3	32.1	32.3	30.4	30.4
Households												
Owner-occupied (%)	62.5	60.1	78.2	91	66.3	39.5	61.5	72.0	76.9	90.9	82.4	91.7
Renter-occupied (%)	37.5	39.9	21.8	9	33.7	60.5	38.5	28.0	23.1	9.1	17.6	8.3
Median household income ($)	55,546	51,571	69,419	32,968	60,287	38,297	51,628	60,009	67,276	94,620	78,335	100,150
Median family income ($)	63,682	59,036	78,153	42,245	67,819	43,854	56,921	62,660	68,513	97,138	80,368	105,652
Median house value ($)	137,400	152,300	180,466	74,900	173,300	93,600	115,070	138,050	137,550	213,966	179,675	236,733
Median contract rent ($)	664	696	989	640	835	724	846	895	858	717	668	1,192

Source: U.S. Census Bureau (2000)
Note: Neighborhood census data presented are only an approximations because census data and community council boundaries do no perfectly align. However, these data make a fair representation of neighborhood statistics for use in this environmental document.

Larger home sites are also found in this area of the Anchorage Bowl. The northern end of the highway has higher percentages of households that are renter-occupied, which corresponds with the higher percentages of low- to moderate-income population distributions.

The following sections provide a brief overview of the social characteristics of the community council areas and the MOA overall.

Municipality of Anchorage

Anchorage is the largest city in Alaska. More than 40 percent of the state population resides within its boundaries. At the time of the 2000 census, Anchorage contained 260,283 people in 95,080 households (U.S. Census Bureau, 2000). The MOA is the financial, commercial, and cultural center of Alaska, as well as a major transportation hub. The Port of Anchorage, TSAIA, Alaska Railroad, and highway system all combine to make Anchorage the primary distributor of goods for Alaska.

The average sales price of a single-family home, reported by the Alaska Department of Labor and Workforce Development in the first quarter of 2003, was $224,971. The average per capita personal income in the MOA was $36,949, compared to $31,027 for the state overall. The city has a lower percentage of minority populations than is found on average in the state of Alaska. Seventy-two percent of the population in Anchorage is white, with the remaining percentages split almost evenly among the different ethnic population groups.

Rabbit Creek Community Council

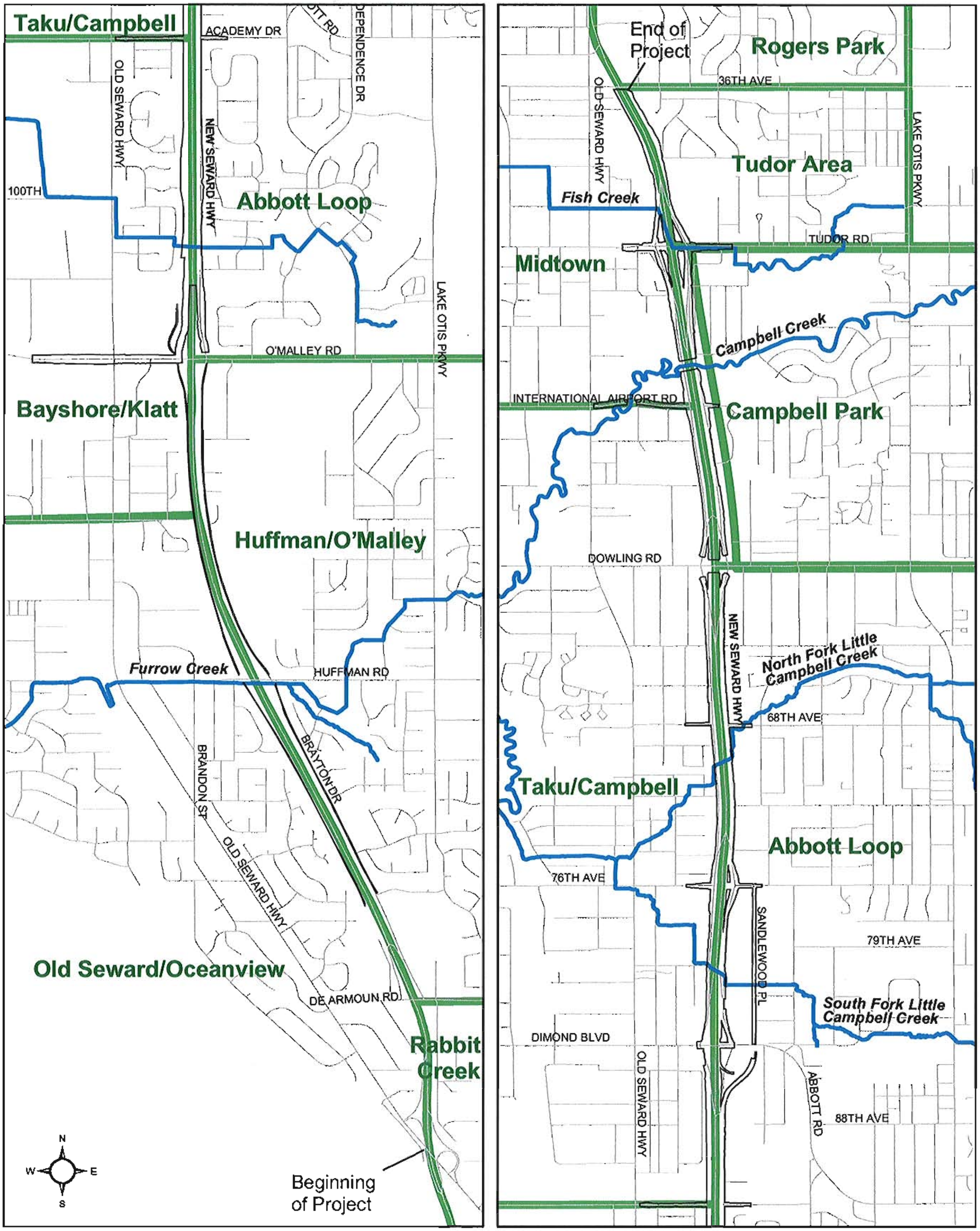
The Rabbit Creek community council area lies east of New Seward Highway below DeArmoun Road, and stretches along Turnagain Arm toward Potter Marsh (see Figure 3.10-1). This community contains the highest percentage of population that is white and the highest percentage of owner-occupied households in the study area. Residential land use is mainly single family; housing lots are larger; and more vacant land is apparent in this part of the study area. Rabbit Creek Elementary is located east of the highway, north of the DeArmoun Road overpass.

Old Seward/Oceanview Community Council

This community council area lies west of New Seward Highway below Huffman Road, stretching to the southern terminus of the proposed project. A high percentage of the population is white. More than three-quarters of the households are owner-occupied. Larger single family homes make up most of this community council area, except for commercial uses along Old Seward Highway and a large nursery west of the highway near the DeArmoun Road overpass.

Huffman/O'Malley Community Council

This community council area lies east of New Seward Highway between O'Malley and DeArmoun roads. The population is mainly white with relatively low representation of minority populations, and approximately one-third of the population is younger than age 18. Most of the households are owner-occupied, ranking the community second in the study area for the number of owner-occupied homes. Most homes near the study area are multifamily residential, however. This community council area contains most of the recreational locations in the study area, including a driving range, indoor water park, indoor golf, ice arenas, athletic club, and public softball fields.



Legend

Streams

Roads

Community Councils

Proposed Footprint

FIGURE 3.10-1
Community Councils in Study Area

0 500 1,000 2,000 3,000 4,000 Feet

Bayshore/Klatt Community Council

The Bayshore/Klatt community council area lies west of New Seward Highway and stretches all the way to the western edge of the Anchorage Bowl and Cook Inlet. The residents of this area are predominantly white and many are younger than age 18. Most of the homes in this community council area are owner-occupied. The area closest to the highway is mostly multifamily homes and townhouses. The western edge of this community council area contains higher-end single-family homes with views of Cook Inlet.

Abbott Loop Community Council

The Abbott Loop community council area lies east of New Seward Highway between Dowling and O'Malley roads. A large portion of this area located nearest the highway is characterized by industrial use. Portions of Abbott Loop also stretch up to the hillside area, incorporating part of Far North Bicentennial Park at its eastern boundary. The population is mainly white, with nearly one-third of individuals younger than age 18. Homes are mainly owner-occupied, although most of the homes along the project corridor are multifamily. There is a large mobile home park along the highway frontage road to the east. Nearly all of the churches in the study area are located in this community council area.

Taku-Campbell Community Council

The Taku-Campbell community council area is bordered by International Airport Road to the north, New Seward Highway to the east, 92nd Avenue to the south, and Minnesota Drive to the west. This area contains housing subdivisions and several mobile home parks. The population is mostly white. Campbell Creek is a prominent feature running through the middle of this community council area. Land uses near New Seward Highway are mostly industrial and commercial, with more residential uses west of Old Seward Highway.

Campbell Park Community Council

The Campbell Park community council area is located east of the highway below Tudor Road. The population of this area is mainly white and contains the second highest number of American Indian/Alaska Native populations in the study area. Less than half of the households are owner-occupied. Near the project corridor, most housing is multifamily residential. The Campbell Park Greenbelt, a popular recreation area, runs through the middle of this community council area.

Tudor Area Community Council

The Tudor Area community council area lies directly below Rogers Park, east of New Seward Highway and north of Tudor Road. The population is mainly white, and more than half of the households are owner-occupied. This community council area abuts the University of Alaska campus and likely contains a large student population.

Midtown Community Council

The Midtown community council area lies west of Rogers Park and the highway. Again, the population is mainly white. Midtown is very diverse, with the highest number of minority populations among community council areas identified in the study area. Midtown and Campbell Park also contain the highest numbers of renter-occupied households.

A 2003-2004 MOA redistricting of community councils, in an attempt to reflect present-day neighborhoods, split the former Spenard Community Council, creating the current Midtown Community Council (MOA, 2006).

Rogers Park Community Council

Rogers Park community council area, a small area with a mostly white population, lies just north of the study area. More than three-quarters of households are owner-occupied. Rogers Park also contains the highest number of individuals older than 65 years of age because of a senior center located in this community council area.

National School Lunch and Breakfast Program Data

A review of findings for the National School Lunch and School Breakfast Program for low-income households, reported in the *Anchorage School District: Profile of Performance (2004-2005)* (Anchorage School District, 2006), revealed the following data for schools along the proposed project corridor:

School Name	Children Identified as Economically Disadvantaged, %
Polaris Middle School	8.6
Rabbit Creek Elementary School	11.0
Tudor Elementary School	48.8

These data indicate a large percentage of students at Tudor Elementary School (Campbell Park Community Council area) are from households with incomes that are lower than those for the two other schools along the project corridor. This school is located in the northern portion of the study area, east of the existing New Seward Highway, and has been identified as an area with low- to moderate-income families.

3.10.2 Travel Patterns and Accessibility

Vehicular Travel

New Seward Highway is a major roadway in Anchorage's transportation system as well as the National Highway System. It serves intra-urban movements; connects the outlying southern communities with the facilities, services, and employment opportunities in Anchorage; ties northern Alaska with southern segments of the state; serves a major share of freight movements; and provides connection to intersecting arterials and access to adjoining land uses.

New Seward Highway runs north-south down the middle of Anchorage. Major destination land uses are located in the midtown and downtown areas on the north side of the city. Rapidly growing suburbs and residential developments lie north of the city limits. New Seward Highway carries more traffic than any other north-south corridor in Anchorage, including substantial commuter traffic during the morning and evening peak hours. Farther south, the highway links the communities of Bird and Girdwood and the Kenai Peninsula with the urban amenities of Anchorage.

Large residential areas on both sides of the highway in the northeast and southeast sections of the MOA require traffic to cross east-west across the facility. These traffic patterns cross and conflict with traffic accessing major commercial destinations that lie north-south along the same arterial road network. This pattern requires the roads to function for both through traffic and local access to commercial property (HDR Alaska, 2002).

The 1991 Long Range Transportation Plan (LRTP) identified New Seward Highway crossings at International Airport Road, 68th Avenue, 76th Avenue, and 92nd Avenue as "missing links" (MOA, 2001b). In 1993, DOT&PF prepared the *Location Study Report for the Anchorage Urban Capacity Improvements Program* (1993). It noted that providing grade separations for the highway crossings alone will not complete the road grid. Many of these east-west arterials do not connect to Lake Otis Parkway or Minnesota Drive, two other north-south corridors paralleling New Seward Highway. This lack of east-west continuity tends to force drivers into circuitous routes on and off the highway, further adding to congestion on existing east-west through streets.

Commuter and Transit Travel

The MOA Public Transportation Department provides various types of transit services in the city, including fixed-route bus service, flexible route van service, and a car and van pooling program.

Fixed-route bus service consists of a fleet of 50 buses, with 39 operating during peak hours, 23 operating during off-peak hours, and 8 for spare bus needs (MOA, 2000b). Two fixed-route buses (Routes 2 and 60) provide north-south service to communities along and adjacent to New Seward Highway. These routes account for approximately 1.5 percent of all person trips in these communities. Bus Route 2 serves communities on the east side of the highway, traveling between downtown Anchorage and O'Malley Road. This bus route also serves some communities on the west side of the corridor between O'Malley Road and Dimond Boulevard. Bus Route 60 serves communities on the west side of the highway only, traveling between downtown Anchorage and those communities located near the intersection of Huffman Road and Old Seward Highway.

No bus routes travel along New Seward Highway in the study area; however, several routes providing east-west service cross the highway at various locations. Route 2 crosses the highway at O'Malley Road, and Routes 2 and 36 cross the highway at 36th Avenue. Route 75 crosses the highway at Tudor Road.

Flexible route van services are available to senior citizens and prequalified riders who are unable to use the fixed-route bus system because of disabilities. Between 1999 and 2001, the flexible route system provided an average of 119,037 annual trips. This system provides curb-to-curb services for riders who wish to meet the drivers at their curbs or driveways, door-to-door services for riders who require assistance from entries or doorways, and demand trip services for passengers who travel to different destinations at varied times.

The car and van pooling program is operated by the Public Transportation Department through an agreement with DOT&PF. This system consists of a 13-van contractor fleet and car and van pools. The number of active pools varies because people move in and out of the program. Between 1999 and 2001, the annual average numbers of pools were 407 cars and 15 vans.

Bicycle and Pedestrian

Bicycle and pedestrian travel is limited to the shoulders of frontage roads that parallel New Seward Highway. Narrow shoulders on the frontage roads do not provide adequate safety for this traffic. Pedestrian and bicycle travel across New Seward Highway is disrupted by insufficient east-west roadway connections at many locations along the corridor and the lack of overpasses and underpasses across the highway. The only existing bicycle and pedestrian facility on the New Seward Highway corridor is a discontinuous paved multiuse trail on the west side of the highway between Huffman and O'Malley roads. No bicycle and pedestrian pathways are separate from vehicle rights-of-way for frontage roads or facilities that are continuous along the highway corridor. The Considerations Relating to Pedestrians and Bicyclists section (3.15) provides additional information.

3.10.3 Traffic Safety

Three years worth of traffic accident data (1999 to 2001) were used to assess the safety performance of New Seward Highway (DOT&PF, 1999a, 2000b, and 2001a). Although no pedestrians were involved in the accidents reported for the New Seward Highway mainline, it should be noted that this analysis was not performed for the frontage roads.

Alaska traffic accident data show that the New Seward Highway mainline and ramps in the study area (Rabbit Creek Road to 36th Avenue) averaged 169 accidents per year between 1999 and 2001. Most accidents occurred between the Tudor Road and 36th Avenue intersections, with a 3-year average accident rate of 469 accidents per 100 million vehicle miles traveled (VMT). This rate is twice as high as the national average for the same period (231 accidents per 100 million VMT).

Most fatal accidents in the study area during the 3-year study period occurred at highway segments and ramps adjacent to the O'Malley Road intersection. No fatal accidents occurred at this intersection in 1999, 16 occurred in 2000, and 1 occurred in 2001. For the same time period, increases in the numbers of nonfatal crashes were recorded at this intersection. Despite the rise in fatal and nonfatal accidents, there was no significant increase in the VMT during these years. Most accidents near the O'Malley Road intersection occurred during the winter months, when the roadway was icy or wet (DOT&PF, 1999a, 2000b, and 2001a).

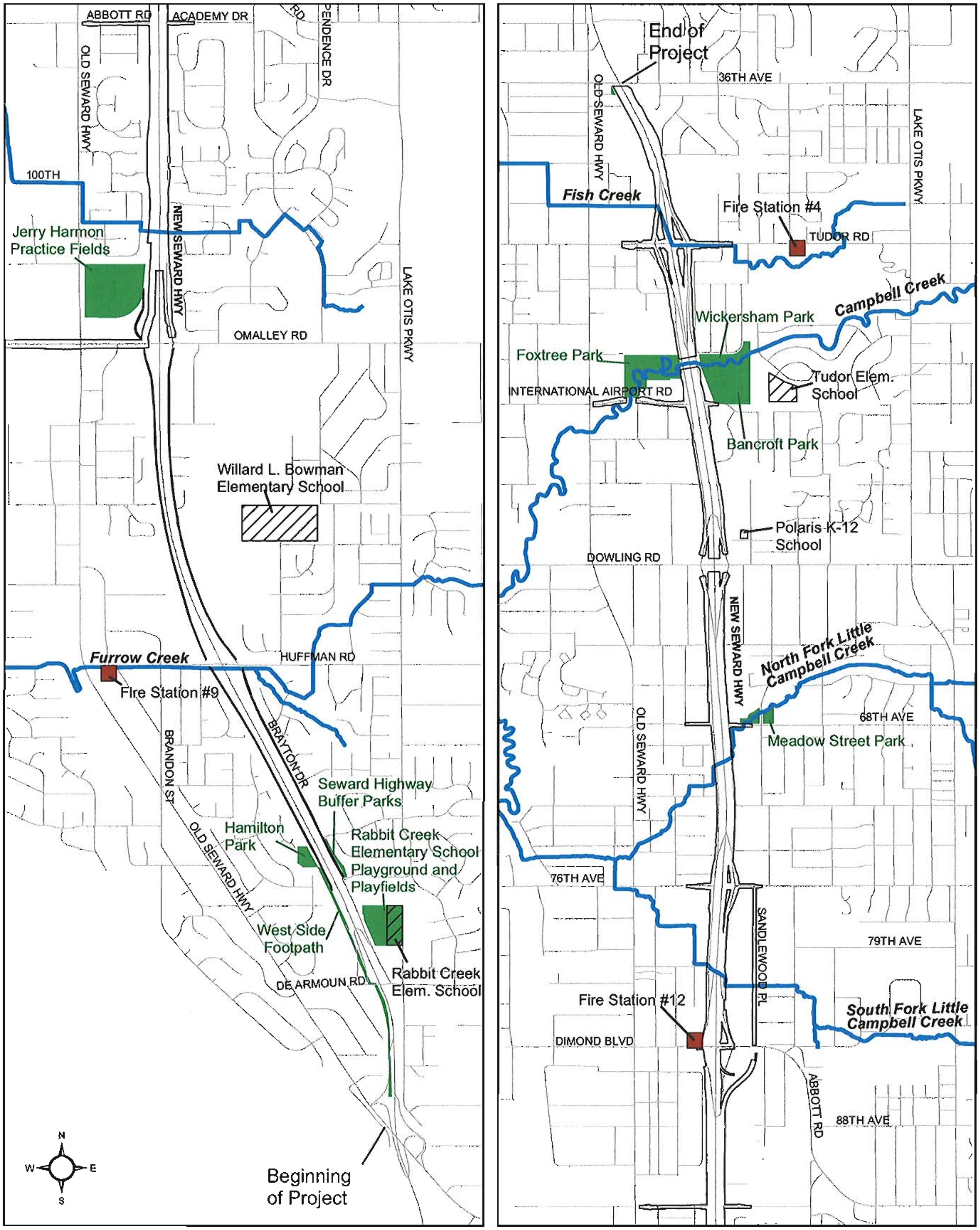
The existing configuration of New Seward Highway is mostly straight with no sharp turns and relatively flat grades. However, freeway ramps are too closely spaced and ramp connections to the frontage roads are deficient (DOT&PF, 2001b). The ramp connections lack the capacity to handle peak-hour, off-ramp traffic volumes, which creates difficulties for frontage road drivers trying to merge with off-ramp traffic. Congested traffic at the frontage road intersections often backs up onto the ramps and disrupts traffic flow on the mainline highway.

3.10.4 Public Services

Schools

Three public elementary schools and one K-12 school are in the study area (Figure 3.10-2):

- Rabbit Creek Elementary, 13650 Lake Otis Parkway (Huffman/O'Malley community)
- Willard L. Bowman Elementary, 11700 Gregory Road (Huffman/O'Malley community)
- Polaris K-12 School, 1444 East Dowling Road (Abbott Loop community)
- Tudor Elementary, 1666 Cache Drive (Campbell Park community)



\\MINER\PROJ\ADOT\159372\GIS\MXD\REPORT\FIG3-10-2_PARKS.MXD 05/05/2006 09:35:45

Legend

- Fire Station
- Park
- Proposed Footprint
- Stream
- Road
- School

FIGURE 3.10-2
Parks, Schools, and Other Public Facilities in Study Area

0 500 1,000 2,000 3,000 4,000 Feet

Polaris K-12 is one of two schools in the Anchorage area that does not have specific enrollment boundaries, and therefore is not served by the school bus system. Students either walk, drive, or are driven to school. Polaris is also the only K-12 school in the Anchorage School District. The remaining schools in the study area are served by the Anchorage School District bus system.

Parks and Recreation Areas

Recreation facilities in the study area include parks, playfields, paths and trails, and indoor facilities. Most recreation facilities are located in the southern half of the study area (Figure 3.10-2).

The playground and playfields associated with Rabbit Creek Elementary School lie at the western edge of the school property, closest to New Seward Highway and the northbound frontage road. Facilities include a softball field, soccer field, and playground. The play areas can be accessed on foot from the path along the frontage road or by entering school grounds from the east. Facilities are used by school children during the day (as allowed by weather conditions), but are open for public use during nonschool hours and when not in use by a childcare program.

The west-side footpath in the southern part of the study area travels from DeArmoun Road through a nursery, eventually leading to Hamilton Park, which has been officially designated a neighborhood park by the MOA. Between DeArmoun Road and the pedestrian crossing over New Seward Highway to Rabbit Creek Elementary School, the footpath is not well defined and shares space with parking associated with nearby buildings. Heading north from the overcrossing to Hamilton Park, the path is paved and roughly 8 feet wide. Near the park, the footpath is separated from New Seward Highway by a wooden fence; farther south it is separated from the highway by a chain-link fence. The footpath temporarily stops at Hamilton Park, but resumes north of O'Malley Road and continues to Dimond Boulevard. Although some vegetation shields the path from the highway, conditions on the path are fairly noisy because there is no frontage road between the path and New Seward Highway to provide distance. (There is also a signed bicycle route along signed streets between Huffman Street and O'Malley Road.)

Hamilton Park is a 1.8-acre park in the middle of the Old Seward/Oceanview community council area. The west-side footpath mentioned above connects into the southern end of the park and terminates at the northwest corner of the park. Facilities at the park include a basketball court, open grass area, three picnic tables, a playground, and swing set. Trees, vegetation, and a wooden noise wall buffer the park from New Seward Highway, which is directly adjacent to the east. Despite the buffering, highway traffic can still be easily heard at the park.

A strip of greenery along the northbound frontage road between Rabbit Creek Elementary School and Legacy Street is the MOA Seward Highway Buffer Park. This 0.76-acre park serves as a buffer between New Seward Highway to the west and houses to the east. The green strip is an area of natural open space, with a drainage swale running through parts of it. A wooden noise wall west of the green space reduces traffic noise coming from New Seward Highway; however, highway traffic noise is still evident. Running through the buffer park is a paved path, which is approximately 8 feet wide. The path continues south to

DeArmoun Road. The path also connects to a pedestrian overcrossing of New Seward Highway by Rabbit Creek Elementary School.

The Jerry Harman Practice Fields are located between Old Seward Highway and New Seward Highway, just north of O'Malley Road. This land is owned by DOT&PF. A local little league uses the fields with DOT&PF's permission. There are two junior-sized ball fields, four softball fields, and one baseball field. Field conditions are fair, but the fields have fenced outfields and removable bases. Noise is evident from both highways. Access is from Old Seward Highway.

The MOA Meadow Street Park consists of two densely wooded parcels with a stream running through them. The two roughly 1-acre parcels are bisected by Meadow Avenue, which leads to the Twin Ponds subdivision. The park property has no facilities and no formal pathways into its interior. North of the Meadow Street Park property are two ponds formed by small concrete barriers (presumably the namesake of the subdivision). The eastern pond has a picnic bench and a gravel path that leads around the pond. The western pond has a gravel path with a wooden footbridge. Although not defined as city park property, the two ponds provide higher-value passive recreation than Meadow Street Park. Meadow Street Park and the twin ponds are somewhat buffered from highway noise by a storage yard that lies between the park and New Seward Highway with its frontage road.

The MOA Bancroft Park is located east of New Seward Highway and Brayton Drive and north of Alpenhorn Avenue. The park consists of 8.5 acres of natural undeveloped space surrounding an open grass field that has the geometry of a former baseball field. Two informal trails made by tire tracks travel north through the park toward Campbell Creek and appear to be used to access the creek in Wickersham Park. Adding to noise from the highway, airplanes fly directly overhead as they takeoff and land at TSAIA. The combined road and air traffic causes extremely high, although temporary, noise levels.

Adjacent to Bancroft Park is Wickersham Park, another MOA park that consists of two parcels totaling 5.64 acres. The park provides passive recreational opportunities, but does not have any recreational amenities such as playground equipment, athletic fields, or picnic tables. The most distinguishing feature of the park is Campbell Creek, which flows from east to west through it and under New Seward Highway into Foxtree Park on the west side of the highway. Traffic noise is very apparent near the highway and frontage roads.

Foxtree Park, also an MOA park, is a naturally wooded, 10.4-acre park. A wooden footbridge provides access to the park from a development north of International Airport Road and west of New Seward Highway. The footbridge connects with a path that goes under the highway and frontage roads and along the creek into Wickersham Park. The path is most likely used by people seeking a spot to fish. The path under the highway is not accessible year-round because water levels during peak flow months would be too high, cutting off the path under the highway and frontage road bridges. The park is very noisy near the highway and frontage roads.

The Helen Louise McDowell Sanctuary Conservation Easement, in the northeast quadrant of the intersection of Tudor Road and New Seward Highway, protects 14.4 acres in Midtown Anchorage and is considered park land by the MOA. The property contains Class B conservation wetlands and provides habitat for wildlife and open space within an urban context. The wetlands are part of the Fish Creek drainage system and are vital to maintaining Fish Creek flow levels. The MOA holds title and considers this area as open space with public access allowed on soft trails. It will be maintained essentially as is with minor improvements for future nature trails and enhancing bird habitat.

Other types of privately owned recreational establishments are plentiful and concentrated in the southern half of the study area. South of O'Malley Road is a recently completed indoor water park with a mini-golf course next door at the Castle on O'Malley. The Alaska Club South, complete with Olympic-size swimming pool and climbing wall, is located on the west side of the highway at the O'Malley Road overpass. Next to this facility is the Tesoro ice-skating rink. Also in south Anchorage around the Dimond Boulevard area are Skateland (an indoor roller skating rink), a large ice-skating rink in the Dimond Mall, and the new Bonnie Cusack ice-skating rink located east of Dimond Boulevard on East 88th Avenue. Tanglewood Lakes Golf Club is located east of New Seward Highway along the frontage road north of O'Malley Road. Road Runners of Alaska Inc. Amusements located on Homer Drive near Dimond Boulevard provides a go-kart track.

Police and Fire Protection

The MOA provides all police and fire protection in the study area. The Anchorage Police Department is the largest police department in Alaska, serving a population of roughly 227,000 in a service area encompassing 159 square miles. There are five patrol districts in the MOA—North, South, East, West, and Central. The study area falls entirely within the South Patrol District. The Anchorage Police Station is located outside the study area.

The Anchorage Fire Department Operations Division consists of 280 personnel covering three rotating 24-hour shifts in 15 fire stations. Three of these stations are located in the study area. Fire Station 9 is located on Huffman Road and Old Seward Highway; Fire Station 12 is located on New Seward Highway between Abbott Road and Dowling Road, and Fire Station 4 is located on Tudor Road between New Seward Highway and Lake Otis Parkway. See Figure 3.10-2.

The Anchorage fire service area covers the immediate 100 square miles of the Anchorage Bowl. Emergency medical service coverage extends throughout the entire MOA. Mutual Aid agreements exist between the Anchorage Fire Department, TSAIA Aircraft/Rescue/Fire, Elmendorf Air Force Base Fire Department, Fort Richardson Fire Department, Girdwood Volunteer Fire Department, and Chugiak Volunteer Fire Department. During the wildland fire season, the Alaska State Division of Forestry and the U.S. Bureau of Land Management help protect residents and property lying within the 1,956-square-mile MOA.

Churches

Of the nine churches exist in the study area, five are between or near Dimond Boulevard and O'Malley Road. The study area churches are Unification Church of Alaska, Korean Open Door Presbyterian, Family Federation International, Grace Pentecostal Church, Baha'i Center, Grace Community Church, Alaska Oriental Mission Church, Christian Church of Anchorage, and God's Greater Holy Temple.

Other Facilities

The nearest medical facilities to the study area are Providence Hospital and the Huffman First Care Clinic. Providence Hospital is located on University Drive, an extension of 36th Avenue to the east. The First Care Clinic Huffman branch is located in the Huffman town center. A funeral home is located off of Old Seward Highway near Klatt Road, west of New Seward Highway. There are 14 daycare facilities in the study area (Environmental Data Resources, 2003).

3.10.5 Social Groups

Anchorage is gradually becoming less industrialized and is broadening its economic landscape, with more retail trade and a larger service sector. It possesses the wide range of economic and cultural opportunities associated with major metropolitan areas. Social groups most likely affected by highway improvements would be the communities nearest the highway right-of-way, including residents of the Southwood Mobile Home Park, east of the highway within the Abbott Loop community council area. New home sites have been developed west of the highway in the community of Taku/Campbell and east of New Seward Highway, south of Dimond Boulevard. Like most households in the study area, these new homes are primarily owner-occupied (Table 3.10-1).

3.11 Economics

This section discusses current economic conditions and trends in the MOA and the State of Alaska, including employment trends, income levels, and the local tax base.

3.11.1 Municipality of Anchorage

The study area is in Anchorage, the state's financial and commercial center and main transportation hub. The Port of Anchorage, TSAIA, Alaska Railroad, and highway system combine to make the transportation sector a critical element of the city's economy. Growth of the MOA was associated initially with the development of military installations during World War II, and later by the discovery of oil and the construction of the trans-Alaska pipeline. Recently, the city has broadened its economic base with growing retail and services industries. Generally, the city and state economies move on a different cycle than the national economy, depending heavily on oil prices, fishing, and tourism. Unlike larger cities in the Pacific Northwest, Anchorage has not experienced the rapid rise of high-tech companies; therefore, it was not affected by the relatively recent collapse of the high-tech industry.

3.11.2 Population and Households

Historical trends in population since 1990 for the MOA and the State of Alaska are shown in Table 3.11-1. In 1990, Anchorage had a population of approximately 226,000. During the next decade, the population increased by an average annual rate of 1.4 percent to 260,000 in 2000. From 1990 to 2000, the state's population grew at a slightly slower pace of 1.3 percent per year, increasing from 550,000 to 627,000.

Housing units in the city grew from 94,000 in 1990 to more than 100,000 in 2000, an average annual increase of less than 1 percent. During the same period, the state experienced an average annual increase in housing units of 1.2 percent from 233,000 to 261,000.

TABLE 3.11-1
Historical Population and Housing

Area	1990	2000	Average Annual Change, 1990–2000 (%)
Population			
Municipality of Anchorage	226,338	260,283	1.4
State of Alaska	550,043	626,932	1.3
Housing Units			
Municipality of Anchorage	94,153	100,368	0.6
State of Alaska	232,608	260,978	1.2

Source: U.S. Census Bureau (2000).

3.11.3 Employment

Table 3.11-2 presents average annual employment by sector for the MOA and the State of Alaska. From 1997 to 2001, employment increased from approximately 123,000 to 135,000, an average annual increase of 2.3 percent. During the same period, the state experienced employment growth of 2 percent. Services, retail trade, government, and transportation, communication, and utilities (TCU) were the largest employers in the MOA in 1997 and 2001. Three sectors experienced the largest average annual growth rates in the MOA: agricultural, forestry, and fishing, 6.2 percent; TCU, 5.7 percent; and manufacturing, 5.1 percent, respectively. Industry sectors experiencing the largest growth in the state were mining, TCU, and construction. Nonclassifiable industry within the MOA experienced a decline in employment from 1997 to 2001, and manufacturing and wholesale trade experienced reductions in employment statewide.

Table 3.11-3 presents the percentage of total employment by industry for Anchorage and the State of Alaska in 1997 and 2001. Both the MOA and the state have experienced increases in the relative share of employment in the TCU and service sectors and a decline in the relative share of employment in retail trade. The share of employment in manufacturing increased slightly in Anchorage and declined for the state. Anchorage experienced a decline of nearly 1 percent in the government sector; there was no change in share of government employment at the state level.

TABLE 3.11-2
Nonfarm Employment: Municipality of Anchorage and State of Alaska

	Anchorage			State of Alaska		
Industry	**1997**	**2001**	**Average Annual Change (%)**	**1997**	**2001**	**Average Annual Change (%)**
Agriculture, forestry, and fishing	620	790	6.2	1,520	1,584	1.0
Mining	3,342	3,562	1.6	9,611	11,338	4.2
Construction	6,952	7,558	2.1	13,134	14,927	3.3
Manufacturing	1,958	2,386	5.1	15,653	14,114	-2.6
TCU	12,535	15,642	5.7	24,142	28,137	3.9
Wholesale trade	5,954	5,945	0.0	8,773	8,407	-1.1
Retail trade	24,377	25,359	1.0	47,066	49,445	1.2
Finance, insurance, and real estate	6,329	6,854	2.0	10,957	11,493	1.2
Services	33,864	38,471	3.2	64,065	71,563	2.8
Non-classifiable	69	17	-29.5	246	53	-31.9
Government	26,987	28,346	1.2	70,948	76,881	2.0
Total	**122,987**	**134,930**	**2.3**	**266,115**	**287,942**	**2.0**

Source: Alaska Department of Labor and Workforce Development (2003).

TABLE 3.11-3
Total Nonfarm Employment by Industry

.	Anchorage (%)		State of Alaska (%)	
Industry	**1997**	**2001**	**1997**	**2001**
Agriculture, forestry, and fishing	0.5	0.6	0.6	0.6
Mining	2.7	2.6	3.6	3.9
Construction	5.7	5.6	4.9	5.2
Manufacturing	1.6	1.8	5.9	4.9
TCU	10.2	11.6	9.1	9.8
Wholesale trade	4.8	4.4	3.3	2.9
Retail Trade	19.8	18.8	17.7	17.2
Finance, insurance, and real estate	5.1	5.1	4.1	4.0
Services	27.5	28.5	24.1	24.9
Non-classifiable	0.1	0.0	0.1	0.0
Government	21.9	21.0	26.7	26.7
Total	**100.0**	**100.0**	**100.0**	**100.0**

Source: Alaska Department of Labor and Workforce Development (2003).

Major Employers

Table 3.11-4 lists the largest employers in the state of Alaska headquartered in Anchorage. This list illustrates the diversity in the region's economy, with representative businesses in the service, retail, communications, natural resource extraction, and tourism industries. Many of the businesses operate work sites in communities outside Anchorage.

TABLE 3.11-4
Largest Employers with Headquarters in Anchorage

Company	Employees	Company	Employees
Providence Health Systems Alaska	3,369	Alaska Communications Systems	984
Safeway Stores/Carrs	3,252	Phillips 66	919
Fred Meyer	2,262	GCI Communications	902
Wal-Mart/Sam's Club	2,178	Kmart Corporation	856
Alaska Airlines	1,833	Alaska Regional Hospital	851
VECO Operations	1,535	Wells Fargo	839
BP Exploration	1,147	Southcentral Foundation	749
Federal Express	1,121	First National Bank of Alaska	741
Alaska Petroleum Contractors	1,105	Alaska USA Federal Credit Union	735
NANA Marriott, Joint Venture	992	Nabors Alaska Drilling Company	735

Source: Alaska Department of Labor and Workforce Development (2003).

3.11.4 Unemployment

The annual unemployment rates for the MOA, the State of Alaska, and the United States are presented in Table 3.11-5. For the 6-year period from 1997 to 2002, the unemployment rate for the MOA was lower than the average for the state. The unemployment rate for the MOA peaked in 1997 at 5.8 percent, and remained below 5 percent until 2002, when it increased by 1 percent, consistent with the slowdown in the state and national economies. During this period, the unemployment rate of Anchorage generally trended closely with the rate of the country and the overall rate of the state trended higher.

TABLE 3.11-5
Comparison of Unemployment Rates

	Unemployment Rate (%)					
Area	1997	1998	1999	2000	2001	2002
Anchorage	5.8	4.1	4.5	4.8	4.4	5.4
Alaska	7.9	5.8	6.4	6.7	6.4	7.7
United States	4.9	4.5	4.2	4.0	4.7	5.8

Source: Bureau of Labor Statistics (2003).

3.11.5 Per Capita Income from 2000 U.S. Census

Table 3.11-6 presents per capita income for the MOA, State of Alaska, and United States. The 2000 U.S. Census data indicated that the census tracts adjacent to the New Seward Highway had median household income levels of $36,697 to $104,538. The median household income for the MOA was $55,546, with 7.3 percent below the poverty level. The median household incomes were $ 51,571 for Alaska and $41,994 for the United States and households below the poverty level represented 9.4 percent and 9.2 percent, respectively (U.S. Census Bureau, 2006).

TABLE 3.11-6
Comparison of Per Capita Income

Area	1990 Income	2000 Income	Average Annual Change from 1990 to 2000 (%)
Municipality of Anchorage	$19,620	$25,287	2.8
State of Alaska	$17,610	$22,660	2.7
United States	$14,420	$21,587	4.7
Anchorage as percent of state	111%	112%	
Anchorage as percent of United States	136%	117%	

Source: U.S. Census 2000 data reported by U.S. Census Bureau, 2006

Per capita income for the MOA was $25,287, which was higher than that for the state, at $22,660, and the United States, at $21,587. The per capita income for the MOA increased by approximately 29 percent ($25,287) from 1990 to 2000. During the 1990 to 2000 census period, Alaska and the United States experienced increases in per capita income of 29 percent and 50 percent, respectively. The per capita income of the MOA in 2000 was approximately 112 percent of the per capita income for the state and 117 percent of the per capita income for the United States (U.S. Census Bureau, 2006).

3.11.6 General Fund Revenues

The general fund of the MOA finances all activities by using property taxes, hotel/motel bed taxes, interest, fees, and other taxes. Property and other taxes are the largest revenue sources for the general fund. The MOA does not have a retail sales tax. For fiscal year 2003-2004, the MOA general fund had a budget of approximately $283 million (see Table 3.11-7). Property taxes accounted for $169 million, or nearly 60 percent, of the total revenue in the general fund. MOA programs funded through the general fund include road maintenance, fire and police, parks and recreation, and other services.

TABLE 3.11-7
Municipality of Anchorage General Fund Budget, 2003

Sources of Funds	Budget ($)	Percent of Total
Property taxes	169,400,000	59.8
Other taxes[a]	26,680,000	9.4
Interest, other earnings	15,800,000	5.6
Program-generated fees/fines	37,000,000	13.1
Federal/state revenues	12,500,000	4.4
Intergovernmental charges	19,500,000	6.9
Beginning fund balance	2,600,000	0.9
Total Revenue	**283,480,000**	**100.0**

Source: MOA Finance Department (2003b).

[a] Includes automobile and aircraft registration, tobacco, rental vehicle, and hotel/motel bed taxes.

Table 3.11-8 presents tax revenues for the MOA. Property taxes account for more than 86 percent of total tax revenues. The hotel/motel bed tax is the next largest contributor, accounting for nearly 6 percent of total tax revenues.

TABLE 3.11-8
Estimated 2003 Tax Revenue for the Municipality of Anchorage

Tax	Budget ($)	Portion of Total Tax Revenues (%)
Property taxes	169,400,000	86.4
Automobile registration tax	5,200,000	2.7
Tobacco tax	5,300,000	2.7
Aircraft registration tax	180,000	0.1
Rental vehicle tax	4,500,000	2.3
Hotel/motel bed tax	11,500,000	5.9
Total tax revenues	**196,080,000**	**100.0**

Source: MOA Finance Department (2003b).

3.11.7 Assessed Value

Table 3.11-9 presents the total assessed value for the MOA. In 2002, the MOA had a total assessed value of more than $17 billion. This total includes locally assessed real and personal property as well as state-assessed property. The MOA has a mill rate range of $8.87 to $16.61 per $1,000 of assessed value, depending on the taxing district in the MOA. The mill rate is composed of levies assessed by different taxing authorities, including the MOA, local schools, fire and police protection services, roads, parks and recreation, and other voter-approved initiatives. In 2003, for example, $7.37 of the total average mill rate was designated to be used for education.

TABLE 3.11-9
Anchorage Assessed Value

Description	Assessed Value ($)
Locally assessed real property	15,222,751,959
Locally assessed personal property	1,879,691,297
State assessed	39,814,170
Total	**17,142,257,426**

Source: MOA Finance Department (2003b).

3.12 Land Use

This section identifies development trends in the study area and describes existing and proposed land uses within 250 feet of the edge of the proposed project right-of-way. The analysis focuses on property that would be acquired for the proposed project and land use patterns that might be affected by the operation of the project.

3.12.1 Guiding Plans and Policies

Land use and development in the MOA are directed by three types of plans that provide guidance for specific implementation actions:

- Comprehensive plans give broad overall policy direction.
- Functional plans provide more specific direction.
- Area-specific plans provide more detail for a particular area.

Together these plans, which are described more fully below, lay out policy guidelines that are implemented through land use regulations and building codes.

Comprehensive Plan

The *Anchorage 2020: Anchorage Bowl Comprehensive Plan* (MOA, 2001a) serves as the blueprint to guide development in the Anchorage Bowl during the next 20 years. It includes land use policies and specific action strategies, but is general in nature. It provides a framework for decisions about land use and transportation, as well as public facilities, economic development, housing, and other public issues that are vital to a healthy and livable community. The Comprehensive Plan focuses on the Anchorage Bowl, the major urbanized area of the MOA. Other settled areas within the MOA—Chugiak-Eagle River, Girdwood, and Turnagain Arm—are covered by separate comprehensive plans.

Chapter 4 of the Comprehensive Plan contains the Land Use Concept Plan, which portrays the preferred land-use scenario in a series of three maps that address major new land use policies, the allocation of additional population and housing, and future open space conservation possibilities. These maps are as follows:

- The land use policy map (Figure 3.12-1, which brings together land use, transportation, design, environment, and public improvement policies to identify new urban elements in the Anchorage Bowl.

- The growth allocation map (Figure 3.12-2), which shows the scale of projected population increases in the Anchorage Bowl and additional housing needed for each subarea of the community.
- The conceptual natural open space map (Figure 3.12-3), which identifies existing natural open spaces important for recreation, local wildlife, and water quality.

Land Use Policy Map

The land use policy map does not assign a Comprehensive Plan designation for all land in Anchorage. Instead it identifies major new urban elements and designates major employment centers, redevelopment/mixed-use areas, town centers, neighborhood commercial centers, industrial reserves, and transit-supportive development corridors. Future land-use elements designated by the map along the New Seward Highway corridor include town centers near the intersections of Huffman Road and Old Seward Highway (west of New Seward Highway), Abbott Road and Lake Otis Parkway (east of the highway), and Dowling Road and Lake Otis Parkway (east of New Seward Highway). Town centers are designed to function as focal points for community activities, servicing up to 40,000 people. A major employment center created to provide one of the highest concentrations of office employment in the city is located near the northern terminus of the proposed project at 36th Avenue. This area is surrounded by land designated as redevelopment and mixed use, with medium- to high-density residential developments intended to surround the core employment center. An industrial reserve area is also designated west of New Seward Highway (and just west of Old Seward Highway) on both sides of O'Malley Road. Industrial reserves contain large vacant areas strategically located in relation to the port, railroad, and airport.

Growth Allocation Map

The growth allocation map shows the scale of forecasted population and housing by planning subarea. The study area lies in three of these subareas—Southeast, Southwest, and Central. New Seward Highway from Rabbit Creek to O'Malley Road divides the Southeast planning subarea from the Southwest planning subarea. From O'Malley Road north, the highway runs directly up the middle of the Central planning subarea, terminating at the southern boundary of the Northeast planning subarea. The growth allocation in the Southeast subarea generally continues the pattern of single-family subdivisions and low-density residential developments already well established there. Nearly one quarter of the expected 2,000 new homes planned in the Southeast subarea are to be single-family rural (large-lot, suburban style) dwellings, a higher representation than for other subareas. In the Southwest subarea, current housing patterns are called for in the future, with a 70 percent/30 percent split between new single-family and multifamily housing units. The Central subarea has much more diverse land uses and a need to accommodate a large number of people; nearly 80 percent of the projected future housing allocation for the Central subarea is multifamily.

Conceptual Natural Open Space Map

The conceptual natural open space map in the Comprehensive Plan (MOA, 2001a) shows an existing inventory of natural open spaces that are important to the community for recreation, water quality, and local wildlife populations. Various open spaces, wildlife habitats, and parklands are scattered throughout the study area; some are adjacent to New

Seward Highway. These areas (and all others on the map) are not intended to represent the future pattern of preserved open space. Instead they represent a range of future possibilities that will be reviewed by city park planners to develop an open space system on an unspecified timeline.

Functional Plans

Functional plans support the *Anchorage 2020: Anchorage Bowl Comprehensive Plan* (MOA, 2001a) and provide additional direction for the design and development of various infrastructure facilities, including streets, trails, utility corridors, and sensitive land-use areas such as wetlands and the coastal zone. Functional plans relevant to this proposed project are the *2001 Anchorage Bowl Long Range Transportation Plan* (MOA, 2001b), the *Freight Mobility Study* (MOA, 2001c), and the *Areawide Trails Plan* (MOA, 1997). The consistency of the proposed project with the policies of these plans is discussed in Section 4.13. Consistency with the Coastal Zone Management Plan (MOA, 1979) is discussed in the Coastal Zone section (3.7) of this chapter.

Area-Specific Plans

Area-specific plans support the Comprehensive Plan (MOA, 2001a) and address particular neighborhoods or districts within the MOA. As part of the implementation program for the Comprehensive Plan, the MOA has initiated a master planning process for two town centers—one in the Northway Mall area (not in the study area) and one in Abbott Town Center (in the study area). The Abbott Town Center Master Plan focuses on an area adjacent to New Seward Highway, which is generally located between Dimond Boulevard to the north, O'Malley Road to the south, New Seward Highway to the west, and Lake Otis Parkway to the east. One characteristic of the Abbott Town Center Master Plan is a 5-minute-walk core area for a mix of retail, service, public facilities, and housing (MOA, 2005c). The consistency of the proposed project with the policies of the Abbott Town Center Master Plan is discussed in Section 4.13.

Anchorage Municipal Code, Title 21, Land Use Planning

On the basis of the above-described guidance plans, the Land Use Planning section (Title 21) of the Anchorage Municipal Code outlines zoning designations that indicate specific allowable land uses in the MOA. Title 21 provides a mandate for the creation and upkeep of a comprehensive plan and also implements the guidance discussed in the Comprehensive Plan in the form of zoning districts and regulations. There are three main designations within the code—Residential (R), Business (B), and Industrial (I)—all of which are split into varying levels of density and intensity. Several other specific designations, rounding out the land use types found in Anchorage, are Public Lands and Institutions (PLI), Watershed (W), Transition (T), Planned Community (PC), Antenna Farm (AF), Marine Commercial (MC), and Marine Industrial (MI). Title 21 is currently being rewritten to modernize Anchorage land-use regulations to include development techniques and design standards, make the code more usable and easier to understand, and implement recently adopted plans and policies. The revised code is currently in the public comment stage (MOA, 2005b).

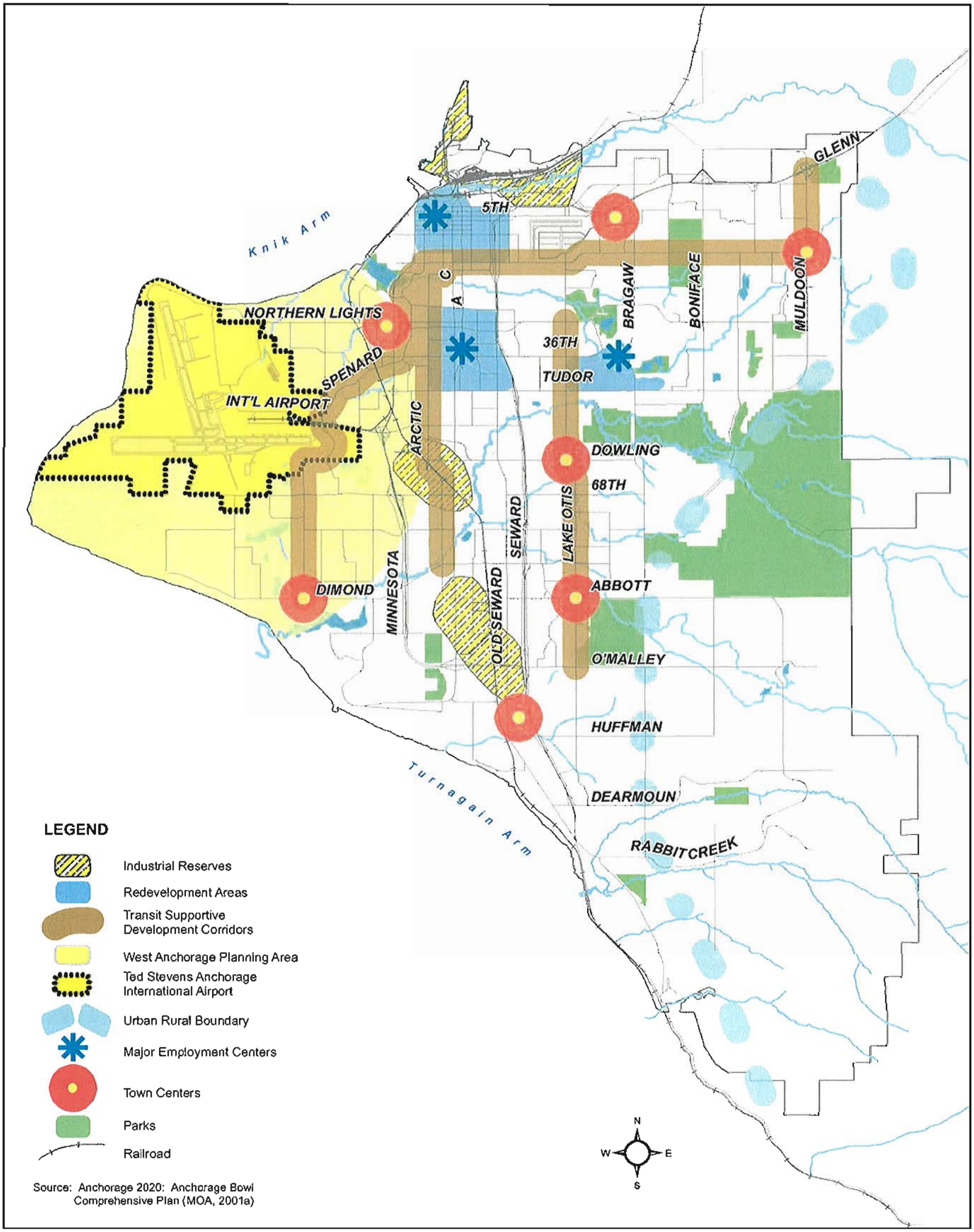


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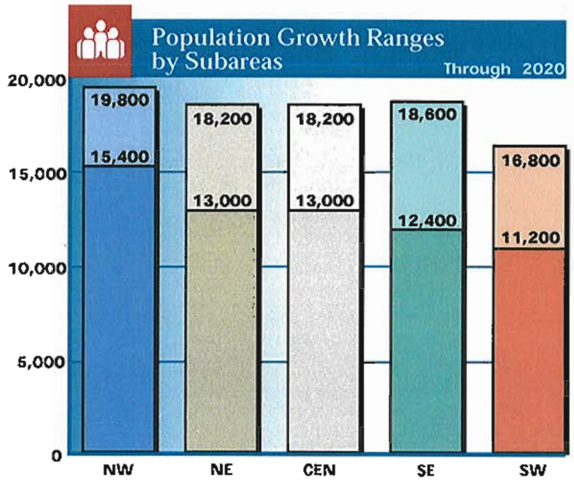
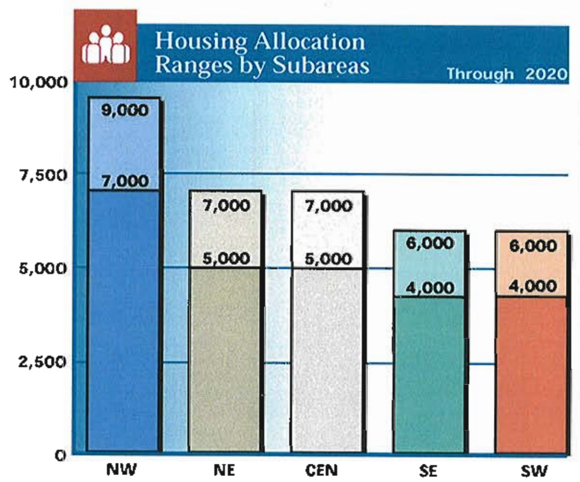
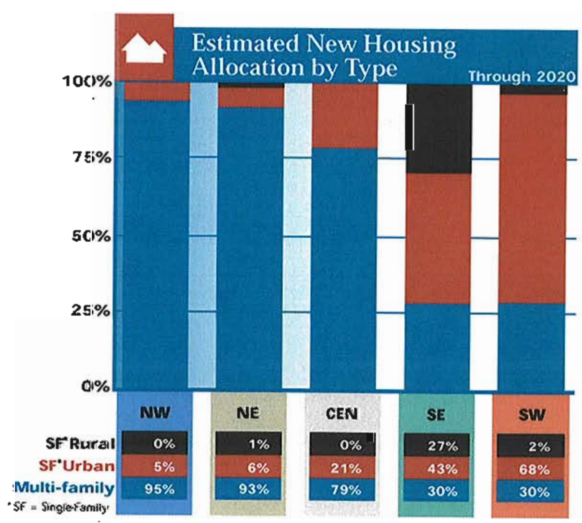
FIGURE 3.12-1
Land Use Policy Map from the Anchorage Bowl Comprehensive Plan







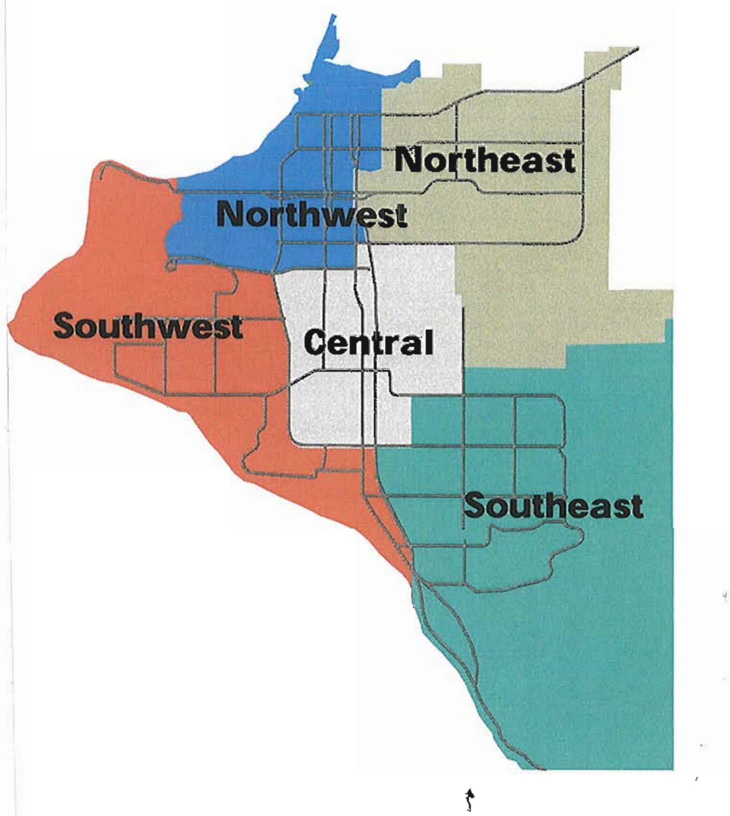
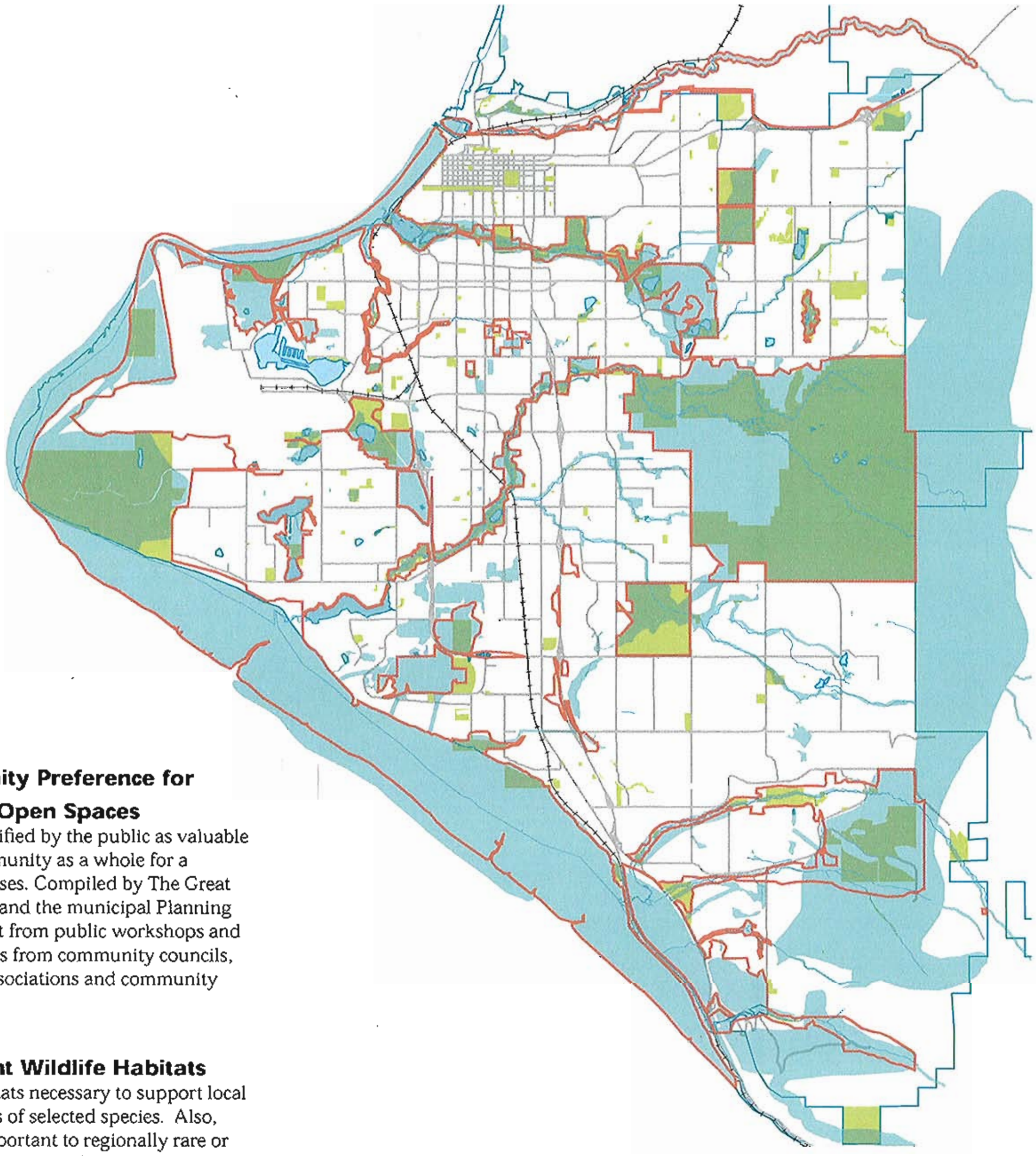


FIGURE 3.12-2
Growth Allocation Map from the Anchorage Bowl Comprehensive Plan

Source: Anchorage 2020: Anchorage Bowl Comprehensive Plan (MOA, 2001a)



Community Preference for Natural Open Spaces
Identified by the public as valuable to the community as a whole for a variety of uses. Compiled by The Great Land Trust and the municipal Planning Department from public workshops and nominations from community councils, business associations and community groups.

Important Wildlife Habitats
Habitats necessary to support local populations of selected species. Also, habitats important to regionally rare or declining species, or for species especially sensitive to disturbance. Compiled by The Great Land Trust and the municipal Planning Department from interviews with local wildlife experts and from scientific reports.

Existing Municipal Parklands
Lands dedicated or encumbered for use as parkland.

NOTE: This map is not intended to represent the future pattern of preserved open space. Instead, it shows a range of future possibilities which future planning efforts and a public process will review to develop an open space system.

FIGURE 3.12-3
Conceptual Natural Open Space Map from the Anchorage Bowl Comprehensive Plan

Source: Anchorage 2020: Anchorage Bowl Comprehensive Plan (MOA, 2001a)

Most land in the study area is zoned residential; the next largest zoning categories are commercial and light industrial. Land in the study area zoned for commercial or light - industrial use includes retail and service establishments that provide goods and services to the community and region (Figure 3.12-4) A few pockets of PLI land in the study area contain schools, churches, and fire stations.

The study area south of Huffman Road is almost entirely single-family rural residences. North of Huffman Road, rural business and light industrial zones are found east of New Seward Highway; PLI land and single-family zones predominate to the west. Closer to O'Malley Road, multifamily residential zones hug both sides of the project corridor, and general business zones lay farther west. Farther east of New Seward Highway, residential zoning gradually decreases in density from multifamily zones to single-family residential zones. Light industrial zones predominate between Dimond Boulevard and Tudor Road, west of New Seward Highway. The east side of New Seward Highway between Dimond Boulevard and Tudor Road is also mainly light industrial; however, more general business and multifamily residential zones are mixed in between the industrial zones. North of Tudor Road, land uses are zoned multifamily and single-family east of New Seward Highway; general business zones lie west of the highway and also surround the northern terminus of the proposed project.

3.12.2 Existing Land Uses

The Anchorage Bowl has a total land area of 64,500 acres. More than 75 percent (49,400 acres) is developed, leaving 15,100 acres of vacant land (MOA, 2001a). Approximately 44 percent (6,675 acres) of the vacant land is considered suitable for development; 33 percent (5,050 acres) is considered marginal for development; and 22 percent (3,375 acres) is considered unsuitable because of steep slopes, wetlands, poor soils, or seismic or other hazards that limit development potential. Currently, 73 percent of developable vacant land is zoned for residential use, 4 percent for commercial use, 8 percent for industrial use, 7 percent for public lands and institutions, and 8 percent for other uses. According to the Comprehensive Plan (MOA, 2001a), a substantial amount of commercial and industrial land in the Anchorage Bowl is underdeveloped, suggesting a potential for more intensive industrial or commercial use or redevelopment to other uses.

Field investigation revealed in general that land uses in the project corridor were consistent with their zoning designations; however, some zoning designations include special limitations. In general, major shopping areas, an extensive retail network, and a light-industrial area lie west of the project corridor. The Dimond Boulevard area west of New Seward Highway is a major commercial center, and is the single largest development and retail freight destination in Anchorage. Another large commercial center lies in Midtown west of New Seward Highway around 36th Avenue, the northern terminus of the proposed project. These commercial centers attract consumers and generate commercial truck traffic through the project corridor. New Seward Highway is a major freight corridor and provides consumer access to commercial facilities. Property east of the project corridor is mainly residential, with some mixed-use development.

The southern end of the project corridor is surrounded by primarily single-family residential units. Traveling north, the highway crosses Huffman Road, where more multifamily residential units become visible, followed by a public golf course and large tracts of public lands east of the highway. At O'Malley Road, the corridor passes through more multifamily residential lands, including a large trailer park east of the highway around 92nd Avenue. A transition to retail and light-industrial centers is apparent as the corridor begins to pass through the Central subarea starting at Dimond Boulevard. Residential development is occurring along the project corridor within the Midtown and Campbell Park community council areas. From this area north, more mixed-use development is spread along the corridor, with small pockets of public land. The corridor's northern end is mostly single-family and multifamily residential to the east, with both office and retail commercial development dominating the west side of the corridor.

3.13 Visual Resources

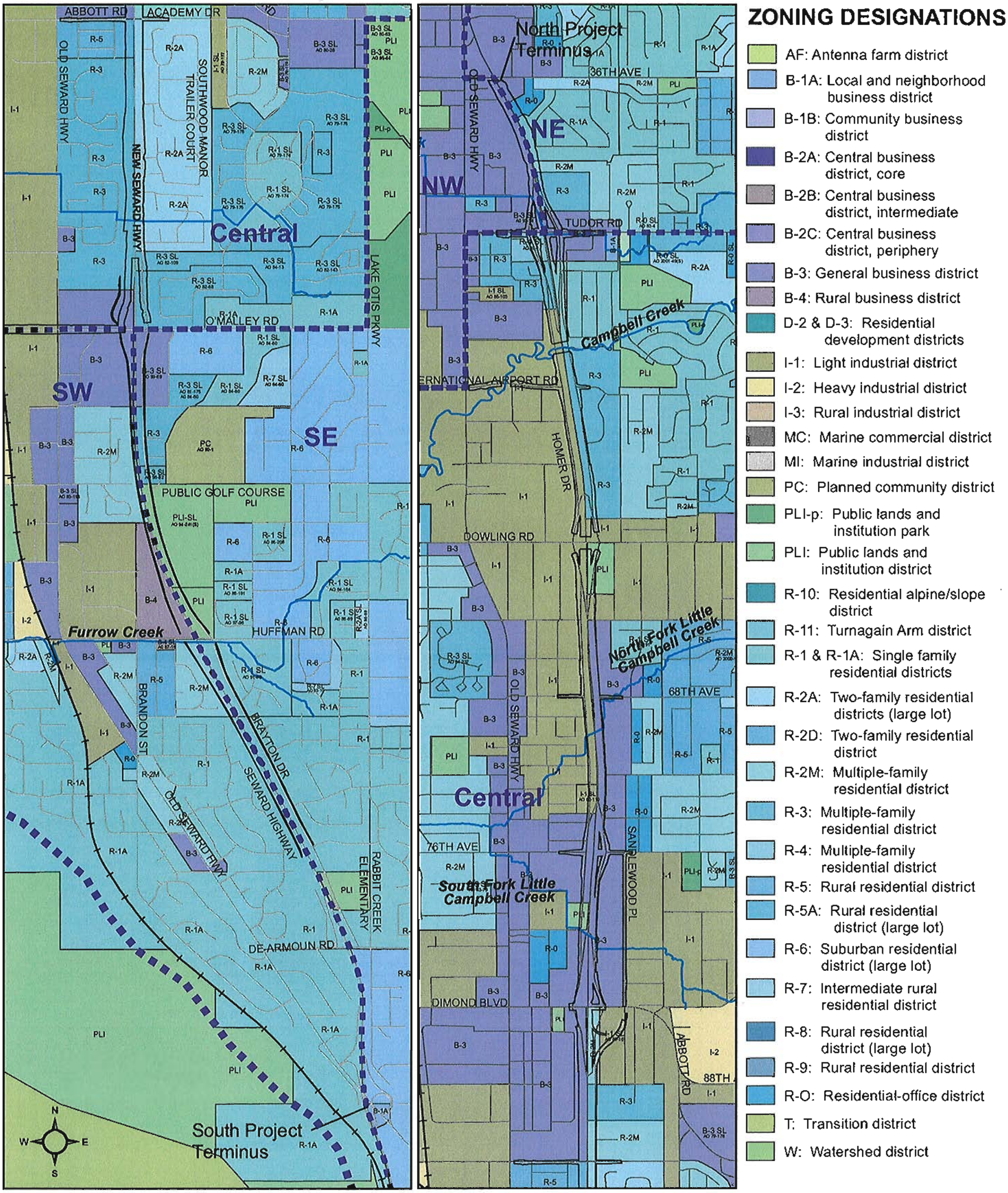
Visual resources are the natural and manmade features that form a landscape. Natural features include landforms, water bodies, and vegetation; manmade features include buildings, fences, and signs. The visual impression that a landscape makes on a viewer depends on the types of features present, the arrangement of these features, and how these features contrast. Although each viewer perceives a landscape differently, an overall landscape character that measures visual impacts on an area can be assigned. Viewers become more aware of visual changes to a landscape during highway construction projects.

Areas generally recognized as sensitive to visual change are residential areas, areas of recognized scenic beauty, parks and recreational areas, and historic or other cultural resources.

Evaluating the quality of the existing landscape in the study area provides a standard for judging the visual changes that would result from the project. Three criteria are defined in FHWA guidance (1981) for judging visual quality—vividness, intactness, and unity. These criteria are defined below:

- Vividness—the visual power or memorability of landscape components as they combine in striking and distinctive visual patterns
- Intactness—the visual integrity of the natural and manmade landscape and its freedom from encroaching elements
- Unity—the visual coherence and compositional harmony of the landscape

The following description of the affected environment for visual resources focuses on the character and quality of the landscape (the landforms, vegetation, and manmade development) and the exposure and sensitivity of viewer groups that would be affected by the proposed project.



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Legend

- Streams
- Roads
- Railroad
- Proposed Footprint
- Subarea

FIGURE 3.12-4
Zoning Districts and Subareas in Study Area

0 500 1,000 2,000 3,000 Feet

3.13.1 Viewer Groups

Viewer groups for the proposed New Seward Highway project include people who have views from the road, such as drivers and passengers, and those with a view of the road, such as residents, students, commercial and industrial employees and patrons, and recreationists. Commuter and local traffic comprises the driver and passenger viewer group, along with a large number of tourists, especially those traveling to and from the Kenai Peninsula during the summer months.

3.13.2 Visual Character and Quality

The visual character and quality of the study area views are discussed by roadway section in the subsections below. For each roadway section, the foreground, middle ground, and distant views are described.

Views from the Road

Rabbit Creek Road to Huffman Road

The foreground view of surrounding topography changes from vegetated cut slopes at the underpasses at Rabbit Creek and DeArmoun roads, to views of the surrounding mountains at the Huffman Road overpass. The cut slopes are vegetated with grasses and intermittent ornamental plantings of trees and shrubs. Concrete retaining walls topped with chain-link fence characterize the roadway section from Rabbit Creek Road to DeArmoun Road. A guardrail is intermittently visible. Between DeArmoun Road and Huffman Road, rustic wooden sound fencing lies along the east and west sides of the highway. Three parks—Hamilton Park to the west and Rabbit Creek Park and Seward Highway Buffer Park to the east—enhance the forested character of this roadway section. Other foreground visual elements include high-tower lights at the Rabbit Creek Road and DeArmoun Road underpasses and a pedestrian overpass that connects foot trails on the west and east sides near Lake Otis Elementary School.

The middle ground view to the east and west is primarily residential with deciduous trees. Exceptions are views of Lake Otis Elementary School and a church to the east and a greenhouse facility to the west.

Distant views of the Chugach Mountains and Turnagain Arm are occasionally visible from the highway.

Huffman Road to O'Malley Road

The foreground view along this New Seward Highway section is undulating topography to the north, northwest, and northeast, with a expansive background view of the mountains to the northwest at the Huffman Road overpass. The views become obscured as the road grade drops. Vegetation along the roadway is primarily native deciduous trees. Evergreen trees cover a berm northwest of Huffman Road. Fencing from Huffman Road to O'Malley Road is primarily highway chain-link fence and private backyard fences of wood and chain link. The frontage road to the east intermittently rises above the grade of the highway. High-tower lights illuminate the highway at Huffman Road and O'Malley Road. Prominent landscape features east of the highway include a golf clubhouse chalet and a large bubble structure that contains a driving range.

The middle ground views to the east and west are primarily commercial development at the overpasses with residential development in the areas between Huffman and O'Malley roads.

Distant views are the Chugach Mountains to the east and the Alaska Range to the north at the O'Malley overpass.

O'Malley Road to Dimond Boulevard

The foreground view includes high-density housing and commercial development. Small sections of undeveloped land contain a mixed forest of birch and spruce. Ornamental evergreen trees and shrubs cover two berms, one on each side of the highway between 92nd Avenue and Dimond Boulevard. Wooden sound fencing between the highway and frontage road to the east buffers a mobile home park located above the grade of the highway. Private wooden fencing screens residential development to the west. High-tower lights illuminate the overpass at the Dimond Boulevard interchange.

The middle ground views to the east and west are primarily high-density residential development. Commercial development begins at 92nd Avenue and continues north to Dimond Boulevard and beyond.

Where the highway is at or above grade, distant views of the Chugach Mountains and the Alaska Range are possible to the east and the north, respectively. There is a sweeping view to the northwest as the highway crests over Dimond Boulevard.

Dimond Boulevard to Tudor Road

The foreground view includes primarily commercial development. Intermittent native vegetation grows between the highway and the frontage road to the east between Dowling and Tudor roads. A berm buffers the Polaris School from the Dowling Road northbound off-ramps. A large commercial area around the Dimond Boulevard overpass and an industrial area around the Dowling Road overpass can be seen.

The landscape character of this New Seward Highway section is forested because of Meadow Park, an undeveloped park associated with Campbell Creek, and the Campbell Creek Greenbelt, which lie east and west of the highway. Campbell Creek and two of its tributaries are not readily visible from the highway because of vegetation and traveling speed.

Dimond Boulevard to Tudor Road is the only roadway section with a paved median and a concrete barrier, located at the Dimond Boulevard interchange. The concrete barrier is incongruous and unattractive, and appears temporary in nature. The rest of this roadway section is a wide grassy swale. Fencing between the highway and frontage roads is primarily chain link, with intermittent privacy or security fencing on adjoining properties. High-tower lights illuminate the highway at the Dowling Road overpass.

The middle ground to the east and west is primarily high-density residential development intermingled with commercial development. Distant views of the Chugach Mountains to the east and the Alaska Range to the north are intermittent.

Tudor Road to 36th Avenue

The foreground view at the Tudor Road underpass includes cut slopes and off-ramps. To the east, the north side of Tudor Road has commercial development, open space, and the

Geneva Woods subdivision. Cottonwood and birch grow intermittently along this roadway section. Existing vegetation within the right-of-way buffers the Geneva Woods subdivision from the highway. Ornamental deciduous and evergreen plantings at the 36th Avenue intersection, an area referred to as New Seward Park, provide a strong visual element. Fencing between the highway and frontage roads from Tudor Road to 36th Avenue on both sides of the highway is primarily chain link.

The middle ground view to the east is residential. The architectural character of the commercial area to the west recently was changed with the construction of a new façade; remodeling of a mall included conversion of some space to part of the University of Alaska Anchorage system. The view to the north is primarily high-rise commercial development.

Distant views are obscured by middle ground views.

At the north end of the study area, the highway changes from a controlled access facility to an at-grade intersection at 36th Avenue. This area has high traffic activity and dense retail and residential development. Mountain views are still visible, but are less prominent because of the office buildings in the foreground.

Views of the Road

Rabbit Creek Road to Huffman Road

Views of New Seward Highway between Rabbit Creek Road and Huffman Road are not prominent because this roadway section is primarily below grade. Solid wood fencing screens views of the highway at two of the residential housing areas. Rabbit Creek Road passes over New Seward Highway, affording views of the highway to the north and south.

Huffman Road to O'Malley Road

The view of New Seward Highway along this roadway section is not noteworthy because it is not obtrusive. As Huffman Road passes under the highway, viewers see concrete panel bridge abutments.

O'Malley Road to Dimond Boulevard

The view of New Seward Highway from the mobile home park to the east is obscured by a screening/noise fence. A landscaped highway berm screens views of the large commercial stores at Dimond Boulevard and Old Seward Highway. The view from the O'Malley Road underpass is characterized by concrete panel bridge abutments.

Dimond Boulevard to Tudor Road

New Seward Highway is not visible from Bancroft Park. Creek vegetation under the highway's low-profile bridges buffers the view from the Campbell Creek Greenbelt bike trail. Creek vegetation also helps to buffer the view from Bancroft Park to the east side of the highway.

Tudor Road to 36th Avenue

The view of New Seward Highway from the residential neighborhood southeast of the intersection is currently screened by a stand of native trees and shrubs growing in the right-of-way to the west and south in the Campbell Creek Greenbelt.

3.13.3 Overall Visual Character of the Project Viewshed

As previously discussed, the three criteria for judging the visual quality of an area are vividness, intactness, and unity.

The vividness of the project corridor lies in the memorable views of the Chugach Mountains to the east of the highway, the Alaska Range to the north, and Turnagain Arm to the south. New Seward Highway was designated an Alaska Scenic Highway in 1993, a National Scenic Byway in 1998, and an All American Road in 2000. The Scenic Highway designation is from the community of Seward, 126 miles south of Anchorage to 5th Avenue and Gambell Street in Anchorage. The Seward Highway Corridor Partnership Plan (DOT&PF, 1998) divided the highway into five segments. The study area lies in Segment 1, the Anchorage Gateway, which is recognized for its views of the peaks of the Chugach Mountains to the east, the Talkeetna Mountains to the northeast, and the ice-covered peaks of Mount McKinley (the highest peak in North America) and Mount Foraker (the fourth highest peak in North America). Segment 1 is the only highway segment in Anchorage from which these peaks are visible.

The intactness of the project corridor is best represented along the east side of the New Seward Highway corridor, where there is a visual separation between the forested upper hillside and the residential areas of the lower hillside throughout most of the corridor. The discontinuities in intactness are locations where residential communities have encroached upon the upper hillside or where large-scale commercial development is interspersed with small-scale residential development.

The project corridor has limited unity because of the change in surrounding land use from the residential and forested hillside to the east and the commercial and residential flat land to the west.

3.13.4 Visually Sensitive Locations

Three viewpoints were identified as representative of the typical views that would be sensitive to change because of their high visual quality in terms of combined vividness, intactness, and unity. These three areas—Campbell Creek Greenbelt, International Airport Road, and 92nd Avenue—were selected as "viewpoints" for the evaluation of visual impacts in support of this environmental document.

Campbell Creek Greenbelt

Views from New Seward Highway east and west of Campbell Creek and the Campbell Creek Greenbelt rank high for their vividness in memory, the intactness of the undisturbed natural vegetation, and unity with the surrounding native vegetation along the highway right-of-way and adjacent lands. Views of the road rank high in vividness because the low profile of the highway structures minimizes its presence in the landscape. As a result, New Seward Highway does not detract from the vividness, intactness, and unity of the surrounding natural landscape.

International Airport Road

International Airport Road currently ends at the frontage road on the west side of New Seward Highway. A local residential road on the east side of the highway also connects to the frontage road. Existing views to the east and west are of continuous strips of native vegetation growing between the highway and the frontage road in the right-of-way. The views from the highway are not vivid because of the sparseness of the native deciduous vegetation, but the views of a continuous vegetation strip contribute to the intactness of the highway foreground views separating the highway from the frontage road.

Views of New Seward Highway have a high visual quality because the low profile of the highway minimizes its presence in the landscape. Because the highway is not very visible, it does not detract from the vividness, intactness, and unity of the surrounding natural landscape. The viewer groups at this location are employees of the business park to the west and residents of the high-density residential housing to the east.

92nd Avenue

Views east from 92nd Avenue rate high for vividness (the Chugach Mountains are in the background), low for intactness (the barrier fence encroaches upon adjacent grassy fields), and low for unity (incongruous because of the abrupt change between barrier fencing and grassy fields). Views of New Seward Highway are low in vividness because native trees buffer the view of the road. Intactness is high because native trees screen the road from the view of mobile home park residents, without other visual elements encroaching upon that view. Unity ranks high because the view of New Seward Highway from 92nd Avenue as it dead-ends at the highway is consistent with the surrounding landscape and New Seward Highway is not obtrusive. This location is representative of other streets proposed to pass under New Seward Highway.

3.14 Archeology and Historic Preservation

3.14.1 Historic Properties Regulatory Framework

Federal and state regulations require consideration of project effects on historic properties. A Section 106 review process is required for projects with a federal involvement (such as requiring a federal permit, license, or funds) under the National Historic Preservation Act (NHPA).

As part of Section 106, an Area of Potential Effect (APE) must be defined. The APE is described as follows in 36 CFR 800.16(d):

> …the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties, if any such properties exist. The area of potential effect is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking.

Any historic properties found within the APE must be considered during Section 106 review. After the APE is defined, a "reasonable and good-faith effort" must be made to identify all cultural resources within the APE. This identification is completed through an Alaska Heritage Resources Survey (AHRS) of previously identified cultural resources (Office of History and Archaeology [OHA] review) and through fieldwork (windshield and pedestrian survey with subsurface testing). A more detailed description of the APE is provided in the following subsection, and the complete Historic Properties Assessment is provided in Appendix G.

3.14.2 Area of Potential Effect

The APE for the proposed New Seward Highway project consists of areas that could experience both direct and indirect project effects (see Figure 3.14-1 [included at the end of this chapter]).

The following relevant definitions are excerpted from regulations in Title 36, Part 800 of the CFR, "Protection of Historic Properties:"

> *APE* [800.16(d)]—"the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist."
>
> *Effect* [800.16(i)]—"alteration to the characteristics of a historic property qualifying it for inclusion in or eligibility for the National Register."
>
> *Historic property* [800.16(l)(1)]—"any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places maintained by the Secretary of the Interior."

Direct project effects include, but are not limited to, structural removal or alteration, building or structure modification, building or structure demolition, excavation, blading, scraping, contouring, cutting, filling, trenching, constructing, rebuilding, accessing with heavy equipment, and temporarily or permanently stockpiling or borrowing soil or other materials.

Indirect project effects include all areas that may be affected by project construction and completion activities, including physical disturbances directly related to project completion that take place after project construction is completed and impacts that do not involve physical disturbances.

Examples of indirect project effects include, but are not limited to, the following:

- Increases in access to and use of public parks, recreation areas, roadways, sidewalks, and trails as a result of increased capacity and ease of access resulting from project completion
- Damage, deterioration, use, visitation, or vandalism of archeological sites or historic properties as a result of project completion
- Access and use of facilities or property affiliated with the current project for purposes of future maintenance or repair
- Areas adjacent to interchanges, intersections, and roadways (especially empty buildings and vacant lots) that may experience an increase in litter accumulation or vandalism because of increased volume and ease of access that would result in impacts on culturally sensitive areas or compromise in the integrity of culturally sensitive areas

The New Seward Highway APE includes all of the proposed construction footprint and generally extends about one tax lot deep on all sides of the proposed footprint and interchange/intersection areas. Public park and recreation areas that abut the project footprint as well as vacant lots and other relatively open areas adjacent to the project footprint are included in the APE. The tax lots in residential neighborhoods that lie directly adjacent to the project footprint and right-of-way are generally included in the APE. In some instances, very narrow tax lots or parcels on which the project footprint is located also include their adjacent parcels in the APE to ensure a consistent APE width throughout the study area. Interchange and intersection areas and the terminal ends of the project corridor generally include a buffer of one or more tax lots at the terminal ends of the proposed project footprint.

3.14.3 Previous Studies

A historic and cultural resources site record and literature file search was conducted at the OHA on June 30, 2003. The goal of the OHA review was to determine the number and nature of previously documented historic and cultural resources in the study area. The search parameters included a half-mile buffer area on each side of the proposed highway alignment footprint and a half-mile radius at the north and south endpoints of the project alignment. Historic and cultural resources generally consist of three categories: subsurface archeological resources (prehistoric, ethnohistoric, or historic), historic (built environment) resources (usually standing buildings/structures of non-Alaskan Native origin), and Native Alaskan traditional cultural properties. The OHA review examined cultural resource reports for projects carried out in the project vicinity that would provide cultural and environmental context information for the proposed New Seward Highway project and information on the location and nature of previously conducted survey efforts.

A cultural resource study conducted in 2001, outside the New Seward Highway APE, resulted in the discovery and relocation of old historic road and trail segments; historic settlement-era cabins and outbuildings; several coastal prehistoric archeological sites; historic railroad construction camps, cabins, and a section house; a telegraph remnant station; and a historic roadhouse (Reger, 2001). There is some potential for finding similar sites in the New Seward Highway study area.

A recent study near the southern portion of the New Seward Highway study area describes an undocumented historical railroad line (possibly included in the APE). For this study, Potter et al. (2000) surveyed proposed railroad realignment locations and reported the presence of five historic sites (including at least two railroad-related sites) and no prehistoric sites in their study area. Another railroad survey conducted by Potter et al. (2002) did not find any noteworthy cultural resources. A railroad survey near the original Anchorage Townsite located several historic railroad sites and structures as well as other historic resources, although these resources are distant from the New Seward Highway study area (Cultural Resources Consultants, 2003).

Other reports about nearby project reviewed include North Wind Environmental, Inc. (2001), Conservation Company (no date), MOA (1986), and Muenster (1999).

3.14.4 Potential to Affect Historic Properties

Much of the study area has been recently developed and is modern in age; however, potential exists for the presence of prehistoric and historic cultural resources that correspond to historic and prehistoric themes. Such theme resources might include the following:

- Prehistoric habitation sites
- Homesteading or early community development
- Resource processing and use sites
- Historic transportation (road, trail, and railroad) sites
- Historic utility lines (such as telegraph, electric, and water)
- Historic settlement-era cabins, outbuildings, and associated archeological debris
- Historic military-related structures and debris
- Historic industrial structures related to the timber, oil, mining, maritime, fishing, and processing industries
- Historic residences and structures up to 50 years old

Evidence of railroading is probable along the south portion of the study area, where railroad grades are close to New Seward Highway.

Historic and cultural resources related to utilities may be present near existing roads, railroad, and property boundaries in the study area, and include old water and sewer pipes, telegraph, telephone, and electrical pole transmission lines, and insulators.

The Cold War of the late 1940s through the 1980s resulted in the establishment of military installations strategically located throughout Alaska. One such site, the Site Summit, exists at Fort Richardson, near Anchorage. Shallow rectangular "foxholes," usually measuring about 3 feet wide by 5 or more feet long by 2 or more feet deep, were constructed as part of World War II and Cold War defense strategy and can be found in urban and rural areas throughout the Anchorage area. Historic artifacts may be associated with these foxholes.

3.14.5 Previously Documented Cultural Resources

Archeological Resources

The OHA review revealed no known or documented prehistoric archeological sites in the search area. The closest known or documented prehistoric archeological sites are located northwest of the study area near downtown Anchorage and on the Anchorage coastline. Similarly, no known or documented historic archeological resources are located within the study area. The closest historic archeological resources are located in downtown Anchorage.

Historic Resources

Two potential historic properties are known or documented in the project vicinity and are shown in Figure 3.14-2 (included at the end of this chapter). Historic properties are cultural resources that are listed in, or are eligible for listing in, the National Register of Historic Places (NRHP). The two potential historic properties include the Alaska Engineering Commission (AEC) Cottage 19 (ANC-326) and the Emery Potts Homestead Cabin (ANC-424).

The AEC Cottage 19, built in 1916 and 1917, was documented as a historic structure in 1983. This one-story, one-bedroom frame cottage was designed and constructed by the AEC for housing its employees during the 1915–1923 railroad construction era (Carberry, 1979). The structure was moved from its initial downtown location, and functioned as a bar from about 1930 to the early 1950s. During the early 1950s, the structure was moved again to its present location (AHRS, 1989a). No formal statement of significance has been issued for this resource. It is unlikely to be eligible for listing in the NRHP because it does not retain integrity of original setting, location, feeling, or association. The structure is affiliated with the themes of engineering and railroad development important to local and state history. Today, the structure serves as a residence and has been slightly architecturally modified (Carberry, 1979).

The Emery Potts Homestead Cabin was a vernacular plywood frame structure that included logs, simulating a cabin, and an attached garage (AHRS, 1989b). The spacious structure was built in 1947 by Emery Potts, who served in the armed forces during World War II and homesteaded thereafter (Carberry, 1979). The structure has been demolished or removed; the location is therefore believed to be ineligible for listing in the NRHP.

Native Alaskan Traditional Cultural Properties

The OHA had no specific information on file about potential Native Alaskan traditional cultural properties in the study area. Consultation with local Native entities occurred and no religious or cultural sites were identified. (See Appendix G.)

3.14.6 New Cultural Resources

Windshield Survey Results

A windshield survey was conducted on November 3, 2003, to determine whether any buildings of historic significance were present within the APE. The APE includes the entirety of the proposed construction footprint and generally extends about one tax lot deep on all sides of the proposed footprint and interchange/intersection areas. The survey was conducted for both sides of the New Seward Highway corridor from 36th Avenue south to Rabbit Creek Road. The study area has experienced extensive growth and development in the recent past. The survey did not identify any new cultural resources.

Pedestrian Survey and Subsurface Testing

The pedestrian archeological inventory survey conducted on November 3 and 4, 2003, did not find any archeological items. No evidence of cultural deposits was encountered at any of the unit survey locations within the APE.

The findings from the shovel testing indicate that no cultural resources are present. Because of the existing extensive ground disturbance in the study area, no archeological monitoring is recommended for the proposed project.

The State Historic Preservation Office has concurred with these findings in a document dated March 30, 2006. This concurrence document is included in Appendix G.

3.15 Considerations Relating to Pedestrians and Bicyclists

3.15.1 Areawide Trails Plan

The Areawide Trails Plan is the basic planning and policy document for the development of trails in Anchorage (MOA, 1997). The plan addresses trails for a wide range of users and activities, including pedestrians, bicyclists, snowmobilers, equestrians, and mushers, among others. The Areawide Trails Plan serves as the trails implementation tool for the Comprehensive Plan (MOA, 2001a), as well as for comprehensive plans of neighboring areas.

The Areawide Trails Plan defines several kinds of trails that differ in users and locations relative to streets and roads. Pedestrian and bicyclist trails relevant to the study area are described as follows:

- Multi-use paved (or unpaved) trails do not follow roadways and are for nonmotorized pedestrian use, including bicycling, jogging, skating, cross-country skiing, and skijoring.
- Bicycle routes provide space on streets so that bicycles can share roadways. These routes are striped, signed, or both and are intended to serve commuters and cyclists.
- Sidewalks are concrete surfaces or otherwise improved areas adjacent to streets for pedestrians. They are located within public street right-of-ways that also contain roadways for use by vehicular traffic.
- Walkways are right-of-ways, dedicated to public use, that cross within a block to facilitate pedestrian access to adjacent streets and properties.
- Paths are separated trails that may or may not be in a road right-of-way. These paths are traditionally and predominantly marked as bike routes with signs throughout the MOA.

3.15.2 Existing Facilities

With the exception of older neighborhoods, the study area is characterized by sporadic sidewalk development. The corridor itself lacks pedestrian facilities. Where pedestrian systems do exist, they provide adequate capacity and the appropriate safety measures to properly serve pedestrians. The constraint to pedestrian travel, however, is generally associated with a lack of connectivity between facilities (DOT&PF, 2002).

As shown in Appendix H, New Seward Highway Pathway and Pedestrian Facilities, no uninterrupted pedestrian or bicycle facilities run the full length of the study area. Two main north-south facilities serve pedestrians. The first facility is a multi-use paved trail that runs along New Seward Highway in the middle and southern sections of the study area. In the southern part of the study area, this trail travels from DeArmoun Road through a nursery and ends at a neighborhood park (Hamilton Park). The trail shares asphalt with a parking lot south of a pedestrian bridge that crosses the highway, but the trail is clearly defined at the bridge and farther north. North of the bridge, the path is paved and roughly 8 feet wide. Some vegetation shields this path from New Seward Highway, but there is no frontage road between the trail and the highway. Conditions on the trail are fairly noisy. South of the pedestrian bridge and parking lot, the trail connects with a sidewalk on the north side of DeArmoun Road.

Farther north in the study area, the multi-use paved trail starts again along O'Malley Road. The trail curves away from O'Malley Road and runs along the west side of New Seward Highway until joining Dimond Road, where it runs along the road on a detached pathway. In this section the trail is roughly 9 feet and has a level of exposure to nearby traffic noise similar to that in the southern section.

The second north-south pedestrian facility is located east of New Seward Highway. A separated paved path roughly 8 feet wide runs along the northbound frontage road between DeArmoun Road and Legacy Road. A wooden noise wall reduces traffic noise coming from the highway. This path connects to a pedestrian overcrossing of New Seward Highway near Rabbit Creek Elementary School. At DeArmoun Road, the path attaches to 9-foot sidewalks on the north and south sides of the road.

North-south facilities specifically for bicycles are even more scattered and informal. Aside from the two sections of multi-use paved trail, no additional bike facilities exist on the west side of New Seward Highway in the study area. East of the highway, the presence of the northbound frontage road allows for some space for bicyclists, which is limited to a narrow shoulder area. The Areawide Trails Plan (MOA, 1997) designates the full length of the northbound frontage road of the New Seward Highway corridor as an Adopted Bike Trail. The segment from Tudor Road to 36th Avenue does not have a frontage road to accommodate a bike path, however. Consequently, a discrepancy exists between the proposed New Seward Highway pedestrian and bicycle improvements and the recommendations of the Areawide Trails Plan.

Existing pedestrian and bicycle facilities along the cross streets intersect New Seward Highway. DeArmoun Road has sidewalks on both the north and south sides of the road heading east and west. Huffman Road has multi-use paved and unpaved routes that extend to other north-south arterials such as Old Seward Highway and Lake Otis Parkway. O'Malley Road has sidewalks on the north side of the road only. Currently both sides of Dimond Boulevard have attached sidewalks, except on the north side east of New Seward Highway. North of Dimond Boulevard, no pedestrian or bicycle facilities cross the highway until Tudor Road, although paths and sidewalks run to the east along Lore Road and west on International Airport Road. An informal footpath follows Campbell Creek underneath the highway and both of its frontage roads. It appears to be used by fishermen wishing to access different sections of the creek and is likely not usable year-round because of water levels in the creek. Both Tudor Road and 36th Avenue have sidewalks on both sides crossing New Seward Highway.

Use of the pedestrian and bicycle facilities varies, but is generally lower in Anchorage than national averages. Anchorage residents primarily use automobiles for travel, but also rely on transit, biking, walking, and skiing. In the winter, only 1 percent of Anchorage residents travel by walking and less than 1 percent travel by bike or skis. In the summer, the percentage of the population who travel by bike or ski group climbs to 2 percent, and the portion of population walking for travel purposes remains at 1 percent (DOT&PF, 2002). The low percentage of usage is likely attributable to Anchorage's weather conditions, as well as the lack of an efficient usable pedestrian network. As a part of the East Anchorage

Study of Transportation (DOT&PF, 2002), the MOA is seeking ways to improve the pedestrian environment by adding sidewalks, limiting building setback distances, improving connectivity, and improving maintenance of the existing facilities.

3.15.3 Planned Facilities

The Areawide Trails Plan proposes pedestrian and bicycle facilities for the length of the corridor. Recreational and multi-use trails are recommended along the northbound frontage road east of New Seward Highway. A multi-use trail is planned to the west from Dimond Boulevard to 36th Avenue. The plan also recommends a system of bicycle commuter routes located approximately 1 mile apart and traveling in parallel directions north and south. The New Seward Highway frontage road is one of the recommended north-to-south commuter routes (MOA, 1997).

3.16 Hazardous Waste Sites

This section provides information on known or suspected contaminated sites that exist along the project corridor. Sites were located by searching environmental agency records for potential sites within 1 mile of the center of the right-of-way in general accordance with American Society for Testing and Materials (ASTM) Standard Practice E-1527. Other sources of information used in this evaluation include historical sources and a windshield site reconnaissance survey that was conducted along the project corridor on July 22 and 25, 2003. Another field survey was conducted on March 28and 29, 2006 for sites adjacent to the proposed project with potential to impact the project (contamination migration) or be impacted by project construction activities.

3.16.1 Summary of Standard Federal and State Environmental Record Review

This section summarizes information obtained from the search of environmental regulatory agency databases (Environmental Data Resources, 2003) and the field site visits. Additional information on these sites is included in the data report in Appendix I.

Federal NPL and CERCLIS List

No sites along the project corridor were identified in the National Priorities List (NPL) or Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS). Review of agency sources revealed five CERCLIS No Further Remedial Action Planned (NFRAP) sites along the project corridor. NFRAP sites are those sites for which no contamination was found, contamination was removed quickly without the need to be placed on the NPL, or the nature or extent of contamination did not require federal Superfund action or NPL consideration.

Federal RCRA TSD Facilities List and RCRA Corrective Action Sites

No Resource Conservation and Recovery Act (RCRA) treatment, storage, and disposal (TSD) facilities were identified within 1 mile of the center of the right-of-way for the project corridor. One RCRA corrective action site, Crowley Environmental Services at 101 East 100th Avenue (Map site 129), was located within one-quarter mile west of New Seward Highway. According to EPA records, the facility was assigned a low corrective action priority.

Federal RCRA Generators List

Two RCRA large-quantity generators (LQGs) of hazardous waste have been identified within 1 mile of the center of the right-of-way for the project corridor. There are also 81 RCRA small-quantity generators (SQGs) of hazardous waste identified. Appendix I provides a complete list of all LQGs and SQGs identified. Figure 3.16-1 shows the locations of these sites, which are listed by their respective identification numbers.

Federal ERNS List

There are no sites identified with an Emergency Response Notification System (ERNS) record along the project corridor. ERNS is an EPA database used to track information on reported releases of oil and hazardous substances.

State of Alaska Hazardous Waste Sites

Seventy-four hazardous waste sites were identified within 1-mile of the New Seward Highway corridor. Appendix I lists the state hazardous waste sites (SHWS) located within one-half mile of New Seward Highway. These contaminated sites may pose a higher risk to human health and the environment than sites listed in most other databases because a release to the environment already has occurred or is strongly suspected to have occurred.

State of Alaska Landfill or Solid Waste Site Lists

State solid waste facility and landfill site records identify one site within 1 mile west of New Seward Highway. Anchorage Refuse, Inc., is located at 6301 Rosewood and is mapped as site 66 in Figure 3.16-1. The site, which is listed as a storage facility, is also listed in state databases for leaking underground storage tanks (LUSTs) and underground storage tanks (USTs).

State of Alaska LUST Lists

There are 109 LUST sites identified along the project corridor. An additional five LUST sites were identified within about one-quarter mile of the project corridor. Information on these sites is provided in Appendix I.

State of Alaska Registered UST Lists

There are 121 registered UST sites identified along the project corridor. Sites with registered USTs within approximately one-quarter mile of the project corridor are identified in Appendix I. Figure 3.16-1 shows the locations of these sites.

3.16.2 Summary of Historical Map and Current Business Review

A search for historical fire insurance maps (Sanborn maps) of the study area was conducted to obtain information on former industrial, commercial, and residential uses. Historical maps often contain information about historical aboveground and underground tanks for fuel storage. No Sanborn maps for the project corridor are on record (Environmental Data Resources, 2003).

Selected Polk reverse city directories were reviewed from the first available volume in 1961 through 2002. The following years were reviewed: 1961, 1976, 1986, 1996, and 2002. The directories show that the study area included residential areas and mixed commercial use.

Existing Sites of Concern

During the records search, three "open" sites were identified among the properties adjacent to the New Seward Highway corridor: Magnum Marine, Denali Fuel Company, and Quik Lube.

A windshield survey of current businesses along New Seward Highway was performed to determine whether the land uses for these businesses were likely, or may have been likely in the past, to generate hazardous materials. A number of land uses, such as motor vehicle maintenance facilities and fuel service stations, are considered businesses that are likely to generate hazardous materials or hazardous substances. The survey included specific stops at sites adjacent to the project corridor to view site conditions from the public right-of-way. The windshield survey found site uses consistent with uses revealed in the environmental agency databases.

In addition to the sites indicated by the records search, several other potential sources of contamination were observed during the windshield survey of sites along the New Seward Highway corridor. These areas had containers, vehicles, tanks, and/or large equipment that have the potential to leak hazardous fluids from paint to oil based products or other necessary vehicle fluids, especially when left in place for a long period of time. These sites included Baker Hughes Inteq, Polar Refrigerant and Restaurant Equipment, Rite Way Roofing, and several self storage areas (Dimond Mini Storage, Space Place Storage, and Brown Bear Auto Body Paint and Self Storage) along the access roads. Specific comments for each site are as follows:

- ADEC records indicate that some remedial actions may have been taken at the Magnum Marine site, but were not properly reported. The results of a record review and sampling event in 2000 indicated that further action was necessary. (Contamination noted at this site included total petroleum hydrocarbon levels in soil, lead and mercury levels in drums, and asbestos in building materials.) An interview with the president of the current business at the location, which has been at the location approximately 5 years, indicated that he was not aware of any further actions. A walk through of the property revealed no obvious signs of contamination.
- The Denali Fuel Company (now Cullip Excavating) is approximately ¼ mile from Brayton Drive, but was included in the list of applicable records and site investigation because of known and possibly increasing diesel- and gasoline-range organic groundwater contamination upgradient of the site. The most recent groundwater sampling event was in 2005. No additional signs of contamination were observed during the site investigation.
- The Quik Lube Site, contaminated by waste oil leakage from a UST, although still listed as a high priority by the ADEC, has not seen any activity other than administrative actions since 1996. The current business at the location is Interior Surface Design. No signs of contamination were observed during the site visit.
- Baker Hughes Inteq, listed in the records review as having a past Resource Conservation and Recovery Information System violation in the "Generator – All Requirements" category, had a large fenced lot enclosing some old construction

equipment, about twenty 10 gallon buckets, two 50-gallon drums, a 200 gallon tank, and other miscellaneous debris.

- Polar Refrigerant and Restaurant Equipment also had potentially hazardous debris on the lot, including broken earth moving equipment and a truck.
- Rite Way Roofing had debris all along the side and back of its property, including several decommissioned vehicles, at least one refrigerator unit, a pile of used paint cans, five 50 gallon drums, and several propane type tanks. An odor of fuel was detected, and a sheen was observed on the puddles at the rear of this location.
- The self storage locations along Brayton Drive and Homer Drive had areas for long-term storage of vehicles, recreational vehicles, and equipment. The areas included both covered and uncovered storage.
- The lot beside the northbound ramp of New Seward Highway from Dowling Road is a storage area for a large number (50 to 100) of decommissioned vehicles.
- The corner lot at Sandlewood Place and 82nd Avenue (southeast corner of the intersection) was a storage area for equipment, drums and other debris. Soil staining from leaks was obvious.

3.17 Energy

The affected environment for energy considers the types, sources, and rates of use focusing on existing transportation-related energy use for the New Seward Highway corridor. The subsections below describe existing conditions affecting energy consumption, such as traffic circulation, traffic volumes, and level of service (LOS) along New Seward Highway. The discussion of traffic conditions provides the basis for an additional qualitative assessment of potential energy costs or savings.

3.17.1 Traffic Circulation

As discussed in Chapter 1, New Seward Highway is a major roadway in Anchorage's transportation system. The functions of the highway include the following:

- Service for intra-urban movements
- Connection between outlying northern and southern communities with facilities, services, and employment opportunities in Anchorage
- Connection of northern Alaska with southern segments of the state
- Service for a major share of freight movements
- Access to intersecting arterials and adjoining land uses

New Seward Highway carries more traffic than any other north-south roadway in Anchorage. The highway carries substantial home-to-work commuter traffic traveling north during the morning (AM) peak hours and returning south during the evening (PM) peak hours. Drivers traveling from large residential areas located northeast and southeast on either side of the highway must cross over or under at the interchange locations to access the highway during the commute to and from work or to access the commercial businesses located east and west of the facility. East-west connectivity is limited in the study area. The lack of east-west continuity tends to force drivers into circuitous routes on and off the highway, further adding to congestion on existing east-west through streets. These traffic patterns often conflict with the north-south traffic during peak periods, creating congestion and lower LOS.

3.17.2 Traffic Volumes

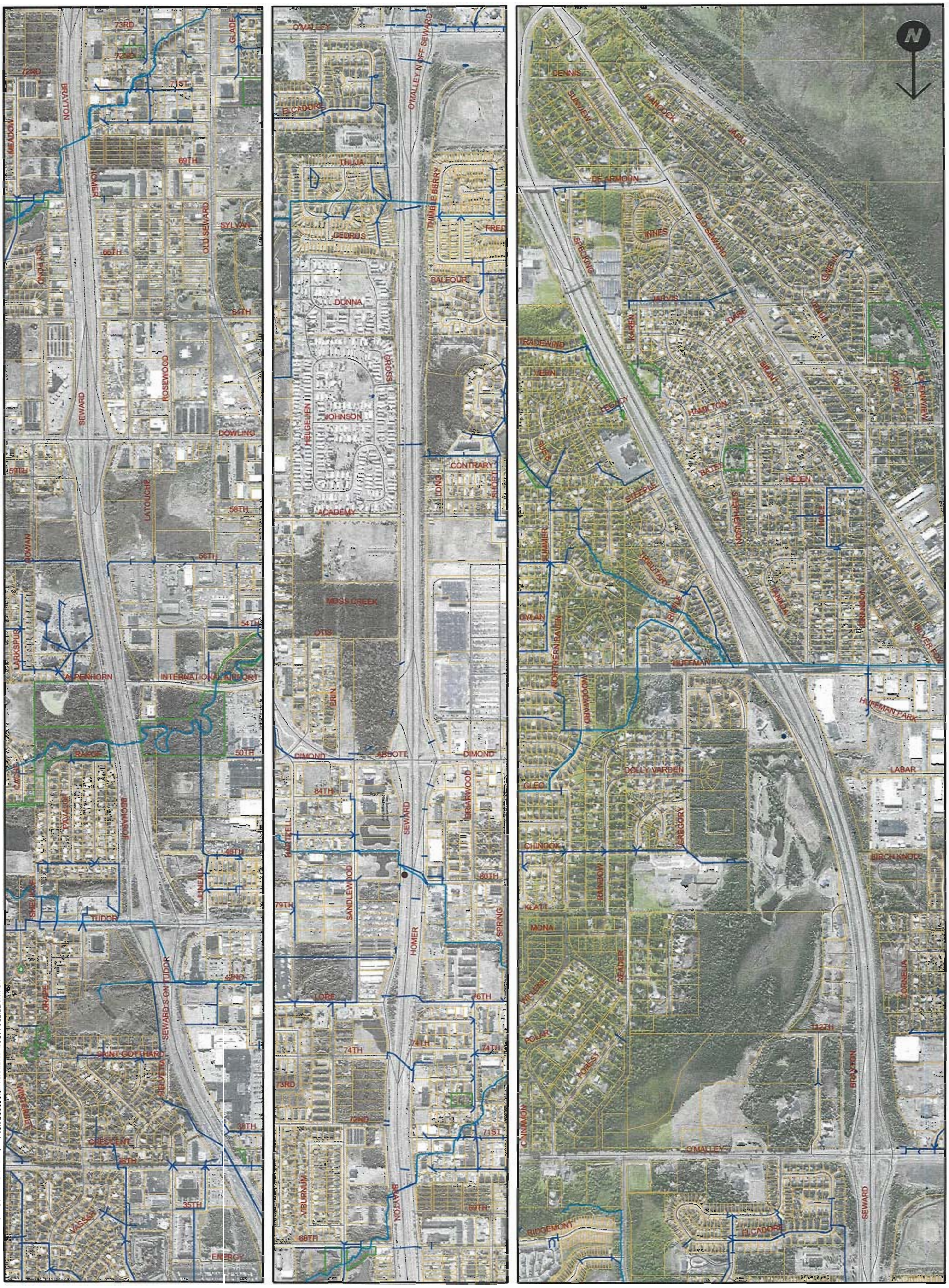
Comparison of daily traffic volume data with peak-hour data or congestion data shows that average daily traffic (ADT) volumes differ depending on the highway segment. Traffic volumes for 2002 are generally lower in the southern segments of the corridor, with volumes staying below 40,000 vehicles ADT south of Dimond Boulevard. North of Dimond Boulevard, traffic volumes rise dramatically to more than 60,000 vehicles. Table 1.3-1 (in Chapter 1) shows the ADT volumes for the New Seward Highway corridor.

3.17.3 Congestion

New Seward Highway between Tudor Road and Dimond Boulevard operates at a lower LOS northbound in the morning and southbound in the late afternoon because the volume of traffic taxes roadway capacity during morning and afternoon commute periods. In the afternoon peak period, southbound traffic flow near Tudor Road is unstable, and can deteriorate to stop-and-go conditions with extremely limited maneuverability. These conditions are exacerbated by snow and ice during winter months. Because the LOS at most New Seward Highway ramp intersections with arterials along the highway is adequate, congestion on the freeway is not exacerbated at these locations.

3.17.4 Energy Consumption

The current amount of energy consumed by automobiles, trucks, buses, and motorcycles was estimated for the existing highway by using the daily VMT divided by the average fuel consumption in miles per gallon, then multiplying the result by the British thermal units (Btu) to estimate daily energy consumption. The daily vehicle miles traveled (VMT) in the study area in 2002 was estimated to consume 34.45×10^9 Btu of energy per day. Energy is also consumed to maintain and repair vehicles (oil, tires, and general maintenance and repair), increasing daily energy consumption by 6.03×10^9 Btu, a result based on VMT (DOT&PF, 2002) times the factor from *National Transportation Statistics 2005* (U.S. Department of Transportation, 2005b).

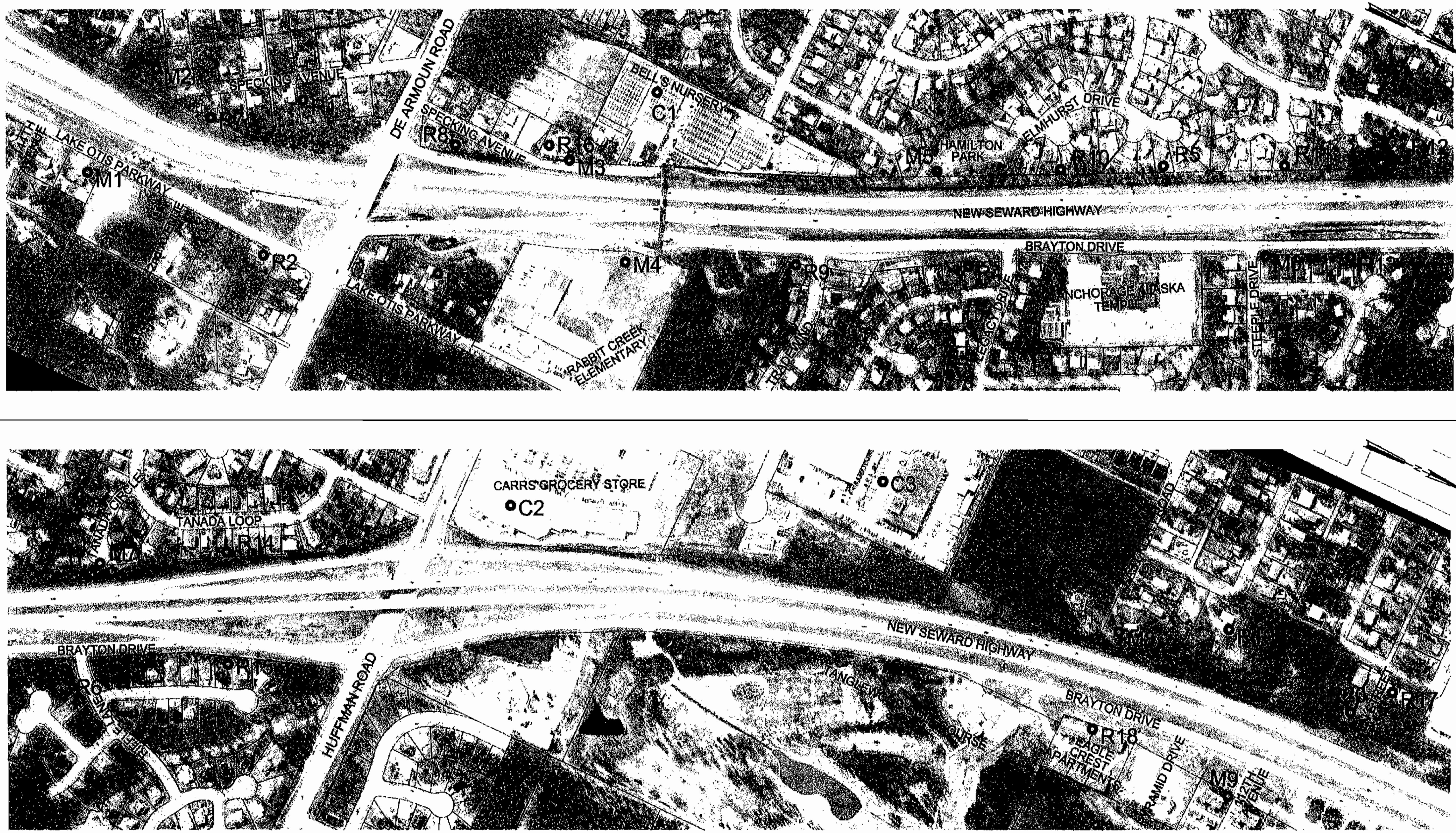


Legend

- Existing Drainage Pipes
- Existing Drainage Outfall
- Streams
- Parcel Boundary

FIGURE 3.2-7
Existing Drainage

0 500 1,000 2,000 3,000 Feet



0 200 400 600

SCALE

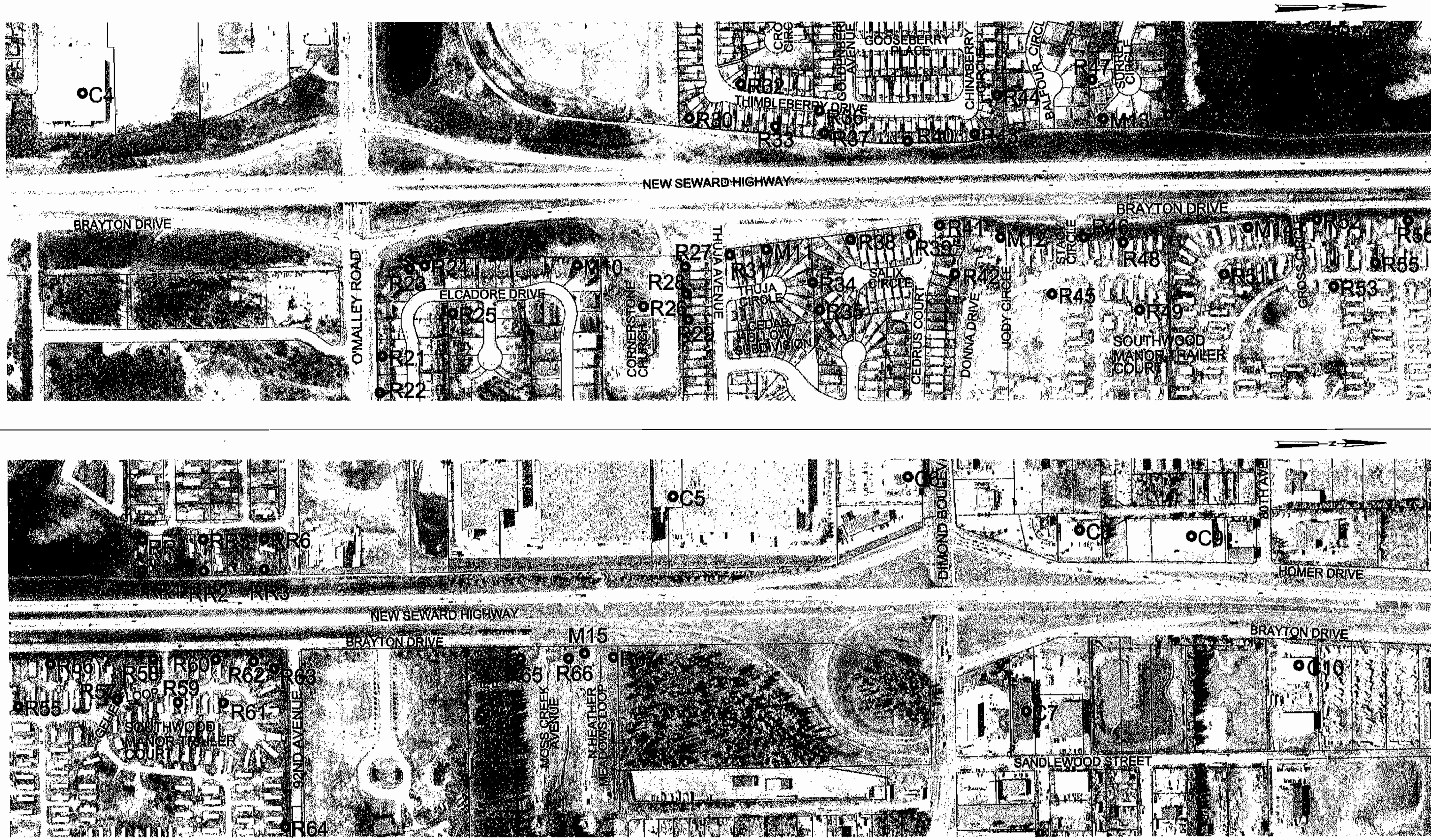
LEGEND

M2 FIELD RECEPTOR

R2 TEST/MODEL RECEPTOR

C2 COMMERCIAL RECEPTOR

FIGURE 3.9-1
NOISE RECEPTOR LOCATIONS

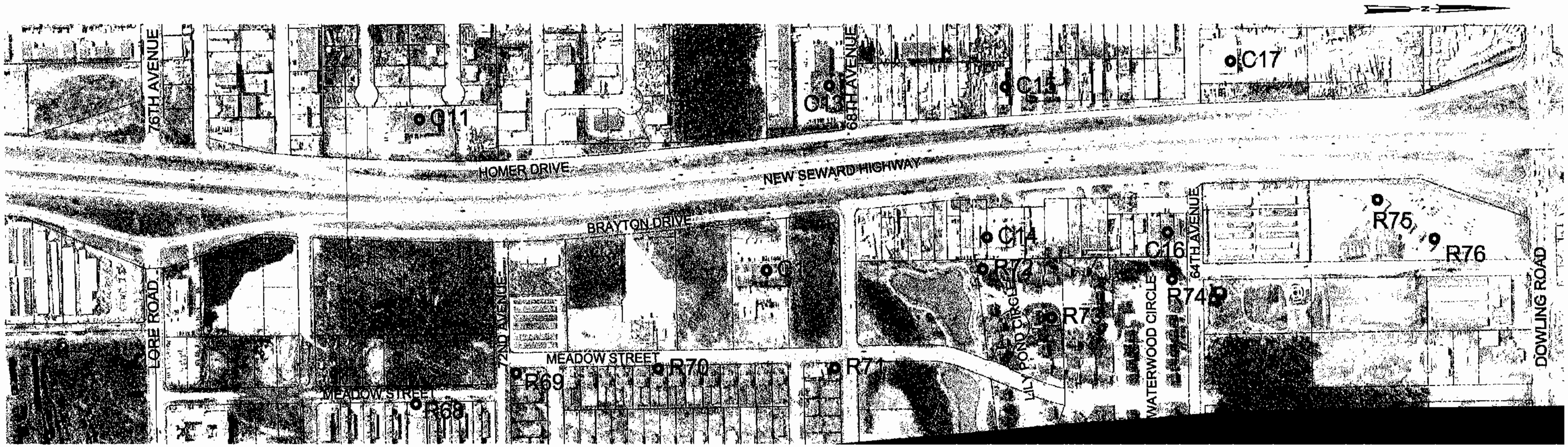


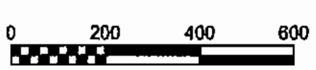
LEGEND

- M2 FIELD RECEPTOR
- R2 TEST/MODEL RECEPTOR
- C2 COMMERCIAL RECEPTOR

0 200 400 600
SCALE

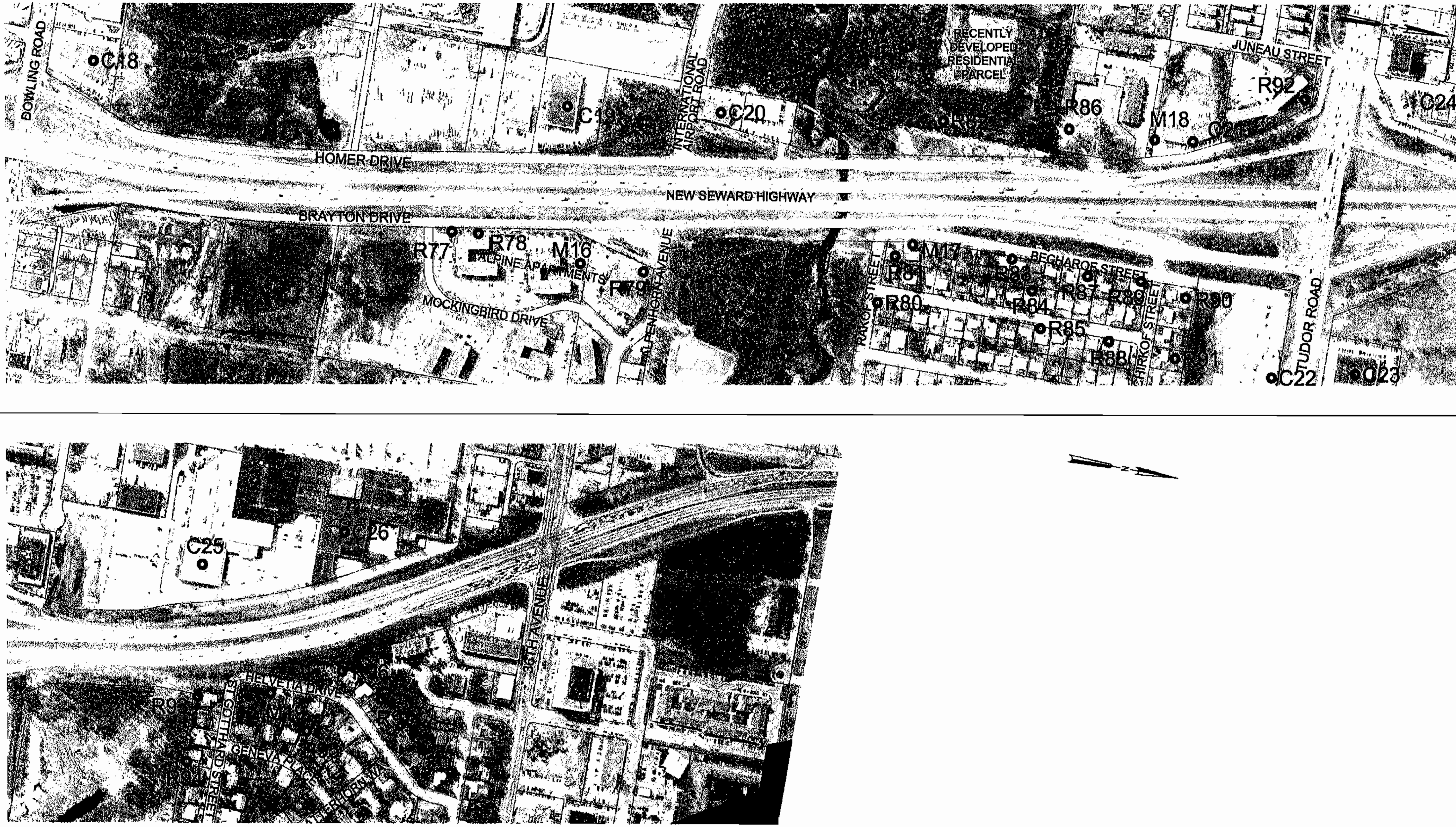
FIGURE 3.9-2
NOISE RECEPTOR LOCATIONS





M2 FIELD RECEPTOR
R2 TEST/MODEL RECEPTOR
C2 COMMERCIAL RECEPTOR

FIGURE 3.9-3
NOISE RECEPTOR LOCATIONS

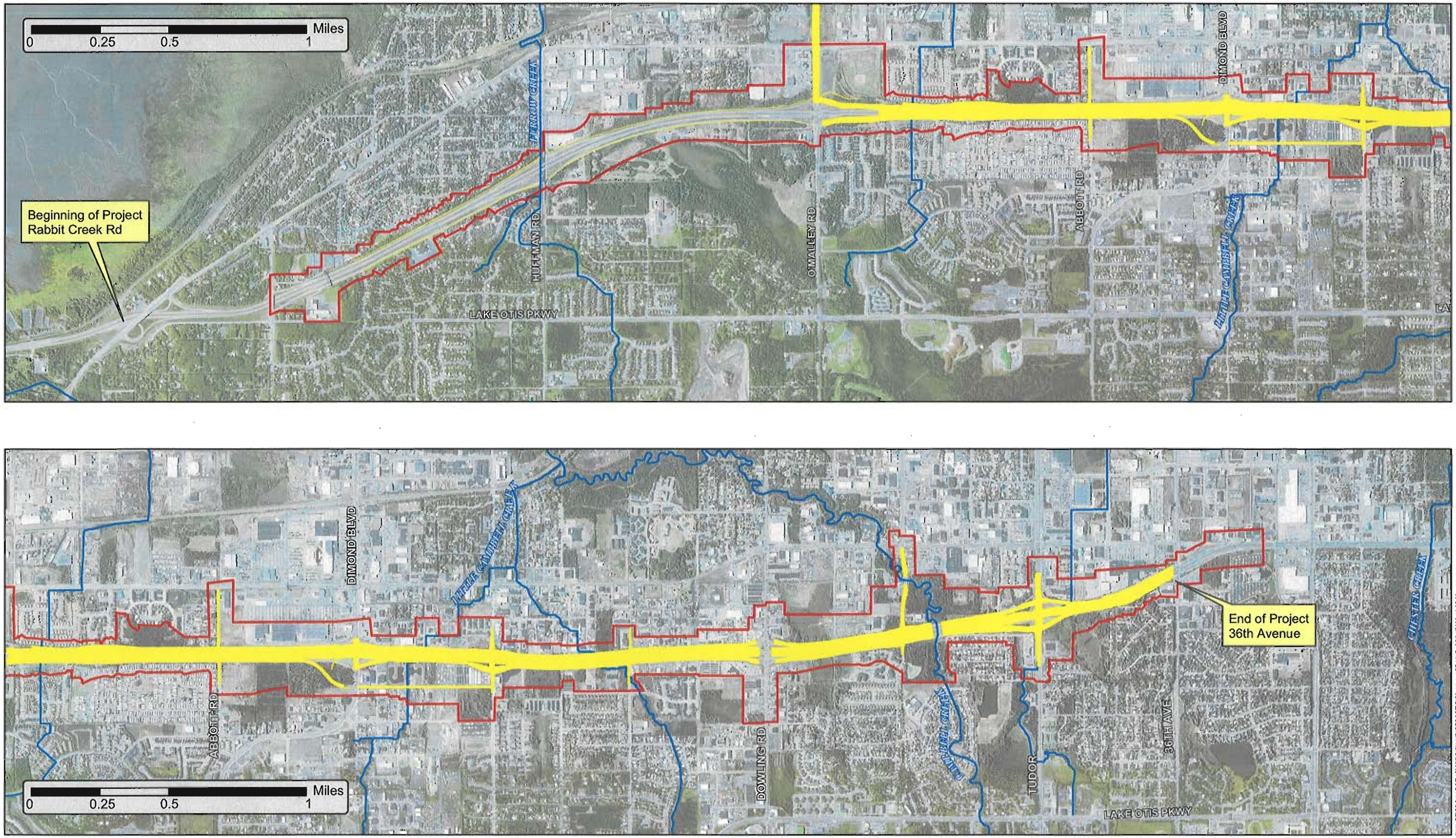


0 200 400 600

SCALE

- M2 FIELD RECEPTOR
- R2 TEST/MODEL RECEPTOR
- C2 COMMERCIAL RECEPTOR

FIGURE 3.9-4
NOISE RECEPTOR LOCATIONS



W
S N
E

Legend

Area of Potential Effect

Project Footprint

FIGURE 3.14-1
Area of Potential Effect

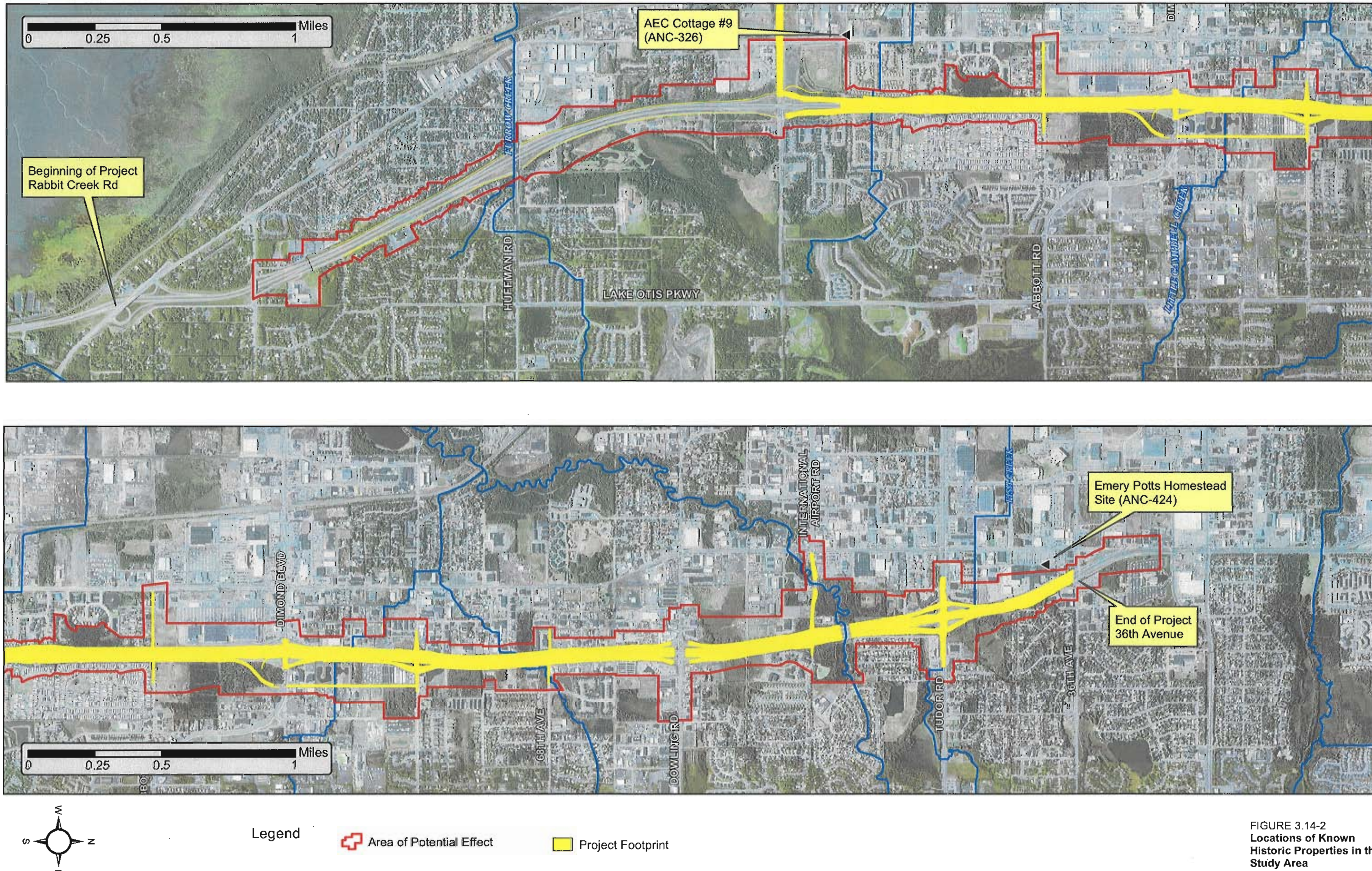


FIGURE 3.14-2
Locations of Known Historic Properties in the Study Area

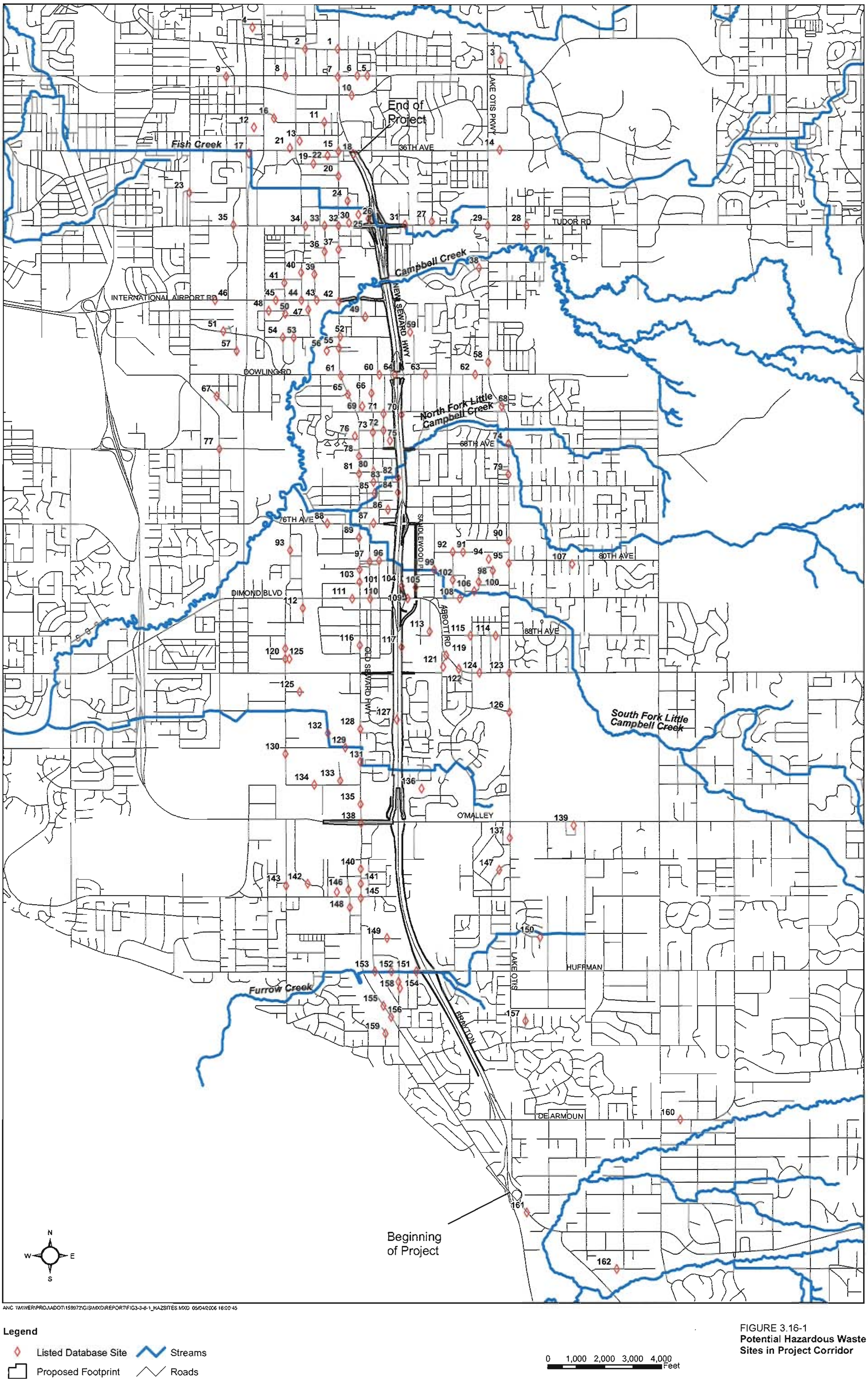


FIGURE 3.16-1
Potential Hazardous Waste Sites in Project Corridor

CHAPTER 4

Environmental Consequences

4.1 Introduction

This chapter describes the probable social, economic, and environmental impacts that would result from alternatives being evaluated for improvements for New Seward Highway, Rabbit Creek Road to 36th Avenue. In addition, measures to avoid, minimize, or mitigate those impacts are discussed.

Impacts discussed in this environmental assessment are based on probable or foreseeable changes to the existing environment, including physical, biological, and human elements of the environment. The existing environment for the proposed New Seward Highway corridor project is described in Chapter 3, Affected Environment. Changes may occur at construction or any time during the 25-year design life of the project (ending in 2035). The potential changes described include both beneficial and detrimental impacts.

4.2 Environmental Elements Without Consequences Imposed by the Proposed Project

The following elements identified in Federal Highway Administration (FHWA) guidelines were not addressed in this environmental document because they are not affected by, nor are relevant to, the proposed project:

- **Farmland Impacts**. There are no prime or unique farmlands in the New Seward Highway project area.
- **Relocation Impacts**. The project as proposed does not require right-of-way acquisition of parcels that would result in displacement of any residences or commercial activities. Most acquisitions would be small-width linear segments adjacent to the existing right-of-way. Therefore, no project-related displacements would occur.
- **Joint Development**. The proposed New Seward Highway project would not be constructed in conjunction with any other project to "preserve or enhance an affected community's social, economic, environmental, and visual values."
- **Wild and Scenic Rivers**. No designated wild and scenic rivers occur in the study area. There also is no nomination for granting wild and scenic status for a river in the study area.
- **Coastal Barriers**. The Build Alternative does not affect any coastal barrier units designated under the Coastal Barrier Resources Act.
- **Threatened and Endangered Species**. No threatened or endangered species are found within the study area (U.S. Fish and Wildlife Service [USFWS], 2005).

4.3 Water Quality Impacts

This section describes impacts of the No-Build Alternative and the Build Alternative on water quality in the area of the proposed project. These impacts would come from constructing the new features of the highway (ground disturbance) and highway runoff from impermeable surfaces. Runoff from impervious surfaces, in both the no-build and the build condition, would be pretreated in grassed medians and drainage swales before it infiltrates or flows into storm drain systems or one of several streams that cross under New Seward Highway. Storm water from urbanized landscapes is often detrimental to receiving water quality for many reasons, including increased pollutant loads that are carried along with rainwater into the storm drains. Fertilizers and other lawn and garden chemicals are major sources of nutrient pollution provided by urban lawn and garden maintenance that results in low dissolved oxygen in stream water from the resultant increase in aquatic plant growth.

Stormwater from impervious road surfaces often contains increased biological oxygen demand, suspended solids, phosphorus, nitrogen, road salts, and metals such as copper and lead, but normally does not contain fecal coliform pollution. Highway slopes and ditches are not normally fertilized annually after construction is completed. Fertilizers are a major source of phosphorous and nitrogen pollution. It should be noted that all creeks that cross New Seward Highway are impaired water bodies from urban runoff, except the main stem of Campbell Creek and are listed 303(d) impaired water bodies by the Alaska Department of Environmental Conservation (ADEC). The water body impairment is for fecal coliform bacteria pollution.

Additional impervious surface area that would result from proposed New Seward Highway improvements would increase the amount of precipitation that runs off the surface. The increased precipitation runoff could result in a negative impact on receiving waters. Slightly faster flow rates and slightly higher volumes of stormwater runoff from impervious surfaces could modify the geomorphologic characteristics of streams, possibly inducing erosion, increased sediment deposition and transport, and perhaps channel instability. Generally, the proposed project would increase the amount of impervious surface within the corridor by about 33 percent because of the addition of another lane in each direction, additional shoulder widths on the mainline and the frontage roads, and new sidewalks/separated multi-use pathways along the frontage roads.

The Municipality of Anchorage (MOA) and the Alaska Department of Transportation and Public Facilities (DOT&PF) are owners or operators of the municipal separate storm sewer system (MS4) within the corporate boundaries of the MOA. These two National Pollutant Discharge Elimination System (NPDES) permittees, under the Clean Water Act administered by the U.S. Environmental Protection Agency (EPA), operate MS4 storm drain systems that discharge to streams (waters of the United States) within the MOA. As a permittee, the DOT&PF is responsible for ensuring that its project development process, for the proposed improvements to New Seward Highway and the road drainage system, comply with the MS4 permit conditions. The limiting of pollutant discharges would be accomplished through the use of the best management practices (BMPs) of the Storm Water Management Program that is part of the NPDES permit, control techniques, system design and engineering methods, and other appropriate provisions of the Storm Water

Management Program. These conditions include limiting the discharge of pollutants, to the maximum extent practicable, into storm water from highway development both during and after construction, and include routine maintenance and inspection of storm water facilities. Pollutants from roadways usually include small quantities of oil, grease, exhaust residues, and trace metals, as well as those related to street sweeping, snow removal, deicing, and sanding activities.

The NPDES permit encourages the permittees to use BMPs and requires that they assess effectiveness of the following:

- Oil and grit separators
- Sedimentation basins
- Stormwater treatment wetlands
- Non-structural source controls
- Avoidance of fecal coliform impacts
- Minimization of stream sedimentation

Permit requirements also relate to management and assessment of snow removal, snow storage and disposal, deicing and sanding activities, floodplain impacts, pesticide, herbicide and fertilizer applications, spill response, and illicit discharges, to reduce discharge of pollutants from these activities into area streams.

The Construction Site Runoff Program established by the permit requires each construction site to have a Storm Water Quality Pollution Prevention Plan. This plan requires appropriate erosion and sediment control, material containment, spill prevention, and other appropriate BMPs to reduce runoff impacts to water bodies; routine site inspection; and corrective enforcement. Each site plan must be reviewed and approved by the MOA.

The NPDES permit establishes a comprehensive monitoring program that the permittees must perform to track pollutant sources and assess and characterize affected water bodies and water quality problems. This program is a joint effort by the permittees.

An extensive review of water quality impacts, on a segment by segment basis along the corridor (see below), was performed with respect to MS4 permit conditions. It showed that highway stormwater runoff from the proposed project would not significantly change the water quality of the existing receiving waters. The majority of the highway drainage would be utilizing open vegetated drainage channels (which provide sediment retention, filtration, and a degree of organic treatment) before drainage flows into storm drain systems or streams; therefore, oil and grit separators are unlikely to provide additional benefit and are not recommended as part of the proposed project.

4.3.1 Rabbit Creek Road to O'Malley Road

No-Build Alternative

The No-Build Alternative would leave roadway runoff and drainage through this highway segment in its current condition, imposing no additional impacts on the natural environment.

Build Alternative

Proposed improvements in this segment of the corridor include the addition of a separated multi-use pathway near the right-of-way boundary on the west side of New Seward Highway and a shared use path along the east side adjacent to Brayton Drive. These facilities would begin near Tradewind Drive just north of Rabbit Creek Elementary School. Existing drainage patterns would be maintained, and all runoff would be pretreated in the grassed median or drainage swales before either it infiltrated or discharged as follows:

- Rabbit Creek Road to the DeArmoun Road pedestrian overcrossing drains to the south into open vegetated areas on the west side of the highway.
- DeArmoun Road pedestrian overcrossing to Klatt Road drains into the underground Furrow Creek storm drain system that continues west on the south side of Huffman Road.
- Klatt Road to O'Malley Road drains to the north into a storm drain system on the south side of O'Malley Road that continues west along O'Malley Road.
- Additional storm runoff from the impervious surface of the proposed multi-use pathways is expected to be nominal. The impervious surface would be increased 18 percent on the east side of New Seward Highway along Brayton Drive and 32 percent on the west side where there is no frontage road.

Mitigation Measures

The ground disturbed during construction of the pathway would be revegetated to provide vegetated infiltration and to slow the velocity of runoff.

4.3.2 O'Malley Road to Dimond Boulevard

No-Build Alternative

The No-Build Alternative would leave roadway runoff and drainage through this highway segment in its current condition, imposing no additional impacts on the natural environment.

Build Alternative

Existing drainage patterns would be maintained and all runoff would be pretreated in the grassed median or drainage swales before either infiltrating or discharging to a storm drain system with inlets at 92nd Avenue, North Goldenberry Avenue, and Goldenberry Avenue all of which direct the flow west to a sedimentation basin in North Klatt Bog and eventually into Campbell Creek. The impervious surface through this segment would be increased about 83 percent (within the corridor) primarily because of the addition of the new frontage road. Although the resulting storm runoff from the impervious surfaces of the new roadway and pedestrian facilities would increase runoff approximately 6 percent (Q25, the design for a 25-year storm event frequency), the existing grassed median and ditches would remain and a new grassed ditch with grassy drainage swales would be developed between the mainline and the proposed west-side frontage road. The existing and new grassed ditches would allow adequate storage, filtration, and infiltration of the stormwater runoff.

The additional runoff from the project improvements would slightly increase pollutants (such as suspended solids, road salts, and trace metals) from the highway to the storm drain system and ultimately to Campbell Creek. Typically highway pollutants are not related to fecal coliform contamination, which is the pollutant currently of concern in this drainage basin. Fecal coliform is usually associated with animal feces (including humans), septic system discharge into shallow aquifers that eventually flow into surface waters, or both.

Mitigation Measures

The following mitigation measures are proposed to minimize the effects of the project in this segment:

- Addition of grassed filter strips—between the existing frontage road and the shared-use path—and drainage ditches—between the mainline and the proposed frontage road on the west side of the corridor—to reduce overland flow velocities and encourage infiltration
- Addition of drainage swales in the grassed median and the grassed ditches between the mainline and the existing and proposed frontage roads to provide for detention of storm water and pretreatment before it is discharged to the storm drain system or stream segment
- Use of BMPs for erosion and sediment control during construction
- Revegetation of the disturbed soil surfaces as soon as feasible
- Avoidance of filling wetlands where feasible and protection of wetland and riparian areas by temporarily fencing them before construction
- Installation of velocity dissipaters to reduce erosion at outfall locations
- Protection and maintenance of the grassed median and grassed ditches between the mainline and the frontage roads
- Road and ditch maintenance

4.3.3 Dimond Boulevard to 76th Avenue

No Build-Alternative

The No-Build Alternative would leave roadway runoff and drainage through this highway segment in its current condition, imposing no additional impacts on the natural environment.

Build Alternative

Proposed improvements in this segment of the corridor would include a new mainline lane in each direction, a grade separation at 76th Avenue, and improvements to both frontage roads in the form of additional shoulder width and pedestrian facilities. The bridge over Dimond Boulevard would be lengthened, and the southbound single-lane off-ramp would be widened to two lanes. Existing drainage patterns would be maintained, and all runoff would be pretreated in the grassed median, vegetated ditches, or drainage swales before either infiltrating or discharging to the detention ponds on the east side of the highway just north of Dimond Boulevard or the three storm drain outfalls located on the west side of the highway. The storm drain, medians, ditches, and swales all eventually drain into the South Fork of Little Campbell Creek.

The South Fork of Little Campbell Creek flows through a highly urbanized and developed area and is an impaired water body for fecal coliform. The land area upstream of New Seward Highway consists of light industrial property, commercial property, and residential development farther upstream. The Build Alternative would result in increased impervious surface within the highway corridor of about 38 percent. This additional impervious surface area would generate increased stormwater runoff volumes and reduce the amount of water infiltrating into the soil through vegetative ground cover.

The additional runoff of approximately 25 percent (Q25) from the project improvements would add highway-related pollutants into the stormwater runoff, which discharges into the South Fork of Campbell Creek. This creek is listed as exceeding the fecal coliform standard and has seen a reduction in dissolved oxygen from urbanization. The additional highway runoff and the pollutants it carries do not normally contain fecal coliform contamination or significant nutrients that would result in reduced dissolved oxygen levels.

Mitigation Measures

Mitigation of water quality impacts associated with increases in impervious surface aim to retain or restore the hydrologic functioning of the landscape. The goal is to control stormwater flow and remove pollutants through the revegetation and maintenance of existing vegetation and flow regimes before discharge into the South Fork of Little Campbell Creek and the MS4. The following mitigation measures are proposed for that purpose:

- Addition of grassed filter strips between the existing frontage road and the shared-use path and maintenance of drainage ditches between the mainline and the proposed frontage roads to reduce overland flow velocities and encourage infiltration
- Addition of drainage swales in the grassed median and the grassed ditches between the mainline and the existing frontage roads to provide for detention of storm water and pretreatment before it is discharged to the storm drain system or stream segment
- Use of BMPs for erosion and sediment control during construction
- Revegetation of the disturbed soil surfaces as soon as feasible
- Avoidance of filling wetlands where feasible and protection of wetland and riparian areas by temporarily fencing them before construction
- Installation of velocity dissipaters to reduce erosion at outfall locations
- Protection and maintenance of the grassed median and grassed ditches between the mainline and the frontage roads
- Road and ditch maintenance

Refer to the Construction Impacts section (4.21.3) of this chapter for additional discussion about mitigation measures that would be implemented during construction of highway improvements.

4.3.4 76th Avenue to 62nd Avenue

No-Build Alternative

The No-Build Alternative would leave roadway runoff and drainage through this highway segment in its current condition, imposing no additional impacts on the natural environment.

Build Alternative

Proposed improvements in this segment of the corridor would include a new mainline lane in each direction, a grade separation at 68th Avenue, and improvements to both frontage roads in the form of additional shoulder width and pedestrian facilities. Existing drainage patterns would be maintained, and all runoff would be pretreated in the grassed median or drainage swales before it either infiltrated or discharged to the North Fork of Little Campbell Creek.

The North Fork of Little Campbell Creek drainage is currently approximately 35 percent impervious, with a mix of residential and commercial land uses; 44 percent of its drainage remains undeveloped. Increasing impervious surface within the creek watershed could alter the natural hydrology and infiltration characteristics of the landscape. The stream flows through a dense residential area, then through a wetland complex, before flowing through a constrained channel along Brayton Drive and through a culvert under New Seward Highway. The Build Alternative would result in additional impervious surface within the highway corridor of about 38 percent. The additional impervious highway surface area would generate an increase in stormwater runoff volume, approximately 25percent (Q25), and would reduce the amount of water infiltrating through natural ground cover.

Six stormwater outfalls currently flow into North Fork of Little Campbell Creek near its New Seward Highway crossing. Some additional runoff generated from 68th Avenue and New Seward Highway widening may flow through these outfalls, although most of the additional stormwater would flow into vegetated ditches along New Seward Highway.

The additional runoff from the proposed project improvements would add some pollutants from the highway into the stormwater runoff. The additional highway runoff and the pollutants it carries do not normally contain fecal coliform contamination or significant nutrients that would result in reduced dissolved oxygen levels.

Mitigation Measures

Mitigation of water quality impacts associated with increases in impervious surface aim to retain or restore the hydrologic functioning of the landscape. The goal is to control stormwater flow and remove pollutants through the revegetation and maintenance of existing vegetation and flow regimes. The following mitigation measures are proposed for that purpose:

- Addition of grassed filter strips between the existing frontage road and the shared-use path and maintenance of drainage ditches between the mainline and the proposed frontage roads to reduce overland flow velocities and encourage infiltration
- Addition of drainage swales in the grassed median and the grassed ditches between the mainline and the existing frontage roads to provide for detention of storm water and pretreatment before it is discharged to the storm drain system or stream segment
- Use of BMPs for erosion and sediment control during construction
- Revegetation of the disturbed soil surfaces as soon as feasible
- Avoidance of filling wetlands where feasible and protection of wetland and riparian areas by temporarily fencing them before construction
- Installation of velocity dissipaters to reduce erosion at outfall locations

- Protection and maintenance of the grassed median and grassed ditches between the mainline and the frontage roads
- Road and ditch maintenance

Refer to the Construction Impacts section (4.21.3) of this chapter for additional discussion about mitigation measures that would be implemented during construction of highway improvements.

4.3.5 62nd Avenue to 46th Avenue

No-Build Alternative

The No-Build Alternative would leave roadway runoff and drainage through this highway segment in its current condition, imposing no additional impacts on the natural environment.

Build Alternative

Proposed improvements in this segment of the corridor would include a new mainline lane in each direction, a grade separation at International Airport Road, higher and longer bridges over Campbell Creek, and improvements to both frontage roads in the form of additional shoulder width and pedestrian facilities. Existing drainage patterns would be maintained and all runoff would be pretreated in the grassed median or drainage swales before it either infiltrated or discharged to Campbell Creek. The main stem of Campbell Creek is not an impaired water body.

Campbell Creek crosses New Seward Highway before its confluence with Little Campbell Creek. A substantial portion of the natural riparian area of Campbell Creek has been preserved. This area buffers water quality against impacts from increased impervious surfaces. One exception is the stretch of Campbell Creek east of the proposed project area, which is dense residential development with very little natural riparian buffer. Wetlands surround Campbell Creek on both sides of New Seward Highway.

The Build Alternative would result in an increase in the amount of additional impervious surface (about 38 percent within the highway corridor). The proposed highway improvements and expanded impervious surface area would generate additional stormwater runoff volume of approximately 15 percent, and add additional highway pollutants. The improvements of the bridges over Campbell Creek would add floodplain and wetland area that is not currently available for use to treat and buffer storm water runoff effects (see Section 4.3.3.3). Wetland/riparian areas exist adjacent to Campbell Creek on both sides of New Seward Highway. Highway runoff would be pretreated with the use of vegetated ditches and drainage swales before the runoff discharges into these wetland areas. Another portion of the stormwater generated from International Airport Road and the New Seward Highway improvements would flow into vegetated ditches with drainage swales along New Seward Highway. Stormwater from the newly constructed lanes and International Airport Road improvements are not expected to have substantial additional water quality impacts to Campbell Creek because of the buffering capacity of the existing wetlands/riparian areas, grassed median and ditches, and grassy swales.

Mitigation Measures
The main mitigation goal at the Campbell Creek crossing would be to protect and preserve the existing wetland complex, particularly during construction, and mitigation of the water quality impacts associated with increases in impervious surface. The following mitigation measures are proposed for that purpose:

- Installation of longer bridges over Campbell Creek and a reduction of embankment material adjacent to the creek and within the floodplain
- Addition of grassed filter strips between the existing frontage road and the shared-use path and maintenance of drainage ditches between the mainline and the proposed frontage roads to reduce overland flow velocities and encourage infiltration
- Addition of drainage swales in the grassed median and the grassed ditches between the mainline and the existing frontage roads to provide for detention of storm water and pretreatment before it is discharged to the storm drain system or stream segment
- Use of BMPs for erosion and sediment control during construction
- Revegetation of the disturbed soil surfaces as soon as feasible
- Avoidance of filling wetlands where feasible and protection of wetland and riparian areas by temporarily fencing them before construction
- Installation of velocity dissipaters to reduce erosion at outfall locations
- Protection and maintenance of the grassed median and grassed ditches between the mainline and the frontage roads
- Road and ditch maintenance

Refer to the Construction Impacts section (4.21.3) of this chapter for additional discussion about mitigation measures that would be implemented during construction of highway improvements.

4.3.6 46th Avenue to Tudor Road

No-Build Alternative
The No-Build Alternative would leave roadway runoff and drainage through this highway segment in its current condition, imposing no additional impacts on the natural environment.

Build Alternative
Proposed improvements in this segment of the corridor would include a new mainline lane in each direction, ramp improvements at the Tudor Road interchange, and improvements to both frontage roads in the form of additional shoulder width and pedestrian facilities. Existing drainage patterns would be maintained, and all runoff would be pretreated in the grassed median or drainage swales before it either infiltrated or discharged to the north into a storm drain system that contains Fish Creek as it passes under New Seward Highway.

The headwaters of Fish Creek are located near Lake Otis Parkway, less than a mile from the proposed project area. Fish Creek flows through a wetland complex before being constrained by channelization starting at Shelikof Street. The stream is substantially affected by urbanization: It flows through a storm drain starting 750 feet east of New Seward Highway at Tudor Road and receives stormwater runoff from the surrounding urbanized area. The once naturally flowing creek now is channeled underground through storm drain pipes with numerous outfalls draining to it.

The Build Alternative would result in an increase in impervious surface area within the highway corridor (about 38 percent), which would result in additional stormwater runoff volume and reduced infiltration through natural ground cover. The proposed improvements would discharge additional highway pollutants to the storm drainage system containing Fish Creek. Fish Creek is an impaired water body for fecal coliform bacteria.

The highway improvements include incorporation of mitigation features and should not cause a further reduction of water quality in Fish Creek. The additional flow to the Fish Creek storm drain system created by a larger impervious area would be pretreated before it discharges into the piped storm drain system. Highway runoff does not normally contain fecal coliform and would not contribute to the fecal coliform pollutant problem in Fish Creek.

Mitigation Measures

The main mitigation goal at the underground Fish Creek crossing would be to provide and maintain the hydrologic functioning of the landscape and mitigate the water quality impacts associated with increases in impervious surface. The following mitigation measures are proposed for that purpose:

- Addition of grassed filter strips between the existing frontage road and the shared-use path and maintenance of drainage ditches between the mainline and the proposed frontage roads to reduce overland flow velocities and encourage infiltration
- Addition of drainage swales in the grassed median and the grassed ditches between the mainline and the existing frontage roads to provide for detention of storm water and pretreatment before it is discharged to the storm drain system or stream segment
- Use of BMPs for erosion and sediment control during construction
- Revegetation of the disturbed soil surfaces as soon as feasible
- Avoidance of filling wetlands where feasible and protection of wetland and riparian areas by temporarily fencing them before construction
- Installation of velocity dissipaters to reduce erosion at outfall locations
- Protection and maintenance of the grassed median and grassed ditches between the mainline and the frontage roads
- Road and ditch maintenance

Refer to the Construction Impacts section (4.21.3) of this chapter for additional discussion about mitigation measures that would be implemented during construction of highway improvements.

4.3.7 Tudor Road to 36th Avenue

No-Build Alternative

The No-Build Alternative would leave roadway runoff and drainage through this highway segment in its current condition, imposing no additional impacts on the natural environment.

Build Alternative

Proposed improvements in this segment of the corridor would include modifications to the Tudor Road interchange ramps. Existing drainage patterns would be maintained, and all runoff would be pretreated in the grassed median or drainage swales before either infiltrating or discharging to the north into a storm drain system at 36th Avenue that continues west along 36th Avenue. The increase in impervious roadway surface (about 10 percent) would be at a much smaller scale than for other segments. Additional storm runoff from the impervious surface of the proposed improvements is expected to be nominal.

Mitigation Measures

The following mitigation measures are proposed:

- Addition of grassed filter strips—between the southbound off-ramp and the proposed shared-use path—and drainage ditches to reduce overland flow velocities and encourage infiltration
- Addition of drainage swales in the grassed median and the grassed ditches between the mainline and the on-ramps and off-ramps to provide for detention of storm water and pretreatment before it is discharged to the storm drain system
- Grassed filter strips and drainage ditches that reduce overland flow velocities and encourage infiltration and the addition of drainage swales to provide for detention of storm water and pretreatment before it is discharged to the storm drain system
- Use of BMPs for erosion and sediment control during construction
- Revegetation of the disturbed soil surfaces as soon as feasible
- Avoidance of filling wetlands where feasible and protection of wetland and riparian areas by temporarily fencing them before construction
- Protection and maintenance of the grassed median
- Road and ditch maintenance

4.4 Wetland Impacts

This section describes the impacts of the No-Build Alternative and the Build Alternative on wetlands within and adjacent to the New Seward Highway right-of-way from Rabbit Creek Road to 36th Avenue. Seventeen wetlands or wetland complexes were identified within the existing New Seward Highway right-of-way, 10 of which are under jurisdiction of the U.S. Army Corps of Engineers (USACE) and four that have wetlands classified by the MOA. The jurisdictional determination and the USACE concurrence letter are provided in Appendix B.

This section also addresses Executive Order (EO) 11990 which requires that federal agency (FHWA) actions minimize the destruction, loss, or degradation of wetlands and preserve and enhance the natural and beneficial values of wetlands. Coordination of the proposed project occurred with the USACE, MOA, and EPA, on several occasions—August and December 2001 and January 2003. Responses to comments during this coordination are included in Appendix B, and relevant information from the comments and responses is incorporated in this section.

Table 4.4-1 categorizes the wetlands that are affected permanently by fill and temporarily by construction equipment within the proposed project by wetland type, USACE jurisdiction, and MOA classifications (Class A, B, or C) from the *Anchorage Wetland Management Plan* (AWMP, MOA, 1996a). It also summarizes wetland functions. More specific information on the wetlands in and adjacent to the New Seward Highway right-of-way is provided in the Wetlands Analysis (Appendix B).

Impacts to wetland for the Build Alternative were estimated by overlaying the footprint of the proposed improvements on the wetland boundaries map and calculating the area of wetland within the footprint. Additionally, a 10-foot-wide zone adjacent to each footprint was assumed to be subject to disturbance during construction, and its area was calculated and included. The relationship of wetland function to potential impacts and mitigation measures also is discussed below.

TABLE 4.4-1
Impacts on Wetlands from the Proposed New Seward Highway Project

Wetland Number[a]	U.S. Army Corps of Engineers Jurisdiction?	AWMP Wetland Class[b]	Area of Build Alternative (acres)		Wetland Functions
			Eliminated	Temporarily Disturbed[c]	
Creek-Fringe Wetlands					
1	yes	NA	0.1	0.06	Absorb runoff, provide flood areas, reduce flow volumes and velocities during high rainfall and flood events, improve water quality by removing sediment from creek waters during floods and retaining pollutants received from urban runoff, and provide important habitat for wildlife
4	yes	NA	0.008	0.007	
6	yes	NA	0	0.344	
6	yes	A	0	0.027	
9	yes	NA	0.38	0.027	
10	yes	NA	0.002	0.006	
11	yes	NA	0.17	0.01	
16	yes	NA	0.0002	0.025	
Subtotal			**0.66**	**0.50**	
Feeder Wetlands					
12	yes	NA	0	0	Provide base flow to creeks; capture and retain runoff, sediment, and other pollutants; aid in flood control; protect creek water quality; and provide habitat for wildlife
13	no	NA	0.13	0.12	
15	yes	NA	0.12	0.29	
17	yes	NA	0	0	
Subtotal			**0.25**	**0.41**	

TABLE 4.4-1
Impacts on Wetlands from the Proposed New Seward Highway Project

Wetland Number[a]	U.S. Army Corps of Engineers Jurisdiction?	AWMP Wetland Class[b]	Area of Build Alternative (acres)		Wetland Functions
			Eliminated	Temporarily Disturbed[c]	
Isolated Extensive Wetlands					
7	no	NA	0.21	0.09	Absorb precipitation and runoff, reduce flow to storm drain systems and creeks, capture urban runoff pollutants, provide aesthetic value, and provide habitat for wildlife species that tolerate human disturbance
7	no	C	0.03	0.07	
Subtotal			**0.24**	**0.16**	
Isolated Remnant Wetlands					
2	no	NA	0.024	0.033	Retain sediment and other pollutants from local runoff and slightly reduce runoff to creeks
3	no	NA	0.001	0.009	
5	no	NA	0.02	0.02	
5	no	B	0.08	0.05	
8	no	NA	0.29	0.086	
8	no	C	0.016	0.037	
14	no	NA	0.006	0.043	
Subtotal			**0.44**	**0.28**	
Total			**1.59**	**1.35**	
Total AWMP Class A			0	0.003	
Total AWMP Class B			0.08	0.05	
Total AWMP Class C			0.046	0.107	
Total Unclassified			0.68	0.4	

[a] The numbers refer to labels in Figure 3.3-1 and Figures 4.4-1 to 4.4-8.

[b] NA = Not applicable; wetlands that do not have Anchorage Wetlands Management Plan (AWMP) class designations.

[c] Represents the 10-foot zone adjacent to the project footprint; limited to construction activities.

No-Build Alternative

Under the No-Build Alternative, none of the existing wetlands within or adjacent to the proposed New Seward Highway right-of-way would be affected by construction.

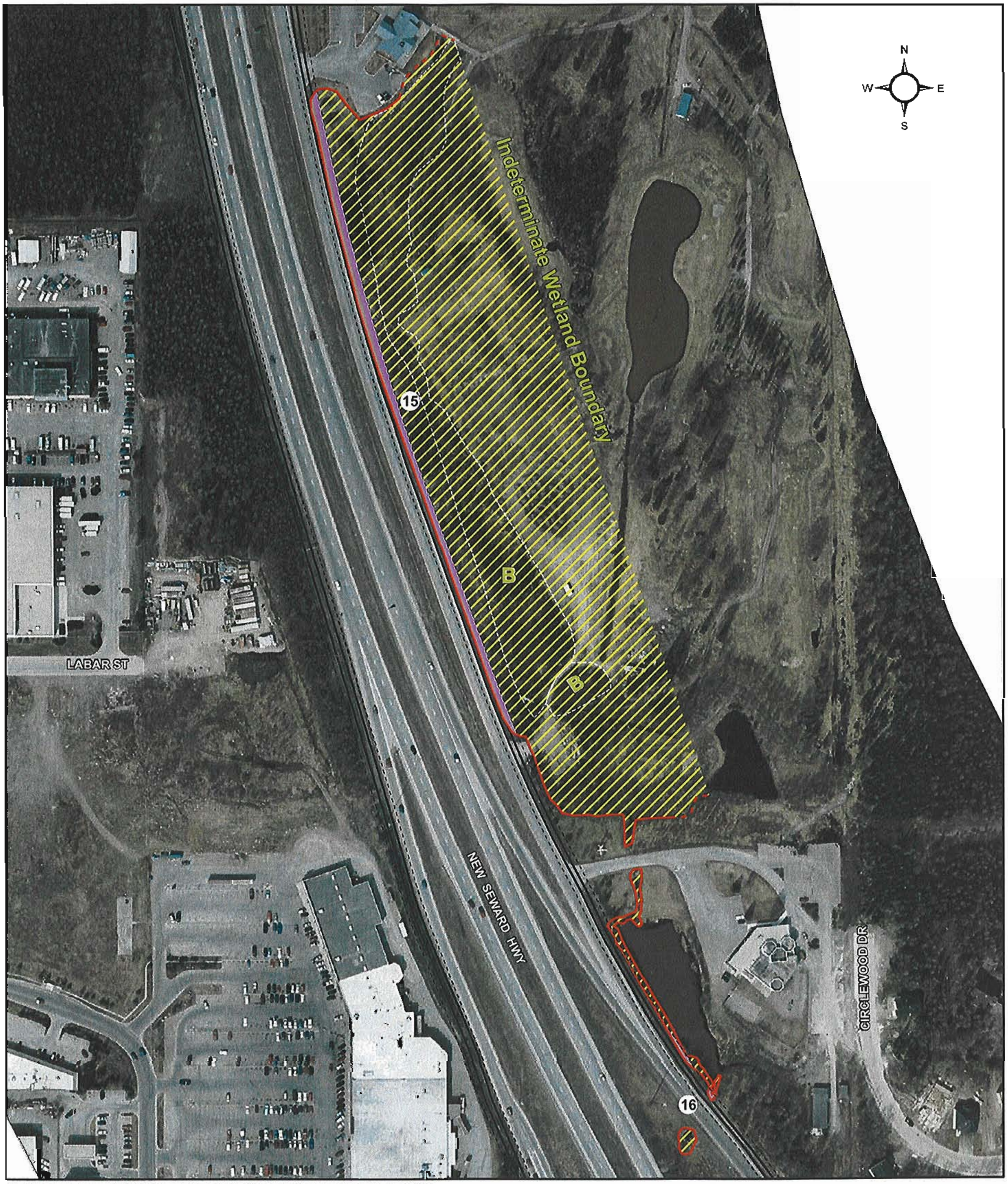
Build Alternative

Despite efforts to minimize disturbance and avoid fill, wetlands within the proposed New Seward Highway right-of-way would be affected under the Build Alternative. The design criteria of the proposed project for mainline, frontage roads, ramps, and minor and major cross streets are based on design and safety standards outlined in the DOT&PF *Alaska Preconstruction Manual* (2005) and the American Association of State Highway and Transportation Officials *Policy on Geometric Design of Highways and Streets* (2001). The number of lanes and width of shoulders could not be reduced without compromising safety, capacity, or the ability of the road to meet the project need.

As many as 14 of the 17 wetlands found within or adjacent to the proposed project would be permanently affected to some extent. Table 4.4-1 lists the acreage that would be affected by the project and the acreage assumed to be temporarily disturbed (but not filled) during construction for each wetland. Note that the areas are based on preliminary design and are approximate. Table 4.4-1 also summarizes the impact of the Build Alternative by USACE jurisdiction, MOA wetland class, and wetland type, which are important to consider for developing mitigation measures.

The wetlands locations within and along the corridor, affected by the proposed project, are shown in Figures 4.4-1 through 4.4-8. Progressing from the south end of the proposed project, wetlands are affected as follows:

- Wetland 16, a USACE jurisdictional creek fringe wetlands and Wetland 15, a USACE jurisdictional feeder wetland—by the multi-use pathway fill adjacent to the east side of the highway north of the Huffman interchange
- Wetland 14, a non-jurisdictional isolated remnant wetland ,on the east side of the highway approaching the O'Malley Road interchange— by the fill for the east side multi-use pathway
- Wetland 13, a non-jurisdictional feeder wetland in the northwest quadrant of the O'Malley Road interchange—by the fill for the west side multi-use pathway
- Wetland 11, a USACE jurisdictional creek-fringe wetland just south of Dimond Boulevard—by culvert replacement, lane additions and frontage road improvements
- Wetland 10, a USACE jurisdictional creek-fringe wetland at 72nd Avenue on the east side—by fill from the frontage road improvements, including a sidewalk
- Wetland 9, a USACE jurisdictional creek-fringe wetland that is within the or adjacent to the existing right-of-way at approximately 70th Avenue—by lane additions, culvert replacement, frontage road improvements, and sidewalks
- Wetland 8, a non-jurisdictional isolated remnant wetland at the northeast quadrant of the Dowling Road interchange—by ramp construction and frontage road improvements, and a sidewalk
- Wetland 7, a non-jurisdictional isolated extensive wetland opposite the highway from Wetland 8—by ramp and frontage road improvements and a sidewalk
- Wetland 6, a USACE jurisdictional creek-fringe wetland (Campbell Creek)—by bridge construction, lane additions, frontage road improvements, and sidewalks. The construction of the bridges would be a beneficial impact because it would provide a longer span over the creek, allowing reestablishment of the floodplain and associated creek fringe wetlands along the creek as it passes through the highway corridor. The increase in wetland area would be approximately 1.1 acre.
- Wetland 5, a non-jurisdictional isolated remnant wetland northeast of the Tudor Road interchange—by ramp improvement fill



ANC \\MINER\PROJ\ADOT\159972\GIS\MXD\REPORT\FIG4-4-X-WET.MXD (HUFFMAN EXTENT) 05/11/2006 09:30:35

Legend

- (5) Wetland Reference Number
- Proposed Footprint
- 10-Foot Temporary Impact Zone
- Jurisdictional Wetland Boundary
- Non-jurisdictional Wetland Boundary
- Unknown Boundary Outside of Right-of-Way
- Project Impacts
- Temporary Impacts
- No Impacts

0 100 200 400 600 Feet

FIGURE 4.4-1
Wetland Impacts, North of Huffman Road

Source: Wetland delineations by HDR Alaska, Inc., with MOA Designations (A/B/C) additionally posted.

ANC \\MINER\PROJ\ADOT\159172\GIS\MXD\REPORT\FIG4-4-X-WET.MXD (OMALLEY EXTENT) 05/11/2006 09:30:35

Legend

(5) Wetland Reference Number

Proposed Footprint

10-Foot Temporary Impact Zone

Jurisdictional Wetland Boundary

Non-jurisdictional Wetland Boundary

Unknown Boundary Outside of Right-of-Way

Project Impacts

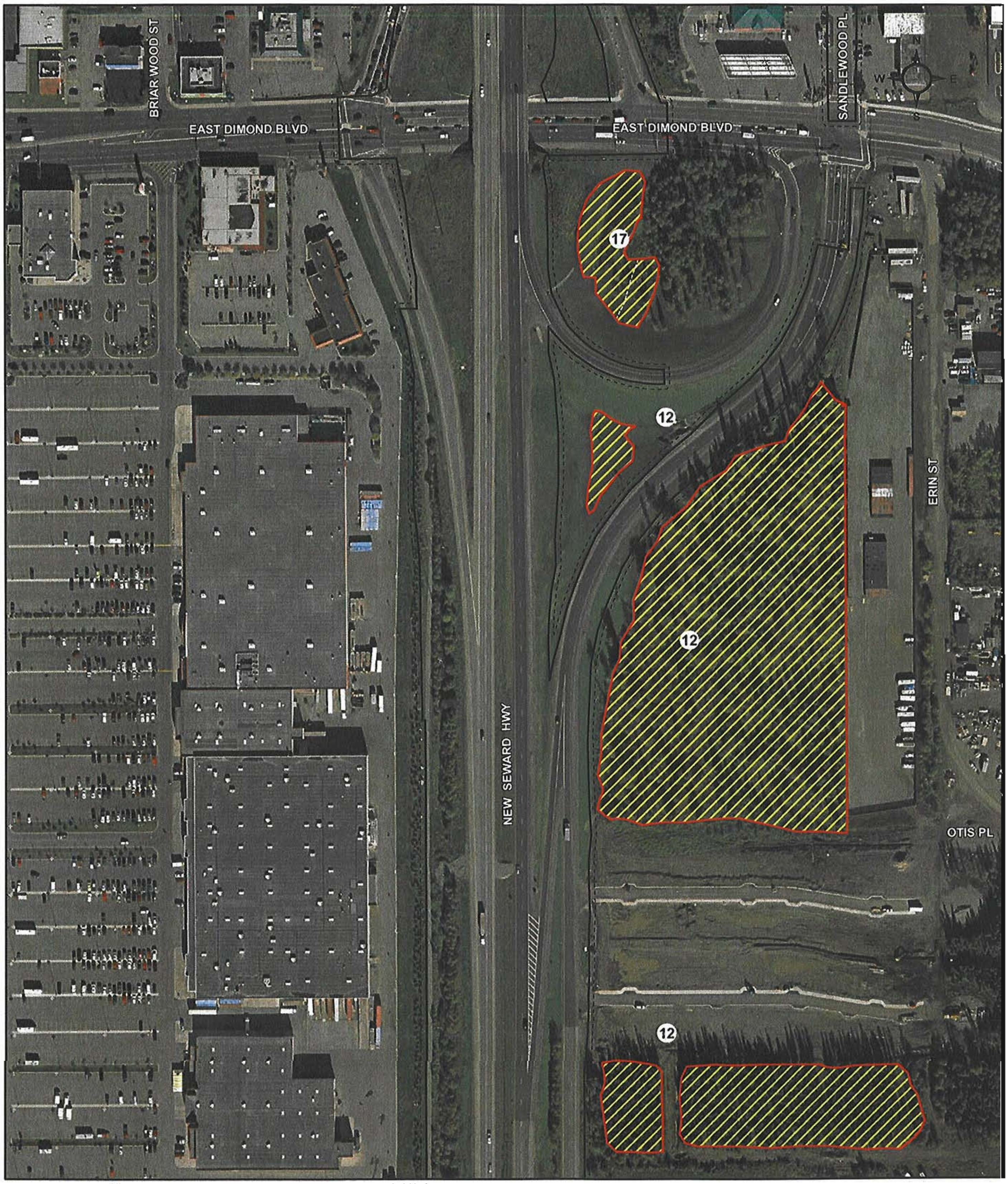
Temporary Impacts

No Impacts

FIGURE 4.4-2
Wetland Impacts, Near O'Malley Road

0 100 200 400 600 Feet

Source: Wetland delineations by HDR Alaska, Inc., with MOA Designations (A/B/C) additionally posted.



ANC \\MINER\PROJ\ADOT\159972\GIS\MXD\REPORT\FIG4-4-X-WET.MXD (DIMOND EXTENT) 05/11/2006 09:30:35

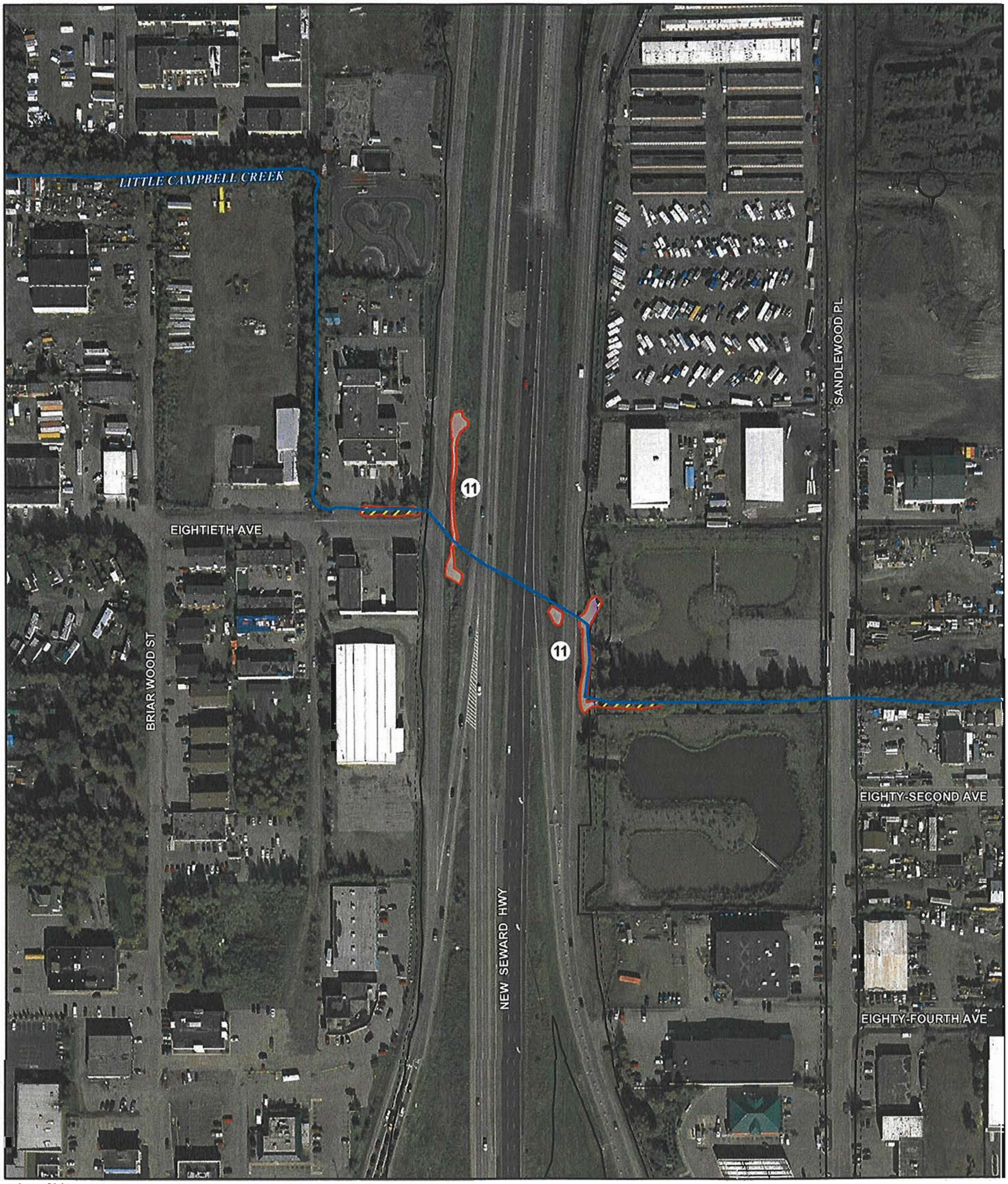
Legend

- (5) Wetland Reference Number
- Proposed Footprint
- 10-Foot Temporary Impact Zone
- Jurisdictional Wetland Boundary
- Non-jurisdictional Wetland Boundary
- Unknown Boundary Outside of Right-of-Way
- Project Impacts
- Temporary Impacts
- No Impacts

FIGURE 4.4-3
Wetland Impacts, Near Dimond Boulevard

0 100 200 400 600 Feet

Source: Wetland delineations by HDR Alaska, Inc., with MOA Designations (A/B/C) additionally posted.



ANC \\MINER\PROJ\ADOT\159972\GIS\MXD\REPORT\FIG4-4-X-WET.MXD (82ND AVENUE EXTENT) 05/11/2006 09:30:35

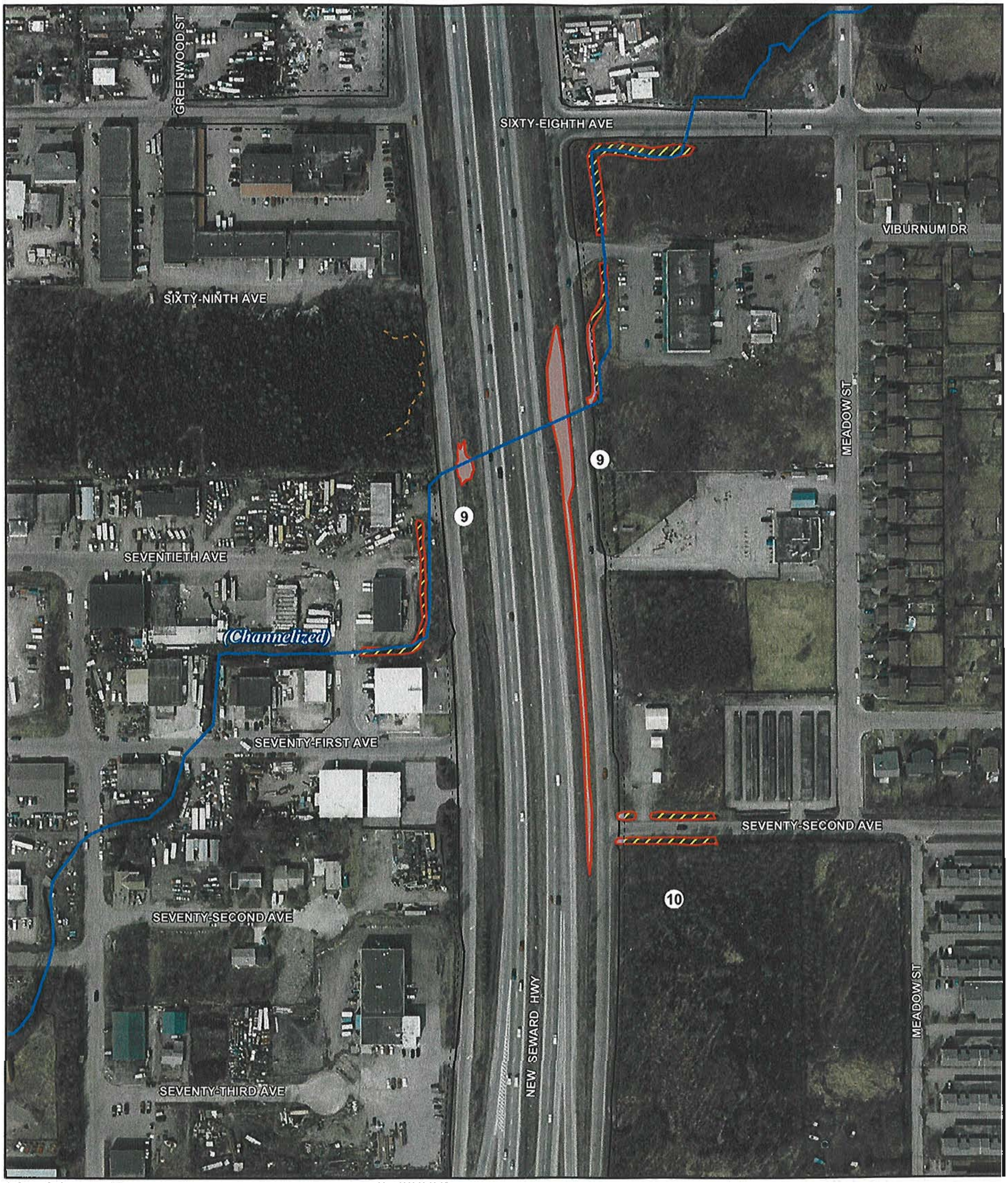
Legend

- (5) Wetland Reference Number
- Proposed Footprint
- 10-Foot Temporary Impact Zone
- Jurisdictional Wetland Boundary
- Non-jurisdictional Wetland Boundary
- Unknown Boundary Outside of Right-of-Way
- Project Impacts
- Temporary Impacts
- No Impacts

FIGURE 4.4-4
Wetland Impacts, Near 82nd Avenue

0 100 200 400 600 Feet

Source: Wetland delineations by HDR Alaska, Inc., with MOA Designations (A/B/C) additionally posted.



ANC \\MINER\PROJ\ADOT\159972\GIS\MXD\REPORT\FIG4-4-X-WET.MXD (70TH AVENUE EXTENT) 05/11/2006 09:30:35

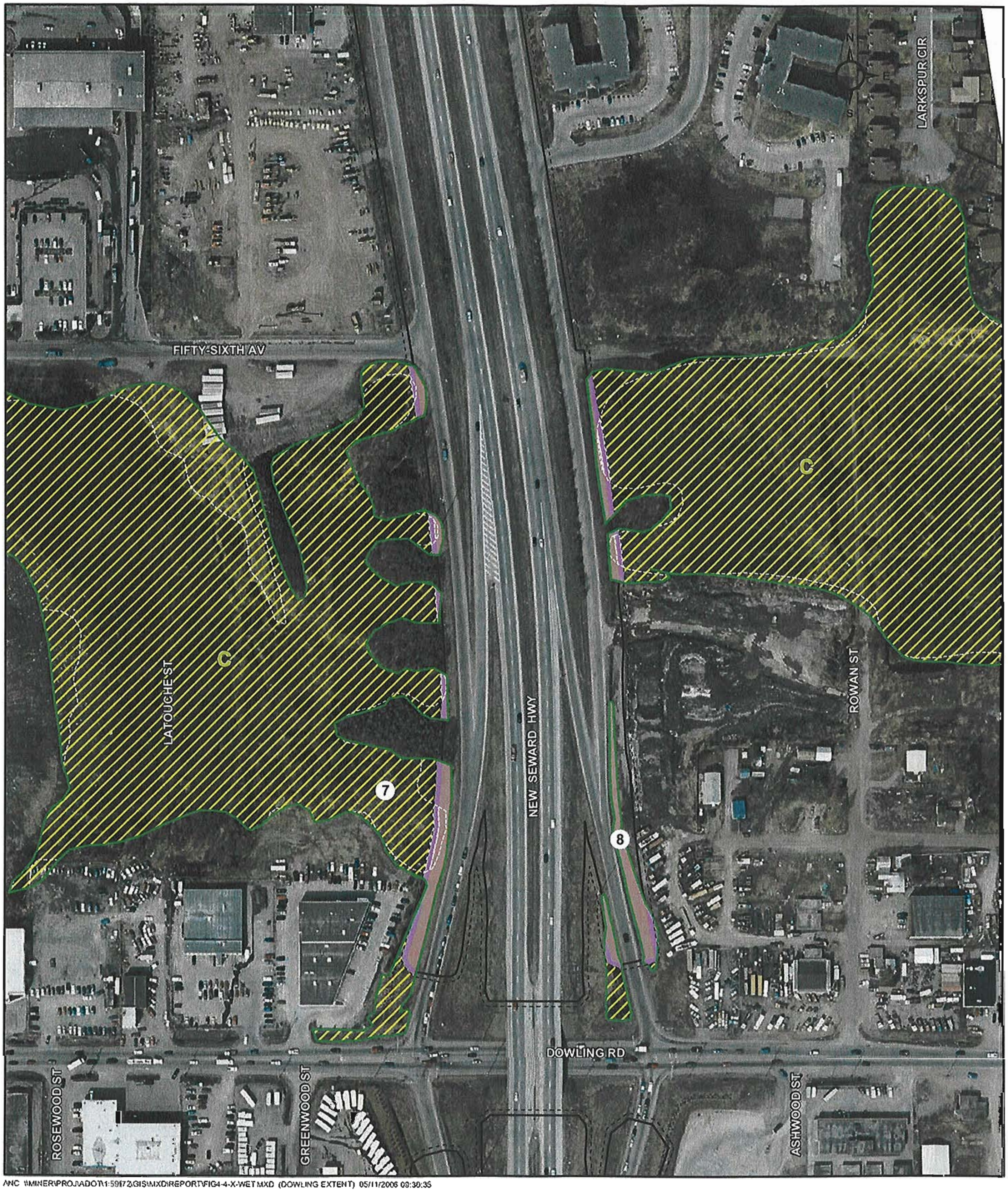
Legend

- (5) Wetland Reference Number
- Proposed Footprint
- 10-Foot Temporary Impact Zone
- Jurisdictional Wetland Boundary
- Non-jurisdictional Wetland Boundary
- Unknown Boundary Outside of Right-of-Way
- Project Impacts
- Temporary Impacts
- No Impacts

FIGURE 4.4-5
Wetland Impacts, Near 70th Avenue

0 100 200 400 600 Feet

Source: Wetland delineations by HDR Alaska, Inc., with MOA Designations (A/B/C) additionally posted.



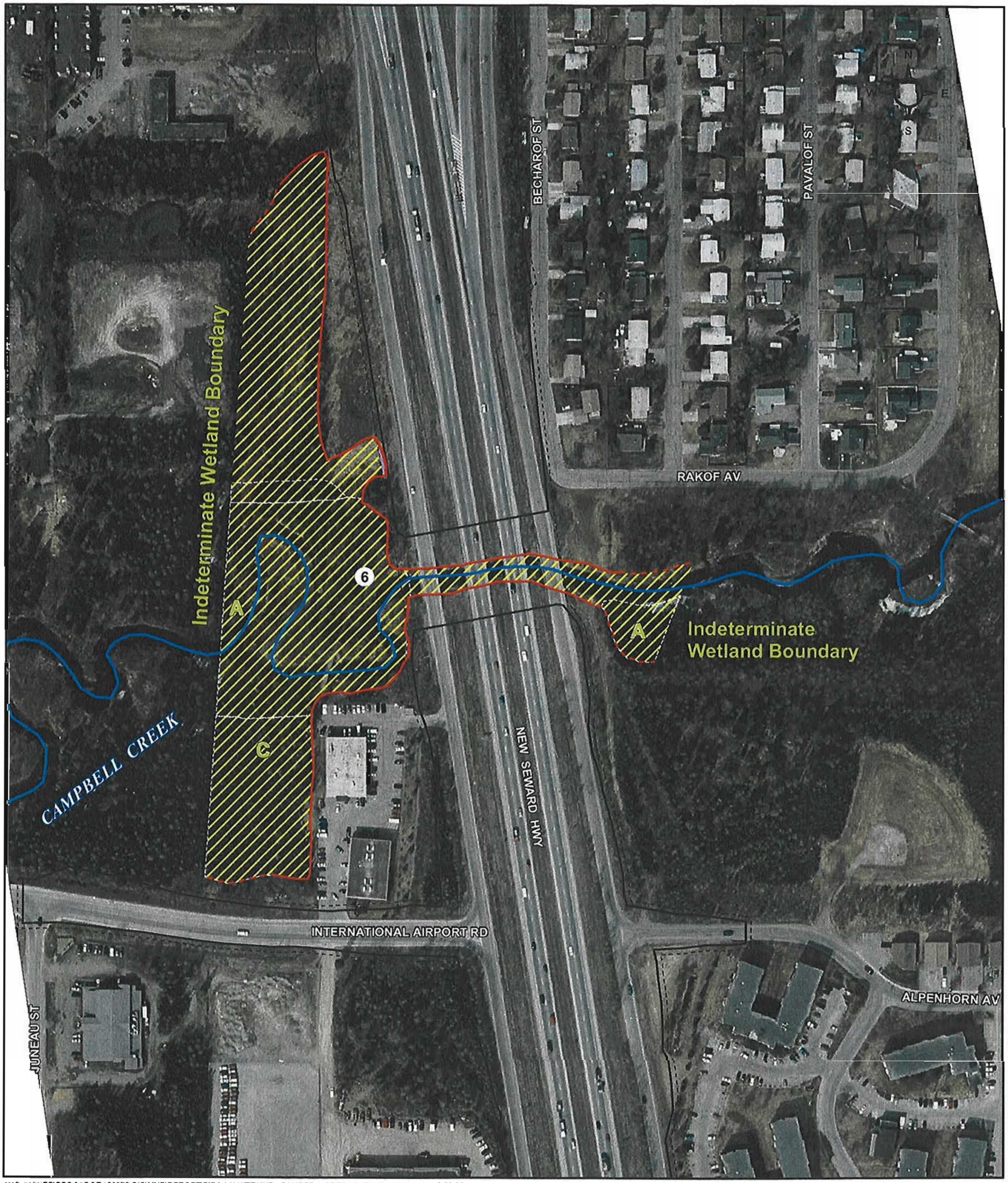
Legend

- (5) Wetland Reference Number
- Proposed Footprint
- 10-Foot Temporary Impact Zone
- Jurisdictional Wetland Boundary
- Non-jurisdictional Wetland Boundary
- Unknown Boundary Outside of Right-of-Way
- Project Impacts
- Temporary Impacts
- No Impacts

FIGURE 4.4-6
Wetland Impacts, Near Dowling Road

0 100 200 400 600 Feet

Source: Wetland delineations by HDR Alaska, Inc., with MOA Designations (A/B/C) additionally posted.



ANC \\WINER\PROJ\ADOT\159972\GIS\MXD\REPORT\FIG4-4-X-WET.MXD (CAMPBELL CREEK EXTENT) 05/11/2006 09:30:35

Legend

- (5) Wetland Reference Number
- Proposed Footprint
- 10-Foot Temporary Impact Zone
- Jurisdictional Wetland Boundary
- Non-jurisdictional Wetland Boundary
- Unknown Boundary Outside of Right-of-Way
- Project Impacts
- Temporary Impacts
- No Impacts

FIGURE 4.4-7
Wetland Impacts, Near Campbell Creek

0 100 200 400 600 Feet

Source: Wetland delineations by HDR Alaska, Inc., with MOA Designations (A/B/C) additionally posted.

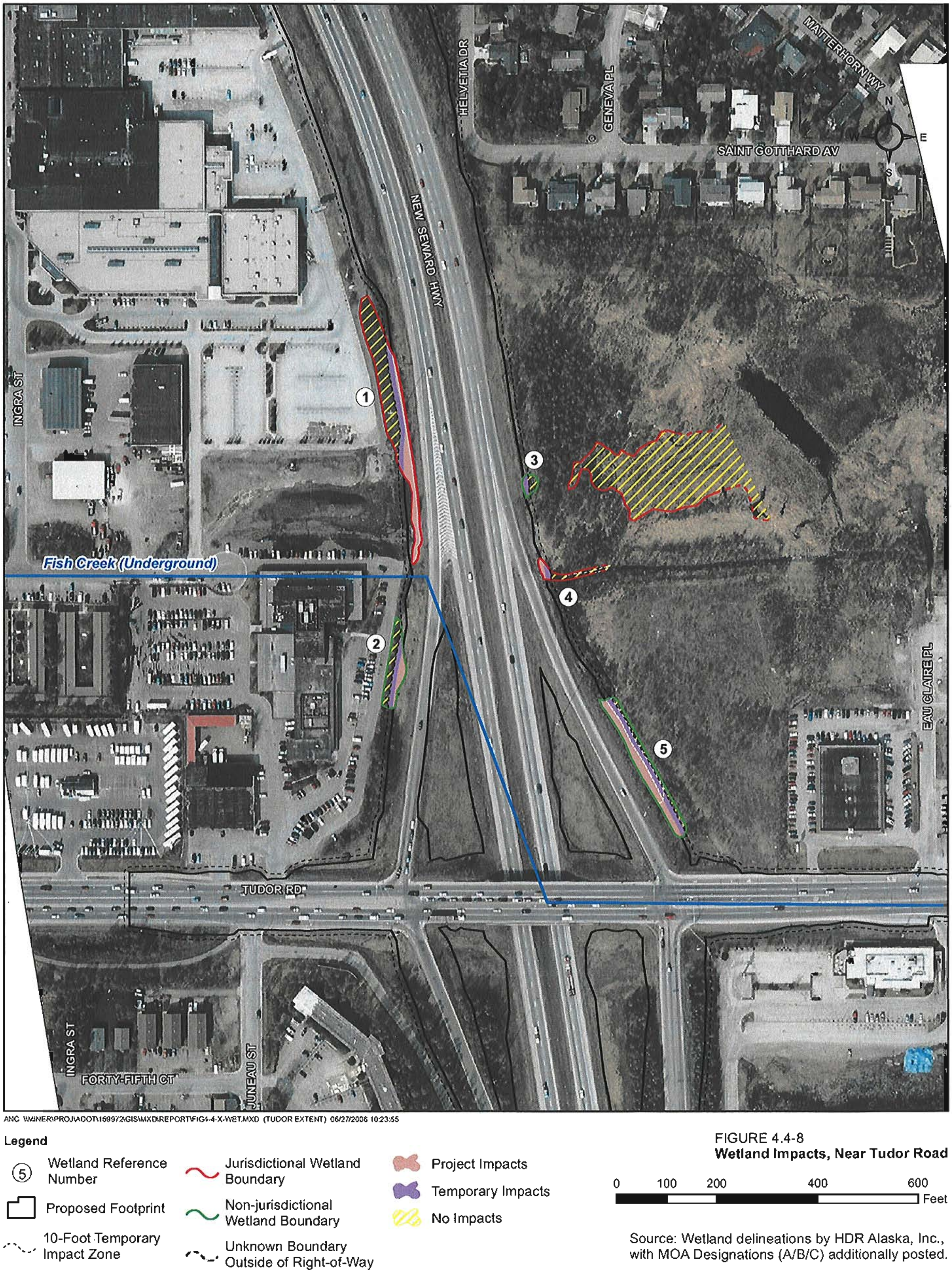


FIGURE 4.4-8
Wetland Impacts, Near Tudor Road

Source: Wetland delineations by HDR Alaska, Inc., with MOA Designations (A/B/C) additionally posted.

- Wetland 4, a USACE jurisdictional creek-fringe wetland north of Wetland 5, and Wetland 3, a non-jurisdictional isolated remnant wetland north of Wetland 4—by ramp improvement fill
- Wetland 2, a non-jurisdictional isolated remnant wetland on the northwest side of the Tudor Road interchange, and Wetland 1, a USACE jurisdictional creek-fringe wetland located north of Wetland 2—by ramp improvements and the multi-use pathway fill.

The Build Alternative would avoid filling Class A wetlands. Approximately 0.003 acre of Class A wetlands (Wetland 6) are located within the 10-foot temporary disturbance zone and therefore could be temporarily disturbed during construction. Permanent impacts to Class B and C wetlands would be minor—0.08 and 0.046 acre, respectively, under the Build Alternative.

Adverse effects on wetlands would result from the Build Alternative. The total area of disturbance is small—1.59 acres permanently affected—relative to the Anchorage Bowl wetland resource. Further, the individual wetlands that would be affected are generally of low value, as indicated by their AWMP classifications (or their lack of identification in the AWMP). The loss of wetland functions are proposed to be compensated through measures already incorporated into the proposed project, such as the longer and higher bridges over Campbell Creek and those related to runoff such as vegetated swales and ditches that retain pollutants, or through in-lieu-fee mitigation.

Total impact areas for each wetland type (based on function) were extracted from Table 4.4-1 are presented in Table 4.4-2 below. Because the wetland type reflects the wetland functions, it is important for describing the type of impact and determining potential mitigation measures.

TABLE 4.4-2
Summary of Impacts to Wetlands From the Build Alternative, By Type

Wetland Type	Build Alternative-Total Impacted Area (acres)	
	Permanent Impacts	Temporary Impacts
Creek-fringe	0.66	0.50
Feeder	0.25	0.41
Isolated extensive	0.24	0.16
Isolated remnant	0.44	0.28
Total acreage disturbed	**1.59**	**1.35**

The primary functions of the portions of the wetlands located along New Seward Highway that would be disturbed by the proposed project include toxicant and sediment retention and stormwater runoff detention. Although all wetlands in and near the right-of-way have the *ability* to perform these functions, only the areas nearest the highway (or other developments) have the *opportunity* to receive and retain pollutants and to receive runoff from adjacent impervious areas. Toxicant and sediment retention and stormwater runoff detention are the primary functions of the smaller wetlands adjacent to New Seward Highway. Where these wetlands would be reduced by the proposed project (for example, creek-fringe Wetland 4 and portions of isolated Wetland 8), the water quality and flood amelioration benefits of these wetlands would be slightly diminished. Where larger wetlands were encroached upon by the proposed project (for example, at Wetland 13, a feeder wetland), the disturbed edge area that currently has the opportunity to retain pollutants and runoff would be eliminated, but the new edge of the wetland would perform those functions. Areas within larger wetlands that were farther from the edges would continue to perform other important functions, such as providing wildlife habitat and green space in the urban environment, but the total area performing these functions would be reduced slightly. Below size thresholds that differ among species, wetland fragments lose their ability to provide habitat to species that are sensitive to human activity.

Secondary Impacts

No-Build Alternative. Under the No-Build Alternative, there would be no detectable indirect effects on wetlands.

Build Alternative. Except for wetland parcels along Campbell Creek and one parcel along the South Fork of Little Campbell Creek at the Old Seward Highway, all AWMP-mapped wetlands within ¼ mile of New Seward Highway in the study area to which access might be improved by the proposed project are designated as Class C wetlands. Because limited constraints apply to development of Class C wetlands and because the amount of land available for development is small, some of those wetlands likely would be included in development of the proposed project. The Class A-designated wetlands along Campbell Creek are municipal park land and are unlikely to ever be developed. Development of the Class B-designated wetlands along Little Campbell Creek is also highly unlikely to occur without full compensation of wetland functions and values. The Class C-designated and undesignated isolated wetlands likely to be developed as an indirect effect of the proposed project have limited ecological and social functions—primarily attenuation of snowmelt and rainfall runoff and providing habitat to disturbance-adapted wildlife—and these functions would be lost.

Mitigation Measures

Regulations and guidelines associated with Section 404 of the Clean Water Act and EO 1990 call for project proponents to take measures to avoid or minimize adverse impacts to wetlands. The following actions would be taken to avoid and minimize impacts to wetlands in the project corridor.

1. Design the project to avoid impacts

The design of the proposed New Seward Highway project would avoid impacts to wetlands to the extent feasible, with special design considerations in the vicinity of the most valuable wetlands in the area. The Campbell Creek bridges would be designed to avoid fill of the Class A creek-fringe wetland adjacent to Campbell Creek, including those along International Airport Road. The bridges would span the creek and part of its floodplain, and no piers would be needed within the creek. Although the preliminary design of the proposed project avoids impacts to some important wetlands, the opportunity to avoid wetlands is very limited within the New Seward Highway corridor. This corridor is constrained by existing development to the east and west. Because many of the wetlands that would be affected by the proposed project occur on both sides of New Seward Highway within the right-of-way, slight shifts toward either side of the proposed road alignments to avoid wetlands are not possible.

The USACE suggested consideration of an alternative (Leighty, 2003) that would widen the lanes toward the inside median in areas where wetlands occur on the outside edges of New Seward Highway. This possibility was evaluated, but was not carried forward because the existing grassy median between the northbound and southbound lanes provides important safety, drainage (mediation of peak runoff), snow storage, water infiltration, and water quality functions (pollutants and sediment removal). The design standard for applicable design speed, indicate at least a 30-foot separation is required between the edges of the travel way of opposing roadways. Reducing the width of this area between the northbound and southbound lanes would require the addition of concrete median barriers and storm drains. It is not practical to eliminate the grassed median to avoid affecting adjacent wetlands when the benefits of the grassed median mentioned above are weighed against avoiding the wetland impacts to mostly low-value wetlands.

2. Incorporate measures to minimize adverse impacts

To minimize the extent of impact, steep embankment slopes (a 2-to-1 horizontal to vertical relationship) would be used where Class A or B wetlands would be affected. The 2-to-1 slopes are proposed for protection of the wetlands north of Huffman Road on the east side and the Campbell Creek area. The use of vertical walls or slopes steeper than those with a 2-to-1 ratio to minimize impact to roadside wetlands was also considered. Given the limited functions of the other area wetlands that would be affected, the lesser safety of vertical walls, need for guardrails that complicate snow removal, and cost of construction, vertical walls were not considered practicable for most areas. Vertical walls are proposed at the North Fork and South Fork of Little Campbell Creek and at Fish Creek tributaries to minimize wetland encroachment at these crossings.

The runoff from the freeway and storm drains that currently outfalls into creeks and wetlands would be treated according to guidance in the *Alaska Highway Drainage Manual* (DOT&PF, 2004a) and the NPDES MS4 permit. The grassed median and drainage swales and other features (see Water Quality Impacts discussion in Section 4.3) would receive, store, infiltrate, and filter snowmelt and stormwater runoff; therefore, they would minimize the impacts of the proposed highway improvements on water quality and surface water flows. The highway drainage design would incorporate all feasible measures to detain water on the site or in other designated areas and to avoid direct routing of storm water to creeks without pretreatment.

The project-wide measures discussed above apply to all wetlands within the study area (even those that are not under USACE jurisdiction), because the FHWA is also directed to use all practicable measures to protect wetlands under EO 11990.

3. Protect or restore sites that must be temporarily affected by the project

To protect the hydrologic, water quality, and vegetated habitat functions of wetlands that would be temporarily disturbed during construction of the proposed project, two methods would be employed:

1. In the area of Campbell Creek, just prior to construction, a cover would be placed over the wetland, utilizing a geotextile and aggregate to allow construction vehicles to pass over the wetlands without disturbing the underlying wetland soil. Upon completion of construction activities, the cover would be removed.
2. After construction activities are completed in the wetlands, the soil would be recontoured and the area revegetated with plant species indigenous to the Cook Inlet area.

4. Compensate for unavoidable impacts through preservation, restoration, or creation of wetlands

In areas where jurisdictional wetlands would be filled and functions lost, or fragmented to the extent that wetland functions would be adversely affected, the losses would be compensated by preservation, restoration, creation of wetland functions elsewhere, in-lieu-fee mitigation, or the purchase of credits from an approved mitigation bank. A similar approach would be implemented for the compensation of non-jurisdictional wetlands.

Significant opportunities to restore and create wetland functions include the following:

- Remove unnecessary existing road embankment for construction of the Campbell Creek bridges on New Seward Highway and International Airport Road. This area of 1.1 acres would become floodplain and wetland between and underneath the bridges. The newly restored wetland/floodplain would also provide compensation for 0.08 acre of Class B wetland impacts (Wetland 5) and 0.046 acre of Class C wetland impacts (0.03 for Wetland 7 and 0.016 for Wetland 8) associated with the proposed Build Alternative. The wetland functions lost from these isolated wetlands would be mitigated by this action and the additions of vegetated swales in drainage ditches and the median and the detention ponds in areas surrounded by ramps.
- Create wetlands from non-wetland depressions in large areas surrounded by the highway and ramps and use them for stormwater detention and treatment for the proposed project. Possible locations are the northwest quadrant of the O'Malley Road interchange and the Dimond Boulevard loop ramp (southeast quadrant).

The Anchorage Debit-Credit Method, developed by the MOA, USACE, EPA, and USFWS, would be used for determining the compensation for wetland losses that cannot be avoided or minimized. The use of this quantitative tool for comparison of impacts and compensatory measures does not affect (make unnecessary) the requirements of the Clean Water Act or the Section 404 Program. This tool does build upon and incorporate the various aspects of the AWMP, including the Anchorage Wetlands Assessment Method.

4.5 Floodplain Impacts

This section describes the impacts of the No-Build Alternative and the proposed Build Alternative on the floodplains of the South Fork of Little Campbell Creek, North Fork of Little Campbell Creek, Campbell Creek, and Fish Creek. Furrow Creek crosses New Seward Highway at Huffman Road; however, it is contained in a buried storm drain system upstream and downstream of the project corridor. Because it is anticipated that this existing storm drain system would not be affected by the project, impacts to the Furrow Creek floodplain were not evaluated.

EO 11988 requires that projects are designed or modified to “minimize potential harm to or within a floodplain” before any building or land modifications are made. The proposed project would adhere to floodplain encroachment design standards for roadways located within floodplains, found in Title 23, Section 650.115(a)(5) of the *Code of Federal Regulations* (CFR); standards of the National Flood Insurance Program; and MOA and DOT&PF floodplain requirements. An application for an MOA Flood Hazard Permit would be submitted as part of the final design.

Floodplains are vital components of all stream ecosystems because of the numerous benefits they provide, such as temporary storage of floodwaters, filtering of pollutants from stormwater, and crucial habitat to numerous plant and animal species. Floodplains help improve and maintain water quality in streams by filtering storm water and serve as natural sponges during flood events by storing and slowly releasing floodwaters. Floodplains also reduce stream velocity during floods and increase the ability of a stream channel to move floodwaters downstream.

Floodplains consist of the floodway and backwater. The floodway is the area that would be required to efficiently discharge the design flood. The remaining floodplain is referred to as the backwater, which is essentially a holding area that provides storage for the floodwaters until the stream can assimilate the additional water downstream. Floodplains protect the community by acting as flood buffers, temporarily storing floodwater, and preventing floods from inundating homes, businesses, and other infrastructure.

Construction and development within the floodplain can increase downstream flooding because of the loss of floodwater storage, increased peak flow volumes, and increased flow velocity. Floodplain alterations can also reduce important habitat and affect riparian vegetation that would normally protect the bank from erosion. It is important to minimize development within floodplains to maintain their natural and beneficial values, such as providing habitat for fish and wildlife, storing storm water during heavy rainfall events, and buffering the effects of urban stormwater runoff.

The Build Alternative does not increase flooding risks, and in the case of the South Fork and North Fork of Little Campbell Creek and Campbell Creek, it would reduce flooding risks. Further, the South Fork and North Fork of Little Campbell Creek, within the boundaries of the project are already modified, relocated, channelized, and contained in culverts. Opportunities for restoring and preserving natural and beneficial floodplain values are incorporated into the inlet and outlet areas of the South Fork and North Fork of Little Campbell Creek, in the bridging of the Campbell Creek floodplain and restoration efforts to provide a floodplain under the bridges, and restoration of the associated wetlands, including the temporarily disturbed wetlands from construction activities for the bridges. The proposed project is consistent with the MOA floodplain development requirements.

4.5.1 South Fork of Little Campbell Creek

No-Build Alternative

The No-Build Alternative would leave the South Fork of Little Campbell Creek in its current condition, imposing no impacts to its 100-year floodplain.

Build Alternative

The proposed highway improvements would occur within the floodplain of the South Fork of Little Campbell Creek. The main encroachment on the floodplain of this stream would include the embankment to support the additional highway lanes, sidewalks, and culvert improvements (replacement and small quantities of fill).

Mitigation Measures

Design and construction would meet state and local MOA floodplain requirements and would minimize impacts on floodplains. The culvert at the South Fork of Little Campbell Creek crossing of New Seward Highway would be redesigned as a part of the proposed project to ensure that the floodplain backwater elevation would not be raised. The design also would replace and extend the existing culvert with a larger culvert to accommodate widening the road and allow flood flow passage of the 100-year event, without flooding of the New Seward Highway travel lanes or Brayton Drive.

Mitigation measures for the floodplain area of the South Fork of Little Campbell Creek would minimize the adjacent filling of wetlands and the potential and existing stormwater detention areas, including the two adjacent stormwater detention facilities east of New Seward Highway north of Dimond Boulevard.

4.5.2 North Fork of Little Campbell Creek.

No-Build Alternative

The No-Build Alternative would leave the North Fork of Little Campbell Creek in its current condition, imposing no impacts on its floodplain.

Build Alternative

The proposed project would occur within the floodplain of the North Fork of Little Campbell Creek. The main encroachment on the floodplain of this stream would include the embankment to support the additional highway lanes, sidewalks, and culvert improvements (replacement and small quantities of fill).

Mitigation Measures

Design and construction would meet state and local MOA floodplain requirements and would minimize impacts on floodplains. The culvert at the North Fork of Little Campbell Creek crossing of New Seward Highway would be redesigned as a part of the proposed project to ensure that the floodplain backwater elevation would not be raised. The design also would replace and extend the existing culvert with a larger culvert to accommodate widening the road and allow flood flow passage of the 100-year event, without flooding of New Seward Highway travel lanes or Brayton Drive. Mitigation measures for the encroachment into the floodplain area of the North Fork of Little Campbell Creek would minimize the adjacent filling of wetlands and to improve and protect detention ponding areas that provide flood water storage.

4.5.3 Campbell Creek

No-Build Alternative

The No-Build Alternative would leave Campbell Creek in its current condition, imposing no impacts to its floodplain.

Build Alternative

The proposed project would occur within the floodplain of Campbell Creek. The floodplain of Campbell Creek would be enhanced through the construction of bridges with longer spans that would allow the restoration of floodplain area adjacent to the creek as it flows under the highway. The new bridges (one for each frontage road and one each for northbound and southbound lanes, total of four bridges) would create a floodplain approximately 143 feet wide under the new bridges. The use of longer spans would create a floodplain area of 1.1 acres, compared to the existing floodplain area under the existing bridges of 0.4 acre. The proposed New Seward Highway bridges over Campbell Creek would minimize impacts of the Build Alternative by providing for a floodway and additional flood water storage. The increased space under the bridge would provide an additional buffer against flood impacts. There would be a small area of encroachment in the existing Campbell Creek floodplain on the east side of the east frontage road for embankment widening. A similar area of encroachment would result for the west side of the west frontage road. The encroachment would not increase the base 100-year-flood elevation.

Mitigation Measures

Floodplain mitigation strategies at Campbell Creek would focus on enhancing and restoring the floodplain area under the new bridge structures for the highway. Further, the adjacent floodplain, greenbelt, and surrounding wetlands would be protected by avoiding the placement of fill in wetlands or floodplains, preserving the riparian buffer and greenbelt areas, and ensure that the design would not increase the 100-year-flood elevation. The bridges would be designed to meet DOT&PF and MOA flood and floodplain requirements. Revegetation of temporarily disturbed areas and reestablishment of the floodplain beneath the bridge area is a mitigation commitment for the proposed project.

4.5.4 Fish Creek

No-Build Alternative

The No-Build Alternative would leave Fish Creek in its current condition, imposing no impacts to its floodplain.

Build Alternative

Fish Creek is not in its historical floodplain and has been piped to New Seward Highway from approximately 750 feet upstream because of prior development, including construction of the Tudor Road Interchange in 1976. After Fish Creek crosses under the highway, it is piped to the west for more than a mile before it daylights between C Street and Arctic Boulevard. A small portion of the proposed highway improvements would occur within the floodplain of an unnamed remnant tributary of Fish Creek that discharges to a culvert and is then piped to the same underground storm drain system as Fish Creek.

Mitigation Measures

No mitigation is proposed for Fish Creek.

4.6 Water Body Modification Impacts

This section describes impacts of the No-Build Alternative and proposed Build Alternative on water bodies along the project corridor—Furrow Creek, South Fork of Little Campbell Creek, North Fork of Little Campbell Creek, Campbell Creek, and Fish Creek. The discussion addresses project activities that might change the shape or course of those creeks. For culverts requiring fish passage, the Memorandum of Agreement between the DOT&PF and Alaska Department of Fish and Game (ADF&G) for the "Design, Permitting, and Construction of Culverts for Fish Passage" (2001) would be used to determine the appropriate tier design requirements. It has been determined that Tier 1 culverts are appropriate for the replacement of culverts for the proposed project.

During the agency scoping meeting on January 23, 2003, it was suggested that "opportunities to daylight creeks that are currently in pipes" be explored. During the subsequent exploration, opportunities to daylight creeks that are currently in culverts were considered. Of the six streams that cross under the New Seward Highway, three are in long, relatively deep storm drain systems, two pass through the highway right-of-way in surface culverts and one (Campbell Creek) is bridged.

The three streams in storm drains are Furrow Creek, an un-named creek near 100th Avenue, and Fish Creek. Furrow Creek falls into a storm drain approximately 200 feet east of New Seward Highway and daylights more than 2,500 feet to the west. The storm drain follows Huffman Road to the west side of Old Seward Highway, draining primarily retail and commercial properties. The un-named creek near 100th Avenue is in a storm drain system for more than 2,000 feet east of and more than 3,000 feet west of New Seward Highway. It drains residential property. Fish Creek is in a storm drain for approximately 750 feet east of and more than 12,000 feet west of New Seward Highway. It drains retail property on the east side of New Seward Highway and residential property on the west side.

The opportunity to daylight any one of these streams is virtually zero, considering the probable right-of-way impacts. Property covering these storm drains is completely developed. Property would have to be purchased so that the newly daylighted stream width, 25 foot setbacks on either side, and a meander width could be accommodated. Of these three streams, only Fish Creek supports anadromous fish species. To daylight this stream would conservatively affect more than 60 parcels. Because there is currently no specific areawide plan to upgrade Anchorage area waterways (including daylighting of piped streams), the project team does not propose to advance these streams as candidates for daylighting, considering the obvious high impact to property owners and cost, particularly in light of the fact that the proposed highway improvements have virtually no impact on the existing condition.

The South Fork and North Fork of Little Campbell Creek present the most feasible opportunities to daylight creeks that currently pass through the New Seward Highway corridor in culverts. Both creeks support anadromous fish and both approach and depart the project corridor in open channels. Preliminary estimates indicate that approximately $5 million would be needed to install four bridges at each stream crossing for a total of $10 million to daylight both streams through New Seward Highway.

No-Build Alternative

Under the No-Build Alternative, the existing condition of the creeks in the project area would not change as a result of modifications to New Seward Highway.

Build Alternative
The Build Alternative would entail culvert replacement and extension, bridge construction, filling, bank reconstruction, and earth moving near streams and wetlands.

Furrow Creek
A small northern tributary of Furrow Creek enters the Furrow Creek storm drain system from a storm drain detention pond just north of Huffman Road, east of the frontage road. The edge of the pond would be filled, and the inlet culvert to the storm drain system would be extended approximately 12 feet eastward to accommodate the pathway along the frontage road. The storm drain detention pond detains runoff and retains particulates and other pollutants from the adjacent (east) parking lot and extensive development upstream.

South Fork of Little Campbell Creek and North Fork of Little Campbell Creek
The Build Alternative would affect both streams in similar ways. Specific modifications to the streams would include full replacement and extension of the existing culverts. The new culverts would be sized for a 100-year-flood event or in accordance with the Memorandum of Agreement between DOT&PF and ADF&G (2001) regarding fish passage, whichever is larger. At each creek, the existing culverts would be replaced and extended to accommodate the addition of lanes and pathways. The creek segments at the inlets and outlets would likely need to be stabilized to prevent erosion at high flows.

Campbell Creek
The Build Alternative would entail construction of higher, longer, and wider bridges across Campbell Creek (see Figure 2.2-5). The new bridge abutments would be located farther from the creek banks than are the existing abutments. Although they would not span the entire natural floodplain, they would effectively widen the existing constrained creek corridor. The creek channel under the existing bridges would likely need to be altered to create stable conditions. These changes would be carefully designed to effect beneficial changes to the morphology, sediment transport, and aquatic habitat of the creek.

Fish Creek
The Build Alternative would widen the highway embankment to the east. The culvert east of New Seward Highway that directs the existing channelized flow into the storm drain system (Fish Creek) would be lengthened by up to approximately 20 feet. The proposed improvements under the Build Alternative would have virtually no impact on the storm drain system that carries Fish Creek under New Seward Highway.

Mitigation Measures
Mitigation measures would consist of implementing sound drainage design and designing culvert extensions and replacements to accommodate floods and fish passage.

4.7 Fish and Wildlife Impacts

4.7.1 Fish

Scientists evaluated the effects of the proposed project on fish populations qualitatively based on existing data; the project description; literature review; communication with Alaska Department of Natural Resources (ADNR), Office of Habitat Management and Permitting; and professional judgment. Fisheries biologists visited each stream crossing in the study area to assess existing stream conditions, substrate, observable in-stream habitat, and condition of banks and culverts. This section addresses the effects on all anadromous and resident fish species in creeks within the study area. The Essential Fish Habitat (EFH) Assessment presented in Appendix C applies only to species managed under EFH regulations.

No-Build Alternative

Under the No-Build Alternative, no impacts on fish would occur.

Build Alternative

The build alternative would involve crossing three streams that bear fish. The direct effects of the project on all fish in the study area would be essentially the same. The species found in these streams include chinook (*Oncorhynchus tshawytscha*), coho (*O. kisutch*), sockeye (*O. nerka*), and pink (*O. gorbuscha*) salmon; Dolly Varden char (*Salvelinus malma*); and rainbow trout (*O. mykiss*). The proposed improvements would provide better fish passage, some improvement to stream bed from Tier 1 culvert installations, and potentially improved spawning and rearing opportunities at the Campbell Creek bridge replacement location. These changes should result in an overall improvement for resident and migratory fish within the project corridor.

Secondary Impacts

Induced development from the proposed project would be minimal but could possibly occur at several locations. Such development could result in additional impacts to fish, including changes in stream characteristics, water quality degradation, and sedimentation upstream and downstream of the project corridor.

Mitigation

Mitigation measures would consist of replacing the existing culverts of fish streams with Tier 1 culverts. Erosion and sediment control BMPs and spill prevention measures would be used during construction activities, and the new highway and drainage features would be inspected and maintained after construction is completed.

4.7.2 Essential Fish Habitat Assessment

Stream segments cataloged by the ADF&G as supporting anadromous fish are designated EFH. Within the project corridor, the South Fork of Campbell Creek, North Fork of Little Campbell Creek, and Campbell Creek are designated as EFH (Appendix C). The species with EFH in these streams include chinook, coho, sockeye, and pink salmon.

No-Build Alternative

The No-Build Alternative would involve no change to EFH in the project area.

Build Alternative

The Build Alternative would involve crossing the three EFH streams in the study area and would have effects on EFH. With implementation of the conservation measures proposed in the EFH Assessment (Appendix C), the long-term effects of the proposed project on EFH in project corridor streams would range from slightly adverse to moderately beneficial.

The new bridges over Campbell Creek at New Seward Highway would be substantially longer and higher than the existing bridges. They would span the creek and restore the floodplain under the bridge. The bridges would be reconstructed to include a flat floodplain area, and the banks under the bridges would be stabilized against erosion. The resulting long-term decrease in sediment input to the creek would represent a moderate benefit to EFH and the managed and unmanaged species.

The necessary changes to existing culverts of the North Fork and South Fork of Little Campbell Creek would comply with the fish passage standards already agreed upon in the Memorandum of Agreement between DOT&PF and ADF&G for the "Design Permitting, and Construction of Culverts for Fish Passage" (2001). It has been determined that Tier 1 analysis is appropriate for the culvert replacements for the proposed project. The DOT&PF goal is for any culvert and channel modifications to have a net result to EFH that is neutral or beneficial. If culverts had to be replaced to improve or maintain fish passage, or a degraded channel had to be realigned, the proposed project would likely have a positive effect on EFH and the managed and unmanaged species.

In the long term, the project could contribute to slight degradation of water quality and change in the flow regime because of increased impervious area draining to the creeks. The drainage features of the proposed project would be designed to minimize these effects through the use of vegetated drainage swales, ditches, and detention basins and by avoiding direct stormwater discharge to a stream without pretreatment.

The proposed project could have short-term and minor adverse effects on water quality and EFH during construction from sedimentation. The proposed project would require culvert extension, removal and installation, minor channel reconstruction, or other in-stream work. A temporary increase in suspended solids might result from such construction activity, and changes to channel morphology could occur. The increase in turbidity might displace or harm fish and reduce the light available to aquatic plants. Impacts to EFH during construction would be minimized through implementation of stringent BMPs throughout the project area.

Secondary Impacts

Induced development from the proposed project would be minimal but could possibly occur at several locations, such as along the east frontage road between Dimond Boulevard and Dowling Road (see land use discussion in Section 4.16). Such development could result in additional adverse impacts to fish, including changes in stream characteristics, water quality degradation and sedimentation upstream and downstream of the project corridor.

4.7.3 Wildlife

No-Build Alternative

Under the No-Build Alternative, impacts on wildlife would be anticipated to continue or slightly increase as traffic levels increase. Traffic data indicates a slow rise in moose-vehicle collisions since 1999. See Section 3.5.3, Wildlife.

Build Alternative

The Build Alternative would replace disturbed habitat with roads, bridges, pathways, and areas of restoration. Most wildlife species in the project area are highly mobile and consequently unlikely to be affected on an individual basis by the proposed actions. One exception to this may be moose. Moose-vehicle collisions have risen on New Seward Highway, and increasing the number of lanes and resulting traffic may result in additional moose-vehicle interactions. Wildlife would experience a loss of black spruce bog, scrub, and birch habitat, and there might be a slight loss of individual small mammals. Implementation of the Build Alternative would result in the loss of approximately 2.6 acres of wildlife habitat within the highway corridor. Some of these areas are currently vegetated with shrubs and trees that provide food and shelter to birds and small mammals. The loss of habitat would include wetland areas that provide roosting, nesting, hiding, and foraging habitat for a variety of wildlife species, mainly shorebirds, waterfowl, and songbirds. Because the habitat that would be lost is currently degraded by its location next to New Seward Highway, it supports mainly disturbance-tolerant animals. The proposed project would shift the location of human noise and activity closer to other remaining habitats, displacing animals that are sensitive to human activity. Particularly during construction, animals might be displaced from the project vicinity.

Reconstruction of the Campbell Creek bridges would benefit wildlife that use the stream riparian corridor for travel. Appropriately designed underpasses have been shown to be effective crossing corridors for wildlife. The design species for the proposed project is the moose. The bridges would be approximately 143 feet long with 12-foot-high openings beneath for wildlife crossing. The openness ratio has been calculated at 5.0, compared to the openness ratio of 1.7 for the existing bridges. The grade separations provided at four other locations along the project corridor would also provide for safer and easier crossing of the mainline by wildlife.

Secondary Impacts

Induced development in the study area, by the proposed project, could result in some additional impacts, including habitat fragmentation and a decrease in overall availability of wildlife habitat such as riparian areas and wildlife travel corridors.

Mitigation Measures

Fences would be used to aid in funneling moose under the Campbell Creek bridges and reduce the number of moose struck on the highway. Fences between the mainline and the frontage roads could also effectively direct larger mammals to the grade-separated crossings of the mainline at 92nd, 76th, and 68th avenues and International Airport Road. The additional lighting for the proposed project would also reduce wildlife collisions by providing drivers a longer sight distance, allowing them to react more quickly to wildlife presence along the road corridor.

4.8 Coastal Zone Impacts

No-Build Alternative

The No-Build Alternative would result in no activities associated with construction occurring in the coastal zone.

Build Alternative

The proposed project would require development of land within the Preservation, Conservation, and Utilization environments of the MOA Coastal Management Program (CMP). Land already within the state right-of-way has been dedicated to public use and is consistent with the MOA CMP. Additional right-of-way acquisition for New Seward Highway improvements would also be dedicated to public use. The segment of highway from Rabbit Creek Road to O'Malley Road crosses through the Utilization Environment designated as urban residential, but does not require additional right-of-way because the project is adding multi-use pathways within existing right-of-way and would not affect this CMP environment. The highway segment from O'Malley Road to Dimond Boulevard does not pass through any CMP policy units. From Dimond Boulevard to Tudor Road, the highway passes through CMP policy units for the Preservation Environment (preservation freshwater wetlands) and Conservation Environment (river floodplain, marginal lands, parks and open space, and Class II waters of the North Fork of Little Campbell Creek, South Fork of Little Campbell Creek, and Campbell Creek Greenbelt).

Projects planned for sites within the coastal boundary must go through a Coastal Zone Consistency Review that consists of wetland, stream crossing, and flood hazard reviews. The MOA Comprehensive Planning Division would work with the permitting agency and the ADNR in making local coastal zone consistency determinations. The proposed project as designed appears to be consistent with the policies and standards of the Alaska Coastal Management Program. DOT&PF would submit documentation to ADNR for a formal consistency review during the permit phase of the project.

The Build Alternative would improve the culvert structures at South Fork of Little Campbell Creek, North Fork of Little Campbell Creek, and Fish Creek. Culvert installation would include improvements to fish passage. A new bridge structure is proposed at Campbell Creek, and bridges over the frontage roads also would be included at this location. Bridge design would accommodate a bicycle and pedestrian path under the bridge on the north side of Campbell Creek, facilitating future trail and recreation area connections.

Secondary Impacts

No secondary impacts on the coastal zone are foreseen.

Mitigation Measures

Ongoing coordination between DOT&PF and resource agencies would be maintained throughout the development process to ensure project design meets all regulatory requirements. Specific mitigation measures are discussed in more detail in the Floodplain Impacts (4.5), Wetland Impacts (4.4), and Water Quality Impacts (4.3) sections of this chapter.

4.9 Air Quality Impacts

This section addresses air quality impacts of the proposed project by reporting the results of the project-specific air quality analysis and the air conformity determination. The air quality analysis is triggered by the fact that the MOA is currently a maintenance area for carbon monoxide (CO). The air quality analysis methodology was coordinated with the interagency consultation group with representatives present from EPA, FHWA, DOT&PF, MOA, and ADEC. The analysis was conducted for both the No-Build Alternative and Build Alternative.

The proposed New Seward Highway project is a federally funded transportation project located in a CO maintenance area; therefore, a project-level conformity analysis of the impacts of emissions of CO is required. Conformity criteria include demonstrating that the project is included in a conforming regional transportation plan and transportation improvement program (TIP) and conducting a "hot-spot" analysis of CO concentrations in the project vicinity. The project is included in the 2004-2006 MOA TIP (2003c) for the Anchorage and Chugiak-Eagle River area, and the 2004-2006 MOA TIP has been determined to conform with the Alaska State Implementation Plan and the Clean Air Act. A draft conformity analysis was distributed to the interagency working group for comments in May 2005. The public review draft of the conformity analysis is enclosed in Appendix D.

No-Build Alternative

Air quality analysis modeling results for the No-Build Alternative indicated that the 1-hour concentrations of CO were below the allowable levels of 35 parts per million (ppm) for the year 2005, 2015, and 2035. Modeling also indicated that the 8-hour concentrations of CO were below the allowable level of 9 ppm for the years 2015 and 2035; however, for the existing 2005 year, the 8-hour concentration was 9.2 ppm. (See Air Quality Analysis, Appendix D). Although the model shows the existing year exceedance of the National Ambient Air Quality Standards (NAAQS) for the 8-hour average, there have been no reported violations of the standard in Anchorage since 1996. The models estimates are considered conservative. Therefore, the air quality in the study area is currently in compliance with required levels and is expected to continue to be in compliance into the design year of 2035. The air quality will also improve through the federally mandated reductions in vehicle exhaust emissions in newer and future vehicles that would more than offset contributions from increased traffic.

Build Alternative

The effects of the proposed Build Alternative on air quality are discussed below.

4.9.1 Analysis of Carbon Monoxide Hot Spots

A CO hot-spot analysis was conducted to evaluate the impact of the proposed roadway modifications along New Seward Highway between Rabbit Creek Road and 36th Avenue. A hot-spot analysis consists of performing dispersion modeling to determine whether a project will cause or contribute to any new violations of ambient standards or increase the frequency or severity of existing violations. An interagency consultation meeting was held in accordance with 40 CFR 93.105 and Title 18, Section 50.715, of the *Alaska Administrative Code* (AAC) to choose a model (or models) and associated methods and assumptions to be used in hot-spot analyses. The work plan developed from the interagency consultation meeting is presented in Attachment A of the air quality analysis report, provided as Appendix D.

The analysis includes all portions of the proposed project that are below level of service (LOS) C. The mainline from Dimond Boulevard to 36th Avenue as well as the Tudor Road intersection are below LOS C during the afternoon peak hour. Therefore, both the Build Alternative and the No-Build Alternative areas involving the New Seward Highway intersections with Tudor Road and with International Airport Road, as well as the mainline and associated frontage roads from Dimond Boulevard to 36th Avenue, are included in the analysis. The alternatives are described in Chapter 2.

Modeling was conducted for the following scenarios:

1. Existing conditions (Year 2005)

2. Opening year (2015) no-build scenario
3. Opening year (2015) build scenario
4. Design year (2035) no-build scenario
5. Design year (2035) build scenario

It was determined in the interagency consultation meeting that the opening year (2015) is expected to have the highest impacts.

Background CO values were determined by adjusting background values taken by the MOA in 1998 to present-day values by using the decrease in actual monitoring results during the same period of time. This approach was developed and recommended by MOA for the 8-hour background. The 1-hour background was then determined by dividing the 8-hour background by 0.7, which is the persistence factor approved by the EPA. Use of this approach to develop the background values was agreed to in the interagency consultation meeting, and the information received from MOA is included in the work plan in Appendix D (Attachment A).

A two-step modeling process incorporating the latest versions of EPA-approved computer models MOBILE6 and CAL3QHC was used to assess impacts of CO emissions from the proposed project. The MOLBILE6 is used to predict average vehicle emission rates at specific speeds. CAL3QHC is used to predict CO concentrations from motor vehicles at roadway intersections and along roads. Emission factors output by MOBILE6, along with roadway information, signal information and traffic volumes, were input to CAL3QHC. Traffic volume projections corresponding to peak afternoon values were used for all analysis scenarios. Other modeling inputs consistent with EPA guidance were also used.

CAL3QHC predicts CO concentrations at specific locations called receptors. Receptors are placed along roadways and at intersections where impacts are expected to be the highest and at locations that are accessible by the public. For this analysis, receptors were placed around the intersections at a distance of 3 meters from the edge of the road and 25 meters apart, according to model guidance. Receptors were also located along the frontage roads from 36th Avenue to Dimond Boulevard. Concentrations were calculated at a receptor height of 1.8 meters.

For both years 2015 and 2035, the modeled maximum 1-hour concentrations for the Build Alternative are below the CO 1-hour NAAQS of 35 ppm and the modeled 8-hour concentrations are below the 8-hour CO NAAQS of 9 ppm. Therefore, the analysis demonstrates that the proposed project would not cause any new localized CO violations. In addition, because all results are below the CO NAAQS, the proposed project would not increase the frequency or severity of any existing CO violations. Therefore, the project is determined to conform with the Anchorage TIP, the purpose of the current EPA-approved Alaska State Implementation Plan, and the requirements of the Clean Air Act.

4.9.2 Impacts of Other Air Pollutants

In addition to CO, motorized vehicle exhaust includes other regulated air pollutants, including particulate matter less than 10 microns in aerodynamic diameter (PM_{10}), volatile organic compounds (VOCs), oxides of nitrogen (NO_X), and sulfur dioxide (SO_2). The

Anchorage area has been determined to be attaining the NAAQS for all regulated air pollutants. Construction of the proposed project is not expected to attract enough vehicles to the Anchorage area to change that status. It should be noted that in the past motor vehicles were a source of lead; since the removal of lead from gasoline, however, lead is no longer an issue associated with motorized vehicle exhaust.

The Anchorage area has had exceedances of the NAAQS for PM_{10}, primarily a result of windblown dust from unpaved roads and unvegetated land and from volcanoes, glacial silt, and forest fires. Unpaved and paved roads are significant sources of PM_{10} because travel along roads re-entrains dust. The MOA has roadway sweeping regulations intended to mitigate this dust. The proposed project does not involve unpaved roads and does not add a significant quantity of paved roads to the road system network. Therefore, construction of the proposed project is not expected to add a significant amount of PM_{10} to the areawide burden.

Secondary Impacts
No secondary impacts on air quality are foreseen.

Mitigation Measures
Because the proposed project would conform to Clean Air Act requirements, no mitigation is required or proposed. However, mitigation would need to be conducted to minimize dust created during construction (see Section 4.21, Construction Impacts).

4.10 Noise Impacts

No-Build Alternative
Under the No-Build Alternative, noise levels increase from approximately 3 to 4 A-weighted decibels (dBA) south of O'Malley Road. North of O'Malley Road, where existing levels are generally highest, the increases are approximately 1 to 2 dBA. These increases are the result of the increased traffic projected to occur during the life of the proposed project.

Build Alternative
The Build Alternative involves widening the New Seward Highway, allowing for increased traffic volumes as development of the Anchorage Bowl progresses. Potential noise impacts associated with the proposed project include permanent impacts from vehicular traffic movements and changes to the physical characteristics of the roadway. The discussion below describes traffic noise impacts. Temporary impacts related to roadway construction activities are described in Section 4.21.6.

Forecasted data for future (2035) traffic volumes used to evaluate the No-Build Alternative and Build Alternative were obtained by using TransCAD software, Version 4.5. The future peak-hour traffic data are included in the noise technical report prepared for this environmental document (Appendix E).

The FHWA traffic noise model (TNM) (Version 2.1) was used to calculate future (2035) traffic noise levels for the No-Build Alternative and Build Alternative in terms of peak-hour traffic noise (L_{eq}). Figures 4.10-1 to 4.10-4 (included at the end of this chapter) depict the noise-sensitive receivers along the project corridor. Although the project study area is defined as Rabbit Creek to 36th Avenue, improvements to New Seward Highway, cross streets, and frontage roads would not occur south of O'Malley Road. Therefore, future noise levels are the same south of O'Malley Road for the No-Build Alternative and Build Alternative.

Table 4.10-1 presents the predicted future sound levels at the receivers identified in Figures 4.0-1 to 4.10-4 without any additional noise abatement. Future (2035) traffic noise levels for the Build Alternative vary along the corridor. Increases of 3 to 4 dBA over existing levels are expected south of O'Malley Road. North of O'Malley Road, the increases are generally 5 dBA or less; exceptions occur between O'Malley Road and Dimond Boulevard, where the existing barriers would be removed to accommodate the expansion. These barriers would be replaced as part of the proposed project. Without replacement, increases for the receptors in this area would be as high 11 dBA (Table 4.10-1).

TABLE 4.10-1
Comparison of Future Noise Impacts (2035) in A-weighted Decibels (dBA)

			No-Build Alternative		Build Alternative		
Map ID	**NAC**	**Existing (2005)**	**Level**	**Difference from Existing**	**Level**	**Difference from Existing**	**Difference from No-Build**
DeArmoun Road to Huffman Road							
M1	65	59	63	3	63	3	0
M2	65	58	61	4	61	4	0
M3	65	**69**	**73**	4	**73**	4	0
M4	65	**69**	**72**	4	**72**	4	0
M5	65	62	**65**	3	**65**	3	0
M6	65	61	**65**	3	**65**	3	0
M7	65	61	**65**	3	**65**	3	0
R1	65	60	63	3	63	3	0
R2	65	59	61	2	61	2	0
R3	65	62	**65**	3	**65**	3	0
R4	65	61	64	3	64	3	0
R5	65	60	63	3	63	3	0
R6	65	63	**67**	4	**67**	4	0
R7	65	**68**	**72**	4	**72**	4	0
R8	65	63	**66**	3	**66**	3	0
R9	65	**67**	**70**	3	**70**	3	0
R10	65	62	**65**	3	**65**	3	0
R11	65	59	62	3	62	3	0
R12	65	59	62	3	62	3	0
R13	65	62	**65**	3	**65**	3	0
R14	65	60	64	4	64	4	0
R15	65	**67**	**71**	4	**71**	4	0
R16	65	63	**66**	3	**66**	3	0
Huffman Road to O'Malley Road							
M8	65	60	63	3	63	3	0
M9	65	69	**71**	3	**71**	3	0
R17	65	61	64	3	64	3	0
R18	65	64	**68**	4	**68**	4	0
R19	65	65	**68**	3	**68**	3	0

TABLE 4.10-1
Comparison of Future Noise Impacts (2035) in A-weighted Decibels (dBA)

			No-Build Alternative		Build Alternative		
Map ID	**NAC**	**Existing (2005)**	**Level**	**Difference from Existing**	**Level**	**Difference from Existing**	**Difference from No-Build**
R20	65	64	**67**	2	**67**	2	0
C1	70	42	44	3	44	3	0
C2	70	65	**66**	1	**66**	1	0
C3	70	61	64	3	64	3	0
C4	70	61	64	3	64	3	0
O'Malley Road to Dimond Boulevard							
M10	65	64	**66**	2	**66**	1	-1
M11	65	**69**	**71**	1	**71**	1	0
M12	65	64	**65**	1	**67**	3	2
M13	65	59	61	2	63	4	2
M14	65	64	**65**	1	**67**	3	2
M15	65	67	**69**	2	**70**	3	1
R21	65	68	**69**	1	**69**	2	1
R22	65	64	**66**	1	**69**	5	4
R23	65	64	**67**	2	**67**	3	0
R24	65	63	**66**	3	**67**	4	1
R25	65	62	64	2	64	3	1
R26	65	**65**	**67**	2	**68**	3	1
R27	65	**68**	**69**	2	**69**	1	0
R28	65	**66**	**67**	2	**68**	2	1
R29	65	63	**65**	2	**67**	3	1
R30	65	68	**70**	2	**71**	3	2
R31	65	69	**70**	2	**70**	1	0
R32	65	**65**	**67**	2	**68**	2	1
R33	65	70	**71**	1	**71**	1	-1
R34	65	**65**	**66**	1	**65**	1	-1
R35	65	62	64	1	63	1	-1
R36	65	67	**68**	1	**67**	0	-2
R37	65	72	**73**	1	**72**	1	-1
R38	65	70	**72**	1	**72**	2	1
R39	65	72	**73**	1	**74**	2	1
R40	65	71	**72**	1	**76**	5	4
R41	65	74	**75**	1	**76**	2	1
R42	65	**66**	**67**	2	**69**	3	2
R43	65	69	**71**	1	**73**	4	2
R44	65	63	64	2	**68**	5	3
R45	65	61	62	2	**65**	4	2
R46	65	**69**	**71**	1	**70**	1	0
R47	65	63	**65**	2	**66**	3	1
R48	65	**66**	**68**	2	**67**	1	0
R49	65	58	60	2	63	4	2
R50	65	**65**	**66**	2	**69**	5	3

TABLE 4.10-1
Comparison of Future Noise Impacts (2035) in A-weighted Decibels (dBA)

			No-Build Alternative		Build Alternative		
Map ID	**NAC**	**Existing (2005)**	**Level**	**Difference from Existing**	**Level**	**Difference from Existing**	**Difference from No-Build**
R51	65	58	60	1	64	6	4
R52	65	64	**65**	2	**75**	11	10
R53	65	58	59	1	**67**	9	7
R54	65	63	**65**	1	63	0	-2
RR1	65	**70**	**72**	1	**72**	2	1
RR2	65	**70**	**71**	1	**72**	2	1
RR3	65	**70**	**72**	1	**73**	2	1
RR4	65	**66**	**67**	1	**69**	4	2
RR5	65	**65**	**67**	1	**69**	4	2
RR6	65	**65**	**67**	2	**70**	5	4
R55	65	60	61	1	**67**	8	6
R56	65	63	64	1	**72**	9	8
R57	65	61	62	1	**68**	7	6
R58	65	**66**	**68**	2	**74**	8	6
R59	65	**66**	**67**	1	**70**	4	3
R60	65	70	**72**	1	**74**	4	2
R61	65	**67**	**69**	1	**70**	3	2
R62	65	**69**	**71**	2	**74**	5	3
R63	65	**69**	**70**	1	**74**	5	4
R64	65	60	61	1	64	4	3
R65	65	**67**	**70**	3	**71**	4	1
R66	65	**65**	**67**	2	**69**	4	2
R67	65	**65**	**67**	2	**68**	3	1
C5	70	63	**65**	2	**65**	2	0
C6	70	**70**	**72**	2	**71**	1	-1
Dimond Boulevard to Dowling Road							
R68	65	63	**65**	2	**68**	5	3
R69	65	63	**65**	2	**69**	6	4
R70	65	63	**65**	2	**68**	5	3
R71	65	63	64	2	**66**	4	2
R72	65	**67**	**70**	2	**70**	2	0
R73	65	64	**66**	2	**66**	2	0
R74	65	65	**67**	2	**69**	4	2
R75	65	**69**	**72**	3	**71**	2	-1
R76	65	**66**	**69**	3	**70**	3	1
C7	70	66	68	2	69	2	0
C8	70	69	**70**	1	69	0	-1
C9	70	69	**71**	2	**72**	3	1
C10	70	70	**72**	2	**72**	2	0
C11	70	69	**71**	2	**73**	4	2

TABLE 4.10-1
Comparison of Future Noise Impacts (2035) in A-weighted Decibels (dBA)

			No-Build Alternative		Build Alternative		
Map ID	**NAC**	**Existing (2005)**	**Level**	**Difference from Existing**	**Level**	**Difference from Existing**	**Difference from No-Build**
C12	70	68	**70**	2	**71**	3	1
C13	70	71	**72**	2	**73**	3	1
C14	70	69	**71**	2	**72**	3	1
C15	70	72	**74**	2	**73**	1	-1
C16	70	68	**71**	2	**73**	5	3
C17	70	70	**72**	2	**72**	2	0
Dowling Road to 36th Avenue							
M16	65	**71**	**73**	2	**72**	1	-1
M17	65	**69**	**71**	2	**69**	0	-2
M18	65	**67**	**68**	1	**70**	3	2
M19	65	**70**	**72**	2	**75**	5	3
R77	65	**75**	**77**	2	**76**	1	-1
R78	65	**75**	**78**	2	**76**	0	-2
R79	65	**70**	**72**	2	**72**	2	0
R80	65	**66**	**68**	2	**69**	3	1
R81	65	**71**	**73**	2	**72**	1	-1
R82	65	64	**66**	2	**71**	7	5
R83	65	**72**	**74**	2	**75**	2	1
R84	65	**68**	**69**	2	**71**	3	2
R85	65	63	**65**	2	**69**	6	4
R86	65	**71**	**72**	2	**73**	2	1
R87	65	**71**	**72**	2	**73**	2	1
R88	65	63	**65**	2	**69**	6	4
R89	65	**70**	**72**	2	**73**	3	1
R90	65	**67**	**69**	2	**72**	5	3
R91	65	64	**66**	2	**68**	4	1
R92	65	**67**	**70**	3	**69**	2	-1
R93	65	**72**	**73**	2	**74**	2	1
R94	65	**65**	**67**	2	**76**	11	11
R95	65	**67**	**68**	2	**72**	5	4
R96	65	**73**	**75**	2	**76**	3	1
R97	65	**69**	**70**	2	**73**	5	3
C18	70	**68**	**70**	2	**70**	2	0
C19	70	**70**	**72**	1	**72**	1	0
C20	70	**68**	**69**	2	**71**	3	2
C21	70	**72**	**73**	2	**75**	3	2
C22	70	68	**71**	3	**71**	3	0
C23	70	65	67	3	67	2	-1
C24	70	67	69	2	**70**	3	1

TABLE 4.10-1
Comparison of Future Noise Impacts (2035) in A-weighted Decibels (dBA)

Map ID	NAC	Existing (2005)	No-Build Alternative		Build Alternative		
			Level	Difference from Existing	Level	Difference from Existing	Difference from No-Build
C25	70	**70**	**72**	2	**71**	1	-1
C26	70	69	**72**	2	**71**	2	0

Notes:
Bold numbers indicate locations where existing noise levels already exceed the noise abatement criteria
M12, M13, M17 and M18 have been adjusted based on the calibration.

Mitigation Analysis

FHWA and DOT&PF noise policies dictate that noise abatement be considered when noise impacts are identified. Noise impacts occur when noise levels approach or exceed the noise abatement criteria (NAC) or when there is a substantial increase in noise. The FHWA NAC for Land Use Activity Categories A, B, and C are 57, 67, and 72 dBA respectively. (See Table 3.9-2 for FHWA NAC adjusted for the DOT&PF Noise Abatement Policy [1996].) Consequently, noise abatement would be considered for any location where future levels of peak-hour noise are within 2 dBA of the NAC or substantially increase (10 dBA) above existing noise levels. Potential measures for traffic noise abatement that were considered for the project include the following:

- Construction of noise barriers
- Realignment of the roadway
- Implementation of traffic management measures (reduced speed limits, limitations, or restrictions on truck traffic)
- Acquisition of “buffer zones” between the roadway and affected properties

Of the above noise abatement measures, the noise barrier option was considered the most practical and effective choice. Substantial realignment of New Seward Highway would not be feasible without considerable property acquisitions. For the same reason, creation of buffer zones is not a viable option for noise abatement. Additionally, traffic management measures, such as lowering the speed limit or limiting truck traffic, conflict with the project purpose and need.

Because the proposed action is a Type I project that adds through traffic lanes and capacity, the DOT&PF noise policy applies in addition to 23 CFR 772. The latter requires that “before adoption of a final environmental impact statement or finding of no significant impact, the highway agency shall identify noise abatement measures which are reasonable and feasible and which are likely to be incorporated in the project.”

On June 12, 1995, the FHWA issued revised guidance on traffic noise analysis and a memorandum to require all state highway agencies to adopt written noise policies according to the revised guidelines (DOT&PF, 1996). To meet this requirement, the DOT&PF developed its *Noise Abatement Policy* (1996), establishing specific requirements, including feasibility and reasonableness criteria, for highway noise abatement. Following is a synopsis of the DOT&PF *Noise Abatement Policy* pertinent to this analysis:

- Noise barriers will not be constructed for Category C and D land uses, which include but are not limited to, industrial and commercial uses and undeveloped lands, unless it is necessary to protect adjacent sensitive uses (land use Categories A and B). As a result, noise barriers were evaluated for residential receivers only. Undeveloped lands include those lands for which a building permit has not been obtained by the date that the environmental document is signed. Existing building permits may be considered to address this criterion during the preparation of the environmental document.
- Noise barrier construction is not feasible if a minimum noise reduction of 5 dBA cannot be achieved. Noise abatement measures that do not achieve at least a 5-dBA reduction in noise, to most protected receivers, are not prudent expenditures of public funds, because any less of a reduction is not easily perceived in a field situation.
- The reasonableness of a noise barrier has to be determined by thoroughly considering a wide range of criteria, such as the amount of noise reduction provided, number of people protected, cost of abatement, views and opinions of affected residents, and potential environmental impacts of noise barrier construction.
- Noise barriers will only be constructed if they have been determined to be both feasible and reasonable.

The TNM (Version 2.1) was used to determine the noise-level reduction provided by noise barriers at locations where noise levels approach or exceed the NAC. This model calculates barrier insertion loss by accounting for variables such as distance from source to barrier, distance from barrier to receiver, source and receiver elevations, and barrier height.

Several existing noise barriers are currently located along the New Seward Highway corridor south of Dimond Boulevard. These barriers would either remain or be replaced in kind (relocated), as follows:

- An existing noise barrier is located in the northwest quadrant of New Seward Highway and DeArmoun Road. This wall is approximately 250 feet long and would be maintained in place.
- A noise barrier, approximately 4,100 feet long, extends from the northern end of Bell’s Nursery, west of New Seward Highway, along the existing highway right-of-way to Huffman Road. This noise barrier would be maintained in place.
- East of New Seward Highway, a noise barrier is located in the northeast quadrant of DeArmoun Road and the New Seward Highway. The barrier is approximately 400 feet long and would be maintained in place.
- A noise barrier located east of New Seward Highway begins just south of Tradewind Drive on the west side of Brayton Drive and extends north approximately 2,600 feet, ending south of Riffle Lane. This noise barrier would be maintained in place.

- North of Huffman Road and west of New Seward Highway is an existing noise barrier approximately 600 feet long beginning south of East Klatt Road. This noise barrier would be maintained in place.
- South of O'Malley Road and west of New Seward Highway is an existing noise barrier approximately 500 feet long and adjacent to the mainline near Oren Street. This noise barrier would be maintained in place.
- North of O'Malley Road and east of New Seward Highway, two barriers protect most of the Southwood Manor Trailer Court. The southernmost barrier begins north of Donna Drive east of Brayton Drive and extends for approximately 500 feet. The second barrier begins south of Gross Circle between Brayton Drive and New Seward Highway and extends 1,000 feet to Gelien Loop. These two barriers would be removed and replaced under the Build Alternative because of the realignment of Brayton Drive to the west.

4.10.1 Noise Barrier Feasibility and Reasonableness Summary

The DOT&PF *Noise Abatement Policy* (1996) requires that a determination of technical feasibility and economic reasonability of noise barriers be made before a decision to recommend a barrier can be rendered. As stated previously, a noise barrier is feasible if a minimum reduction of 5 dBA is achieved and reasonableness should be determined by considering the amount of noise reduction provided, number of people protected, cost of abatement, views and opinions of affected residents, and potential environmental impacts of noise barrier construction.

The test for one criterion of reasonableness, cost, is determined by dividing the estimated total cost of the noise barrier by the number of residential units that receive a minimum of 5-dBA reduction in noise level (regardless of whether the residence was identified as a location at which the NAC was exceeded). If this cost is $25,000 per residence or less, the barrier is deemed economically reasonable. If this cost is exceeded, the noise abatement measures would typically not be recommended.

Many densely packed residential areas lie immediately adjacent to New Seward Highway. Given their proximity to the highway, these areas are predicted to exceed the NAC, and given their density, it is typically regarded as possible to achieve a feasibly reduction (5 dBA) for a cost of less than $25,000 per benefited residences. Ultimate barrier locations would be developed during final design to ensure that each barrier is placed appropriately to achieve maximum reduction for minimal cost without presenting a safety or snow removal hazard. The analysis is summarized below by area.

O'Malley Road to Dimond Boulevard

Residential uses are found on both sides of New Seward Highway. On the east side of New Seward Highway, several existing barriers would be removed to accommodate the Build Alternative. A barrier wall system extending from O'Malley Road to 92nd Avenue is proposed on the east side of New Seward Highway. Similarly, on the west side of New Seward Highway, a new barrier that starts near the O'Malley Road off-ramp and extends north to 92nd Avenue is recommended. These barriers are both feasible and reasonable.

A developing area south of Dimond Boulevard on the east side of New Seward Highway (represented by receptors R65 to R67) was considered for a noise barrier. The driveway configuration and the proximity to the frontage road and off-ramp merge would compromise the effectiveness of a barrier at this location. At this time, it does not appear that a barrier would be effective; therefore, no barrier is proposed. However, there receivers would be revaluated for noise abatement during the design phase after the site development plans are finalized.

Dimond Boulevard to Dowling Road

Land use on the west side of New Seward Highway is commercial. According to DOT&PF policy, noise barriers are not considered consistent with commercial land uses. On the east side of New Seward Highway, a residential neighborhood exists north of Lore Road; however, this area is set back approximately 400 feet from the highway (receptors R68 to R71). The land use between New Seward Highway and these residential areas is commercial. Therefore, a noise barrier would not be recommended at this location.

Just south of Dowling Road is the K-12 Polaris School, represented by receptors R75 and R76. Because the primary outdoor use area, the playfield east of the school, is an area where a reduced noise level would not necessarily be of benefit, the time of use would not necessarily correlate with the peak-hour noise conditions modeled here, and there were no outdoor use areas outside the classrooms identified, the interior noise levels were evaluated. The buildings are of arctic construction and, consistent with FHWA guidance, are estimated to achieve an outdoor to indoor noise reduction of between 25 dBA and 35 dBA. Given that the predicted exterior levels range from 70 to 72 dBA, even the lower estimated reduction of 25 dBA achieves compliance with the interior NAC of 50 dBA. Therefore, a noise barrier is not recommended to reduce noise levels at this school.

Dowling Road to Tudor Road

The land uses on the west side of New Seward Highway between Dowling Road and Campbell Creek are commercial. North of Campbell Creek to Tudor Road is a newly developed residential area (receptor R82) and existing residential uses (receptors R86 and R92). Barrier 9, which extends from Tudor Road to Campbell Creek, was determined to be both reasonable and feasible; therefore, it is recommended.

Exterior outdoor use areas on the east side of New Seward Highway were identified at the Alpine Apartments (receptors R77 to R79 and M16) located between Mockingbird Drive and Alpenhorn Avenue. Barrier B6 extends between these two roads and is recommended because it was found to provide a 5-dBA reduction to ground level areas and satisfies the reasonable cost criteria.

Also on the east side of New Seward Highway, between Campbell Creek and Tudor Road, the area represented by receptors R80, R81, and R83 to R91 is predicted to exceed the NAC. A barrier system (B7) has been found to be both reasonable and feasible and is therefore recommended.

Tudor Road to 36th Avenue

Land uses on the west side of New Seward Highway are commercial throughout this segment of highway, and no barriers are recommended. On the east side of New Seward Highway, the residential area represented by receivers R93 to R97 is predicted to exceed the NAC. It is feasible and reasonable to achieve a 5-dBA reduction at the first row of residences; therefore, barrier 10 is recommended

The above noise barrier recommendations are based on preliminary engineering, existing conditions, and policies. A final decision on noise abatement would be made upon completion of the final design and public involvement process.

4.11 Social Impacts

This section discusses the impacts on elements of the social environment that are likely to occur under the Build Alternative and No-Build Alternative for the New Seward Highway improvements. The widening of the highway and addition of grade separation structures (to cross over or under New Seward Highway) at 92nd, 76th, and 68th avenues and International Airport Road and the construction of pedestrian and bicycle facilities along the frontage roads would favorably change the physical character of the highway, improving traffic movements, reducing congestion, and providing safer pedestrian and bicycle facilities. The grade separations would also provide more frequent east-west connecting links to neighborhoods, businesses and commercial facilities along the highway corridor.

4.11.1 Neighborhood/Community Character

No-Build Alternative

Under the No-Build Alternative the highway, frontage road, and pedestrian and bicycle facilities would not be constructed. Congestion and traffic on New Seward Highway, its interchanges, and frontage roads would continue to increase. Community and neighborhood character would begin to deteriorate as the number of vehicles and congestion increased, making it harder for residents to gain access to neighborhoods, businesses, facilities, and recreational areas along the highway. Bicycling or walking instead of driving would not be promoted under the No-Build Alternative.

Build Alternative

The Build Alternative would have a positive impact on community cohesion. Because of their spacing, the existing grade-separation structures in the New Seward Highway corridor provide minimal connection between neighborhoods east and west of the highway from Rabbit Creek Road to 36th Avenue. The proposed project would provide additional grade separation structures at 92nd, 76th, and 68th avenues and at International Airport Road. These east-west connections would provide additional access to neighborhoods as well as to parks and recreational areas, paths and sidewalks, and frontage roads along the highway.

The 92nd Avenue grade separation would connect the Abbott Loop community council area to the neighborhood south of Abbott Road, west of New Seward Highway, and the Dimond Center shopping and commercial area. This grade separation would link the residents of the Southwood Homes mobile home park and other residential areas east of the highway to the neighborhoods and commercial businesses west of the highway. It has been reported that neighborhood children make holes in the fence east of the highway to cross over to the Dimond Boulevard retail area, creating an unsafe situation for both motorists and pedestrians. Construction of the 92nd Avenue grade separation would help alleviate this problem.

The 76th and 68th avenue grade separations would connect Abbott Loop (east side of New Seward Highway) and Taku/Campbell (west side) community council areas. The International Airport Road extension to the east under New Seward Highway would connect the west Campbell Park community council area (on the east side) with the commercial area along Old Seward Highway (west side) and the Midtown community council area to the west. The proposed improvements would create cohesion between neighborhoods and between neighborhoods and business/retail centers that now require circuitous travel to reach those locations. The improvements may also increase traffic in some neighborhoods as local traffic patterns change from construction of the improvements.

4.11.2 Travel Patterns and Accessibility

A large portion of the highway traffic within the study area consists of travelers making their way between Anchorage employment centers (Midtown and Downtown Anchorage) and local destinations along the east and west sides of the highway corridor. A number of east-west arterials that intersect the highway are not continuous between New Seward Highway and other major north-south roadways within the study area. Discontinuous east-west connections tend to force vehicles traveling between local destinations to use New Seward Highway for access.

No-Build Alternative

The No-Build Alternative would maintain existing travel patterns and access throughout the corridor. As congestion increases on the existing east-west crossings and population in the Anchorage Bowl increases, access to and from existing properties, businesses, and local roadways along New Seward Highway will become more difficult. Bicycle and pedestrian facilities will likely remain as they are now because upgrades are usually associated with road improvements.

Build Alternative

The Build Alternative would increase local and regional access by providing additional capacity and improved east-west connectivity within the study area. The increased capacity and connectivity would provide more direct and convenient neighborhood access. The additional east-west connectivity between Lake Otis Parkway and Old Seward Highway may result in local drivers staying off the New Seward Highway mainline in favor of one of the new east-west connections. Travel patterns for residents of residential areas on both sides of the highway, who currently take circuitous routes to cross the New Seward Highway, would likely become shorter and more direct to retail and commercial destinations. Regional travelers and those who supply goods and services may use the new east-west connections and additional mainline lanes to take more direct routes to their destinations. Some alleviation of congestion at intersections (Dimond Boulevard and Tudor Road) would be provided with improved east-west connectivity within the study area as vehicles are afforded alternative routes to reach their destinations.

The addition and improvement of bicycle and pedestrian facilities would provide more trail continuity, bicycle commuter routes, and better neighborhood and business access to trails. Improved east-west connectivity would improve transit movement across New Seward Highway and accommodate additional future transit routes for neighborhoods adjacent to New Seward Highway. Improved transit routes may take some vehicles off the road as residents find transit easier and safer to use with better connections.

Mitigation Measures

Because the proposed project improves travel patterns and accessibility, no mitigation is proposed. Mitigation for temporary construction impacts would be to ensure that the public and emergency service providers are notified well in advance of proposed construction activities to alert people about travel pattern or access changes because of construction.

4.11.3 Parks and Recreation

No Build Alternative

The No-Build Alternative would maintain the existing access to the parks and recreation areas throughout the corridor. This access is inconvenient to many neighborhoods and users who don't live close to the parks because of the difficulty of east-west travel along New Seward Highway from neighborhoods.

Build Alternative

A few small municipal parks, the Campbell Creek Greenbelt, and several recreation areas are located along the project corridor, as shown in Figure 3.10-2. Access to parklands and connectivity with nearby trails within the vicinity of the New Seward Highway corridor are expected to improve under the Build Alternative. The additions to and improvement of the shared use pathways and sidewalks along the New Seward Highway corridor are consistent with the *Anchorage 2020: Anchorage Bowl Comprehensive Plan* (MOA, 2001a) and the *Areawide Trails Plan* (MOA, 1997). These additions would enhance and add pedestrian and bicycle linkages and connections to schools, parks and other recreational facilities, greenbelts and park trails, and commercial and business districts. The extension of International Airport Road would also facilitate better east-west movement between three municipal parks lying just north of International Airport Road (Foxtree, Wickersham, and Bancroft) and the Campbell Creek Greenbelt, which follows Campbell creek in an east-west direction. These improvements address a deficiency in connectivity identified in the parks and open spaces component of the MOA recreational facility plan (MOA, 2005a). No use of MOA park land is required as a result of the Build Alternative.

Mitigation Measures

No mitigation is being proposed for this resource.

4.11.4 Traffic Safety

No-Build Alternative

The segment of roadway experiencing the highest number of traffic accidents, nearly twice as high as the national average, is between Tudor Road and 36th Avenue (DOT&PF, 1999a, 2000b, 2001a). Most fatal accidents along the New Seward Highway corridor have occurred near the O'Malley Road intersection and adjacent ramps. Most of these accidents occurred during winter months or when the road was icy or wet. Without the proposed improvements, these high-accident locations are expected to worsen as congestion increases. Ramp connections to the frontage roads lack the capacity to handle peak-hour traffic volumes. Emergency service response would also be slower as congestion increases response times to accidents and other emergencies. These conditions are expected to worsen over time.

Build Alternative

Construction of the proposed project would alleviate congested traffic at the frontage road intersections, which often backs up onto ramps, disrupting traffic flow on the mainline highway. Areas with high incidence of traffic accidents, such as the Tudor Road intersection, would be expected to improve under the Build Alternative, with improved access and traffic movement along the entire New Seward Highway road system. Improvements to the Tudor Road interchange and intersection would improve traffic movement on and off Tudor Road, improving access to the New Seward Highway. Better traffic movement through the New Seward Highway corridor would mean fewer stop-and-go situations created by congestion and backed-up ramps, allowing safer traffic conditions for all users of the highway system. Fencing at specific east-west crossing points and other areas of the corridor would help wildlife cross under the highway without placing them at risk on the mainline highway; for example at the Campbell Creek Bridge crossing. These new bridges would be designed with adequate height, width, and length to accommodate wildlife such as moose.

Mitigation Measures

Mitigation for temporary construction impacts would be to ensure that the public and emergency service providers are notified well in advance of proposed construction activities so that people can plan for any inconveniences from traffic delays or changes in routing. Mitigation for congestion and disrupted traffic flow would be to construct the proposed project to alleviate these problems.

4.11.5 Public Services

No-Build Alternative

Under the No-Build Alternative, local and regional traffic congestion would increase on New Seward Highway and the existing cross streets, impeding cross-town access and exacerbating circuitous travel by local residents, emergency responders, and other services. Increased congestion would have an adverse impact on emergency-vehicle response times. Without improvements, access to school grounds, parks, and recreational facilities would become more difficult as congestion increases from continued traffic growth.

Build Alternative

The Build Alternative would improve continuity of local roads. The enhanced continuity would result in beneficial impacts on ease of access to community facilities for local residents and other road network users, as well for services such as school bus and transit service.

Movement would be less circuitous with more direct links to points east and west of New Seward Highway. The addition and improvement of frontage roads and grade-separated structures to permit east-west travel under New Seward Highway would improve traffic flow. Emergency-vehicle response times would improve with better access along, through, and adjacent to New Seward Highway in the study area. The proposed improvements would also create opportunities for expanded transit service for neighborhoods with easier connections on both sides of New Seward Highway.

Mitigation Measures

Mitigation for temporary impacts would be to ensure that the public, schools, emergency services, and other service providers are notified well in advance of proposed construction activities so that people can plan for any inconveniences from traffic delays or changes in routing.

4.11.6 Social Groups

No-Build Alternative

Social groups that are reliant on transit and the elderly and handicapped people who rely heavily on transport services for access to health care, businesses, and neighborhoods would be negatively affected by the No-Build Alternative over time as congestion increases. These impacts would result from population growth in the Anchorage Bowl and corresponding traffic growth with infrastructure incapable of supporting it.

Build Alternative

Social groups most likely to be affected by the Build Alternative would be the neighborhoods nearest the highway right-of-way. The Southwood Manor Trailer Court neighborhood, located between O'Malley Road and Dimond Boulevard on the east side of the highway, would be temporarily affected by project construction. The neighborhoods located adjacent to the highway between O'Malley Road and 36th Avenue would be affected by temporary disruptions from construction traffic delays, rerouting, and changes in scheduling of services to neighborhoods. These temporary disruptions could affect social interaction within and between these neighborhoods.

The construction of the east-west extensions of 92nd, 76th, and 68th avenues and International Airport Road, under the New Seward Highway, would provide access for adjacent neighborhoods to reach commercial and business centers east and west of the highway, resulting in a beneficial impact. The extension of International Airport Road would provide the Campbell Park neighborhood with an access to the west side of New Seward Highway, allowing less circuitous routing to the businesses, services, and neighborhoods to the west. The Campbell Park neighborhood has the second lowest median household income of all neighborhoods in the study area and is approximately 43 percent minority.

The Build Alternative would result in better access for the elderly, handicapped, transit-dependent, and low-income or minority groups through the addition of the east-west extensions and frontage roads. These additional road extensions would not divide any existing neighborhoods. The proposed project would not alter the opportunity for employment by minority or ethnic groups in the project area or the Anchorage Bowl.

Mitigation Measures

No mitigation is proposed.

4.12 Environmental Justice

The proposed project was developed in accordance with the Civil Rights Act of 1964, as amended by the Civil Rights Act of 1968, and EO 12898, “Federal Actions to Address Environmental Justice in Minority and Low-income Populations” (White House, 1994).

Populations along the corridor that could be directly affected by the project ranged from 8.5 to 32 percent minority population. The average State of Alaska minority population is 30.7 percent. Median household income along the project corridor ranged from $32,968 to $100,150. The median household income for the State of Alaska is $55,546.

No Build Alternative

The No-Build Alternative should not alter the mix of the population or its income. Because the area is fairly well built out at present, the housing and work in the project area are not likely to change significantly.

Build Alternative

There are no planned direct impacts to the two low-income neighborhood areas adjacent to the proposed project that were identified in Chapter 3. The Southwood Manor Trailer Court neighborhood, located between O'Malley Road and Dimond Boulevard on the east side of the highway, would not have any direct right-of-way impacts and would not require relocations to construct the project. The Campbell Park neighborhood, located on the east side of New Seward Highway between Dowling Road and Tudor Road, would also not be directly affected and would require no relocations for the proposed project. No minority population pockets or neighborhoods were identified in the project corridor. No disproportionate adverse effects would occur to low-income or minority communities as a result of the proposed project.

Mitigation Measures

The requirements of the Civil Rights Act of 1968, EO 12898, and the Uniform Relocation and Right-of-Way Acquisition of Real Property Act will be complied with to mitigate any adverse effects to low income or minority populations or individuals.

4.13 Economic Impacts

For this report, operational effects were evaluated through a review of aerial photographs, site visits, and information about transportation effects from the *New Seward Highway, Rabbit Creek Road to 36th Avenue, Traffic Analysis of Alternatives (CH2M HILL, 2003)*. For broader regional effects, research about the linkage between transportation infrastructure improvements, mobility, congestion, and economic growth was reviewed, and the findings were applied to the alternatives.

No-Build Alternative

New Seward Highway, local roads, and interchanges in the study area would experience increased congestion if the proposed improvements are not constructed. The extent to which congestion could adversely affect overall economic growth in the area is uncertain. There is a point at which congestion may influence companies and workers to locate elsewhere. The local area also would not benefit from the highway-related construction employment and spending in the local economy. No taxable property would be acquired under the No-Build Alternative; therefore, no direct effects on property tax collections are anticipated.

Build Alternative

Under the Build Alternative, businesses in the study area would benefit from the increased access provided by the interchange upgrades and improved east-west road network. Construction of the grade-separated crossings would provide the highway corridor with greater east-west mobility as well as increased safety. Improvements to local frontage roads would enhance access to local shopping centers and would alleviate congestion by redistributing traffic in the area. These improvements would result in lower travel times, more reliable delivery times, enhanced safety, and improved operational efficiency.

Property tax is a major source of revenues for the MOA. The proposed project might affect property tax funding as a revenue source during its operation and construction. At this time, it appears that most of the proposed project would be constructed within existing right-of-way. The total property acquisition costs for the Build Alternative are expected to be about $1.3 million, resulting in a loss of municipal tax base and subsequent decrease in tax revenue.

Secondary Impacts

No secondary impacts are foreseen.

Mitigation Measures

The construction-related effects of the Build Alternative would be temporary and minor. Recommended measures to reduce economic effects to existing businesses in the study area during construction include the following:

- Providing public information about construction activities. The public would be informed that businesses are open during construction and encouraged to continue patronage.
- Providing adequate signage to detour access to businesses
- Carefully planning construction to minimize delays on the local road network
- Employing night construction where possible to minimize the duration of construction phases reducing impacts on businesses and residences. Night operations would have to comply with the MOA ordinance on noise.

4.14 Land Use Impacts

No-Build Alternative

If the proposed project is not built, no impacts directly associated with roadway construction would occur. However, planned and programmed developments are likely to result in the intensification or change of existing land uses over time in those areas of the project corridor that are available for development (which are currently very limited). The No-Build Alternative would not provide transportation infrastructure to accommodate other development or land-use intensification.

The increasing congestion impacts from rising noise, air pollution, and commuting times to residential neighborhoods served by and adjacent to the major arterials from New Seward Highway will worsen.

Build Alternative

The Build Alternative would have direct impacts (conversion of land to highway use) on residential, commercial, and industrial land. The proposed project is consistent with both the *Anchorage 2020: Anchorage Bowl Comprehensive Plan* (MOA, 2001a) and the *Anchorage Bowl*

2025 Long-Range Transportation Plan (MOA, DOT&PF, and Anchorage Metropolitan Area Transportation Solutions, 2005). The majority of the project corridor area is already developed as commercial or residential. Very little developable land remains between Lake Otis Parkway to the east and the Old Seward Highway to the west for the length of the project corridor. No MOA park land would be required for development of the Build Alternative.

The land use impacts of the Build Alternative are described by segment below, from the beginning of the project at Rabbit Creek Road to 36th Avenue.

From Rabbit Creek Road to the Huffman Road interchange and continuing to the O'Malley Road interchange, no right-of-way acquisition would be required. The additional pathway construction would occur inside the existing right-of-way.

From the O'Malley Road interchange north to the Dimond Boulevard interchange, the addition of the 92nd Avenue grade-separation and road connection under the mainline would not require right-of-way acquisition because construction limits would be controlled through the use of retaining walls. Induced development of some available commercial land on the northwest quadrant of this east-west connection may occur. It is likely, however, that this parcel will be developed before construction of the proposed the road because it is the only piece of commercial land remaining that is easily accessible from the Old Seward Highway in the Dimond Mall shopping center complex.

From the Dimond Boulevard interchange to Dowling Road, 17 partial right-of-way takes (slivers) would be required to accommodate the design and construction of the extension of Sandlewood Place, the grade-separated connections of 76th and 68th avenues under New Seward Highway, and additions of pathways adjacent to the frontage roads. The changes in land use would result in some conversion of commercial land to highway use, but should not induce development because this land is already accessible from the existing frontage roads and much of it is currently developed.

From Dowling Road to Tudor Road, four partial right-of-way takes would be required to accommodate the frontage road ramp and pathway improvements. The changes in land use would result in conversion of some commercial land to roadway use. All land parcels adjacent to International Airport Road improvements are already developed or are currently being developed. No induced development is expected from the extension of this road under New Seward Highway. The addition of a pathway on the west side of the west frontage road (Homer Drive) and a sidewalk on the east side of the east frontage road (Brayton Drive) also would require some new right-of-way at specific locations.

From the Tudor Road interchange to 36th Avenue, the proposed project is within the existing right-of-way.

The total property acquisition costs for the Build Alternative are expected to be about $1.3 million, resulting in a loss of municipal tax base and subsequent decrease in tax revenue.

4.14.1 Development Plans and Policies

The *Anchorage 2020: Anchorage Bowl Comprehensive Plan* (MOA, 2001a) advocates policies to promote land use and housing development in the more central portions of the Anchorage Bowl in major employment centers and town centers and along transit corridors, shifting growth from the Hillside. The proposed project supports land use policies and local and regional transportation plans. The proposed New Seward Highway project passes through a major employment area, provides access between three MOA subareas (Southeast, Southwest, and Central) within or near the project corridor, and serves east-west transit routes that cross the highway at several locations. Improvements to New Seward Highway would enhance access to these areas and mobility through the corridor. Improvements and extensions of 92nd, 76th, and 68th avenues and International Airport Road would facilitate expansion and enhancement of transit routes that would better serve adjacent neighborhoods and businesses.

Town centers made up of mixed-use development, including retail, services, public facilities, and housing all accessed within a 5-minute walk, are supported under the New Seward Highway improvements. These walkable communities include convenient connections to residential neighborhoods and transit facilities, which are provided under the Build Alternative. Natural open spaces and recreational areas are enhanced by better trail connections and access points under the Build Alternative.

The Build Alternative would facilitate local and regional movement of goods and services with improved mobility and better access between commercial areas and residential neighborhoods.

Secondary Impacts

Induced development is expected to be minimal from the proposed project. There would likely be some induced development of several small parcels adjacent to the frontage roads and the new grade-separated intersections. It is also likely that the development would occur regardless of the proposed project because few vacant parcels remain along the corridor and commercial and retail development is currently continuing at a rapid pace.

Mitigation Measures

The DOT&PF would coordinate development of visual resources, noise, land use, and design elements of the proposed project with the MOA to ensure that community design standards and transportation design policies are appropriately addressed in the design of the proposed project.

Right-of-way acquisition would follow the Uniform Relocation and Real Property Acquisition Act of 1970, as amended by the Surface Transportation and Uniform Relocation Assistance Act of 1987 and 49 CFR 24. The DOT&PF relocation advisors provide information on programs and benefits and develop individual relocation plans. These resources are provided without discrimination to all residential and business relocates.

4.15 Visual Impacts

No-Build Alternative

No direct impacts on views would occur if the proposed project is not built. Views of and from the existing New Seward Highway corridor would remain essentially the same. Without improvements, roadways in the study area would operate near or at capacity, creating a visual sense of congestion.

Build Alternative

The Build Alternative would result in visual impacts from the improvements to the existing roadways. The greater height of the improved road would affect views over the existing road, and removal of existing vegetation would affect surrounding land users by increasing their view of the road and by blocking some middle-ground views to the mountains. The changes in roadway height and vegetation would have a positive impact on motorists' views from the road by increasing the opportunity for distant views of mountain ranges. The existing high-mast lighting would be supplemented by continuous lighting between the interchanges. This lighting would improve driver visibility and hopefully improve response to unsafe situations, such as moose crossing the road. However, light spill could affect views and residents along the corridor. The effects are discussed below for the mainline, underpasses, frontage roads, noise barriers, and visually sensitive locations.

Mainline

Improvements to the mainline of New Seward Highway from Rabbit Creek Road to 36th Avenue would follow the existing road alignment. From O'Malley Road to International Airport Road, the mainline would be widened from the existing four lanes to six lanes. The additional lanes would be outside of existing lanes. The improvements would require removal and replacement of the grassy median and grasses on outside slopes. The retention of the grassy median would result in no impact on distant views of the roadway or from the road because the separation of directional travel would be intact and vegetated.

Underpasses

The proposed underpasses for New Seward Highway at 92nd Avenue, 76th Avenue, 68th Avenue, and International Airport Road would result in a temporary loss of roadside vegetation, opening up views of the road to adjacent residences and businesses.

Frontage Roads

Additional frontage road connections and a multi-use path along the frontage roads would result in temporary loss of vegetation, opening up views of the road to surrounding residences and businesses.

Noise Barriers

Noise barriers would create a foreground visual barrier to and from the highway that could be observed as a positive visual impact because the barrier design would be an improvement over the ability to see traffic and the existing road, although some may consider the view negatively affected.

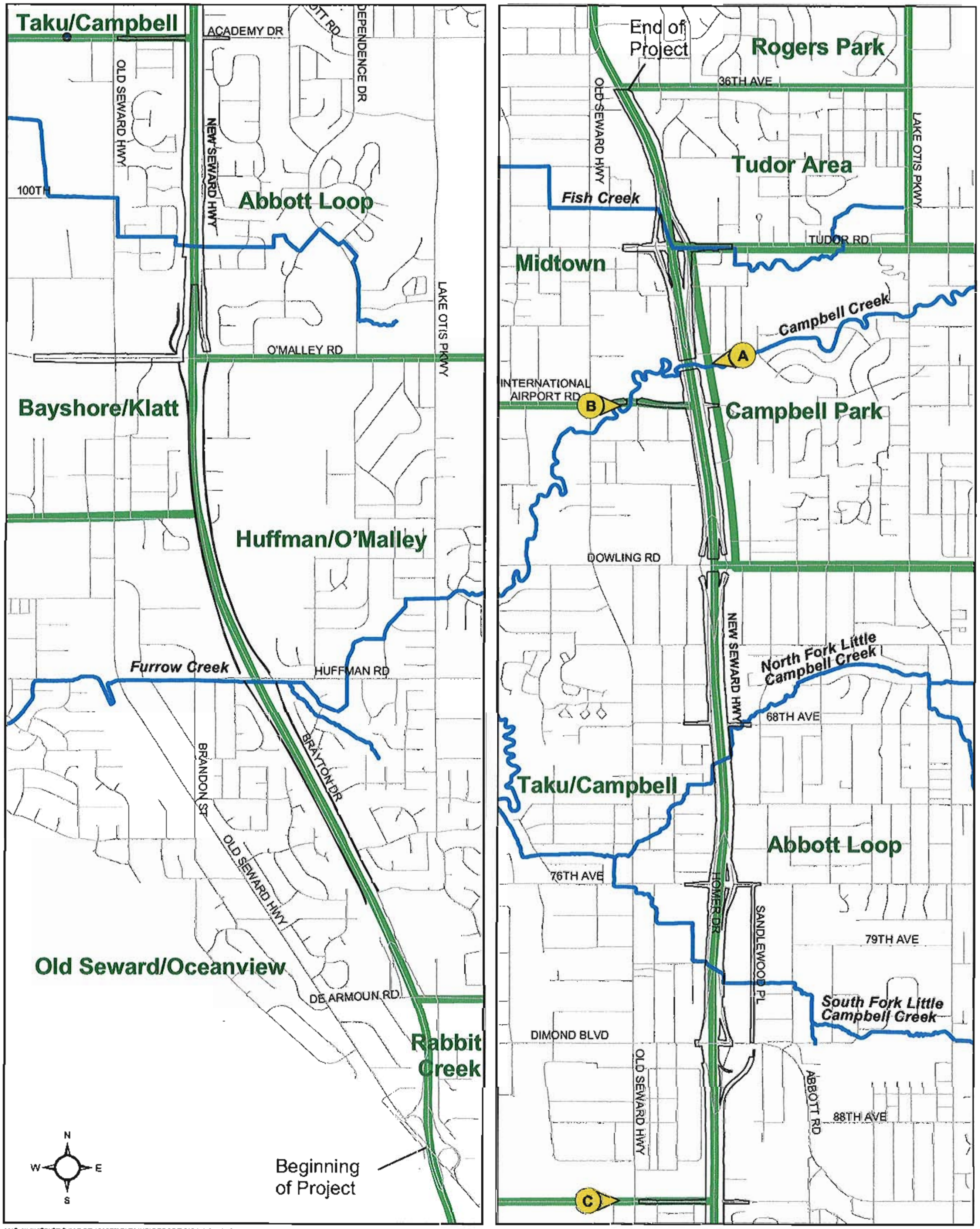
Visually Sensitive Locations

Three view points, described below, were identified as representative of the typical views that would be sensitive to change because of their high visual quality in vividness (memorable or distinctive), intactness (visual integrity), and unity (coherence and compositional harmony). Figure 4.15-1 shows these locations, and Figures 4.15-2 through 4.15-4 provide photographs of the existing views (before project construction) and simulations of proposed improvements (after project construction).

Campbell Creek. Views of Campbell Creek from Campbell Creek Greenbelt would be improved as a result of the Build Alternative. The existing bridge structures would be replaced and raised to provide clearance for future trail extension and wildlife movement under New Seward Highway. A continuous view of the creek flowing under the roadway would be a positive impact. Loss of vegetation from construction activities would be a temporary adverse impact because disturbed areas would be revegetated. Views of the raised roadbed would have short-term impacts on views from surrounding land uses until slopes are vegetated. Moderate middle-ground impacts to views of the mountains would occur from the raised roadbed, but would not affect distant views.

International Airport Road. Views from the road to the east and west would result in short-term moderate adverse impacts to foreground and middle-ground views because of the removal of existing vegetation along the road. Views of the road from the east and west would result in moderate adverse impacts to foreground and middle-ground views that would be blocked by the higher roadbed.

92nd Avenue. Distant views from the highway at 92nd Avenue would be improved because of the raised roadbed. The raised road would have short-term impacts on views from surrounding land uses until slopes are vegetated. Moderate middle-ground views of the mountains would be affected because of the raised roadbed, but distant views would not be affected.



Legend

Roads
Streams
Neighborhoods
Proposed Footprint

(A) Figure 4.15-2 Location
(B) Figure 4.15-3 Location
(C) Figure 4.15-4 Location

FIGURE 4.15-1
Visually Sensitive Locations

0 500 1,000 2,000 3,000 4,000
Feet

Existing view of Campbell Creek from Campbell Creek Greenbelt, looking west (before project construction)

Simulated view of Campbell Creek from Campbell Creek Greenbelt, looking west (after project construction). See Figure 2.2-5.

FIGURE 4.15-2
Comparison of Campbell Creek Views Before and After Construction of Proposed Project

Existing view of International Airport Road, looking east (before project construction)

Simulated view of International Airport Road, looking east (after project construction)

FIGURE 4.15-3
Comparison of International Airport Road Views Before and After Construction of Proposed Project

Existing view of 92nd Avenue, looking west (before project construction)

Simulated view of 92nd Avenue, looking west (after project construction)

FIGURE 4.15-4
Comparison of 92nd Avenue Views Before and After Construction of Proposed Project

Mitigation Measures

Mitigation measures would include implementation of a landscaping plan for all areas disturbed by construction. The landscape plan would be guided by the Anchorage Municipal Code, Title 21.45.125 C. 1, Visual Enhancement Landscaping; the American Association of State Highway and Transportation Officials (AASHTO) *Guide for Transportation Landscape and Environmental Design* (1991), and AASHTO highway safety guidelines (2001). The landscaping plan would include these elements:

- Landscape plant material—The landscape design would provide a visual buffer in many areas and visual enhancement in others. It would also provide a degree of wind and dust control. Plant material would use native species compatible with the surrounding landscape.
- Lighting fixtures would have shielded tops to reduce the "skyglow" effect and to direct the light downward to the area needed to be lit.
- Fencing—Existing fencing along the outside of the mainline would be replaced with new fencing where appropriate.
- Noise barrier—The aesthetic design of the noise barriers would be determined with community input during preliminary and final design. Currently the continuation of the existing wooden barrier concept is proposed throughout the project corridor to maintain consistency.
- Seeding—All areas disturbed by construction would be revegetated with native grasses to provide visual enhancement.

4.16 Archeology and Historic Preservation Impacts

Using the defined Area of Potential Effect (APE) for the proposed project (Appendix G), an extensive review of existing site records and literature, windshield and pedestrian surveys, and subsurface shovel testing were accomplished to determine if any subsurface archeology, historic built environment, or Native Alaskan traditional cultural properties could be affected by the proposed project.

No-Build Alternative

The No-Build Alternative would have no impact on historic properties, and would leave the area in its current condition.

Build Alternative

The earthquake of 1964 is thought to have disturbed many local cultural resources in Anchorage. Office of History and Archaeology (OHA) research revealed that although the study area had many of the floral, faunal, and hydrologic resources that would have sustained prehistoric cultures, no known or documented prehistoric archeological sites were located in the APE. Only two potential historic properties were identified in the APE, and neither was determined to be eligible for the National Register of Historic Places (NRHP) because of modification and loss of integrity. Native Alaskan traditional properties are not known to be located within the APE. Fieldwork also did not identify cultural or historic properties at risk from the proposed project; therefore, no impacts are anticipated from the

Build Alternative. The pedestrian archeological inventory and the windshield survey for historic properties, as well as subsurface shovel testing, indicated that no cultural properties are present in the APE. Evidence of extensive existing ground disturbance in the study area was noted.

There are no prehistoric, historic, or archaeological sites or properties on or eligible for the NRHP that would be affected by the proposed New Seward Highway project. No historical buildings of significance were found within the project-defined APE. Tribal and State Historic Preservation Office (SHPO) correspondence as well as SHPO concurrence with the FHWA Finding of No Historic Properties Affected can be found in Appendix G.

Secondary Impacts
No secondary impacts are foreseen for archeology and historic properties.

Mitigation Measures
In the unlikely event that Native Alaskan archeological sites were encountered during construction, formal archeological testing would be required to evaluate the NRHP eligibility status of any discovered archeological resources. Archeological sites determined to be eligible for inclusion in the NRHP are subject to requirements for mitigation (treatment) measures, such as data recovery, if avoidance is not possible.

If previously undiscovered archeological remains are encountered during construction activities, all work that could affect the site would be temporarily halted and the SHPO would be notified immediately. Work would not resume until the appropriate consultation with SHPO, FHWA, and local Native tribes was completed and an approved plan was implemented. In accordance with state and federal regulation (Section 107-1.07 of *Standard Specifications for Highway Construction* [DOT&PF, 2004c]), if previously undiscovered archeological remains are encountered during construction, the contractor would be required to stop work immediately at the site of a discovery to avoid damage to the resources at the site. If any human skeletal remains were discovered during construction, all work in the affected discovery area would be stopped, and appropriate agencies (MOA Medical Examiner, DOT&PF, OHA, and the State Troopers) would be notified immediately. If the remains were suspected to be of Native Alaskan origin, appropriate authorities would include the local Native Alaskan tribes, as directed by the DOT&PF and OHA.

4.17 Considerations Relating to Pedestrians and Bicyclists

No-Build Alternative
The No-Build Alternative would have no direct impacts on the existing fragmented trail system in the corridor. The *2006-2008 State Transportation Improvement Program* (DOT&PF, 2006) references other future construction projects along New Seward Highway where pedestrian improvements would occur. These projects are discussed in the Cumulative Impacts section (4.24) of this chapter.

The No-Build Alternative does not support the recommendations of the *Areawide Trails Plan* (MOA, 1997) for continuous trails through the Campbell Creek Greenbelt, pedestrian and bicycle facilities along the length of the corridor, or commuter bicycle routes traveling in parallel directions along the frontage roads.

Build Alternative

Proposed bicycle and pedestrian improvements consistent with the *Areawide Trails Plan* (MOA, 1997) are described below by roadway segments. All improvements discussed would help alleviate the increase in user conflicts that are anticipated throughout the existing discontinuous trail system as trail use increases. In addition, new commuting and recreation opportunities and improved connections joining south, east, west, midtown, and downtown Anchorage would result.

Rabbit Creek Road to O'Malley Road

In this segment, proposed pedestrian and bicycle improvements consist of separated multi-use pathways on the west and east sides of New Seward Highway. A commuter bicycle route is also included to the east along the right shoulder of Brayton Drive from Huffman to O'Malley roads. At the existing Rabbit Creek Road pedestrian overcrossing, Americans with Disabilities Act (ADA) upgrades include ramp access improvements.

O'Malley Road to Dimond Boulevard

In this segment, proposed multi-use pathways are included adjacent to both east and west frontage roads. The pathways are separated from the roadways as much as possible where right-of-way is available. In areas of limited space, the pathways are adjacent to the roadway, separated only by curb and gutter. Commuter bicyclists are accommodated along the right shoulder of the existing Brayton Drive frontage road and the proposed extension of the Homer Drive frontage road.

Dimond Boulevard to Dowling Road

In this segment, proposed sidewalks are included adjacent to both east and west frontage roads. Commuter bicyclists are accommodated along the right shoulders of Brayton Drive and Homer Drive frontage roads.

Dowling Road to Tudor Road

In this segment, construction of sidewalks for pedestrian travel are proposed adjacent to the existing frontage roads from Dowling Road to International Airport Road, and separated multi-use pathways are proposed from International Airport Road to Tudor Road. Commuter bicyclists are accommodated along the right shoulders of Brayton Drive and Homer Drive frontage roads. The extension of International Airport Road would connect Homer and Brayton drives. This segment also includes replacement of the Campbell Creek bridges, which would provide adequate clearance for a future trail extension along Campbell Creek under New Seward Highway.

Tudor Road to 36th Avenue

In this segment, proposed bicycle and pedestrian improvements consist of a new separated pathway on the west side of New Seward Highway, adjacent to the mainline, and ADA upgrades for the existing pathways at 36th Avenue and along Tudor Road.

Grade Separations and Intersections

The design of the proposed east-west intersection improvements at 92nd, 76th, and 68th avenues and International Airport Road provide sidewalks along both sides of each crossing to points where they tie in with existing or proposed frontage roads and New Seward highway on and off ramps. The intersection designs would include provisions for curb ramps and all ADA requirements.

Secondary Impacts

No secondary impacts from the shared use pathways or sidewalks are anticipated from the proposed project.

Mitigation Measures

Pedestrian and bicycle facilities would be designed in accordance with the DOT&PF *Alaska Preconstruction Manual* (2005) and the most current AASHTO *Guide for the Development of Bicycle Facilities* (1999). The facilities would be consistent with the *Areawide Trails Plan* (MOA, 1997). In general, the proposed project would enhance pedestrian and bicycle facilities; therefore, no mitigation is proposed. The project would be closely coordinated with local jurisdictions to ensure continuity of designated or planned bicycle and pedestrian facilities.

4.18 Hazardous Waste Impacts

An area larger than the study area was investigated for the presence of known or suspected sites contaminated with hazardous waste, as described in Chapter 3. An area encompassing a mile on each side of New Seward Highway and extending approximately a mile past Rabbit Creek road and 36th Avenue was used for the initial research screening of sites in the area. This extensive list was later pared down to those sites with the potential (because of their location and site characteristics) to contaminate the highway corridor or be affected by the proposed project (see Figure 4.18-1). Through field inspection, five other sites not in the research list and that could also pose contamination potential were identified. (See Phase I Site Assessment Report, Appendix I.)

The facility types and number of sites along the project corridor from the data research and field review are summarized in the following list:

Nuclear Regulatory Commission – Material Licensing Tracking System (MLTS) site	1
Resource Conservation and Recovery Act Information System (RCRIS) Violation	1
Facility Index System Database (FINDS) – Administrative Violation	1
Alaska state hazardous waste sites (SHWS)	2
State of Alaska, ADEC, Underground Storage Tank (UST) sites	15
State of Alaska, ADEC Leaking Underground Storage Tank (LUST) sites	6

No-Build Alternative

No known or potentially contaminated sites would be affected under the No-Build Alternative.

Build Alternative

In general, no overt signs of contamination were observed during the field sites investigation; however, evidence provided by the records search indicated there were several areas near the proposed project site where soil and groundwater contamination still exist. The nature of some of the storage practices by businesses along the access and frontage roads dictates that right-of-way acquisition and construction should be approached with caution. After the site review, those sites with potential to affect or be affected by the proposed project were determined. The following sites are of concern for construction activities associated with the proposed project:

- Excavation near the two sites adjacent to the approach roads to Brayton Drive (Quik Lube and Magnum Marine, Site 70) would need to be undertaken with caution because the final closure of the site has not been completed and potentially contaminated soil or groundwater may still exist. The current design for the proposed project would reconstruct the approaches within the existing right-of-way. The probability of encountering contaminated soil or groundwater to reconstruct the approaches is considered to be low based on the site records and the on-site visual inspection.
- Evidence of spills may be masked by covering the ground with snow, asphalt, gravel, or fresh soil. Areas known to house vehicles, equipment, tanks, and drums should be re-examined before right-of-way acquisition of the property. These areas include Baker Hughes Inteq, Polar Refrigerant and Restaurant Equipment, Right Way Roofing, a property on the corner of Sandlewood Place and 82nd Avenue, and self storage locations along Brayton and Homer Drive. Although the probability of encountering contaminated soil or water is low, care would need to be taken when excavating near these areas to be alert to potential contamination from leaked fluids.
- In the event of spills occurring since the completion of this investigation, it may be necessary to update information provided in the Phase I Site Assessment Report (Appendix I) before conducting any construction activity.

Potential impacts to the proposed project from unearthing previously unknown hazardous waste sites fall into three categories: schedule, public health, and operations. During the proposed improvements, an uncontrolled hazardous substance not identified during the agency list reviews, environmental assessments, and site surveys could be encountered; for example, a UST could be discovered. Impacts from identification of a new hazardous waste source could result in temporary work stoppage or delays, additional project costs for investigation, and expenditures for cleanup of ground water and soil and for disposal of contaminated soil. In addition, unexpected contamination may expose project workers to hazardous substances.

Secondary Impacts
No secondary impacts are anticipated for this resource.

Mitigation Measures
Updated agency list data would also be obtained during the final design phase of the project to ensure that the most recent data are available and used to determine potential property contamination risk. If previously undiscovered contamination were encountering during construction of New Seward Highway improvements, work in the surrounding area would stop immediately, and the proper state and federal agencies (ADEC and EPA) would be notified at once. Proper investigation and cleanup would be coordinated by the DOT&PF with responsible government agencies.

If the required right-of-way acquisition for the proposed project changes from that anticipated in this document and potentially contaminated properties are to be acquired, a

Phase II site investigation would be undertaken at those locations during the final design phase, before construction.

4.19 Energy Impacts

The estimated energy requirements for the proposed project include operational energy needs for the No-Build and the Build Alternative utilizing the design year of 2035. The operational energy requirements are for the Build Alternative to increase the existing road from four to six lanes from Tudor Road to O'Malley Road; construct new grade-separated intersections at 92nd, 76th, and 68th avenues and International Airport Road; construct off and on ramps and frontage roads; and install continuous illumination between O'Malley Road and Tudor Road.

No-Build Alternative

The analysis of the vehicle energy consumption for the No-Build Alternative was estimated from the existing condition and is shown in Table 4.19-1. Table 4.19-1 summarizes the average daily energy consumption for vehicle activities. Energy consumption from vehicles, based on vehicle miles traveled (VMT) for the design year of 2035, is 3.48×10^9 British thermal units (Btu) per day. No additional lanes would be constructed under the No-Build Alternative. The lack of improvements would result in increased congestion and energy use over time because of reductions in average vehicle speeds. Studies of fuel consumption on congested highways indicate that average miles-per-gallon (mpg) for passenger vehicles can reach a low of 16 mpg (U.S. Department of Transportation, 2005). Congestion and LOS are currently degraded in some sections and are expected to worsen in the future (LOS E and F) as average daily traffic increases.

Although the vehicle energy consumption of 3.48 Btu $\times 10^9$ for the No-Build Alternative, based on VMT for the design year, is a lower energy consumption than for the Build Alternative (3.62 Btu $\times 10^9$), this figure is misleading because the energy consumed under the No-Build Alternative is based on efficient use of fuel by vehicles operating on New Seward Highway. The increase in congestion and lower average vehicle speeds (lower and unacceptable LOS at E or F) of the No-Build Alternative would increase the energy consumed by vehicles through lower mpg vehicle rates. For example, if the passenger vehicle mpg were lowered to 18 mpg from 22.3 because of congestion and lower speeds, the energy use would be 2.8 Btu $\times 10^9$, instead of 2.26 Btu $\times 10^9$ (shown in Table 4.19-1)—an increase in energy use of approximately 20 percent for the same VMT. Use of extrapolation to describe the other types of vehicles results in vehicle energy use of 4.6×10^9 Btu for the design year, considering the increase in congestion that would occur under the No-Build Alternative. This calculation does not consider the potential increase in fuel efficiency of new vehicles in future years. The amount of fuel used is expected to drop with anticipated efficiencies.

TABLE 4.19-1
Projected Energy Consumption for Existing New Seward Highway (2035)

Vehicle Type (Use)	Percent of VMT[a]	Daily VMT[b] (520,333)	Average Fuel Consumption[c] (mpg)	Daily Fuel Consumption[d] (gallons)	Daily Energy Consumption[e] (Btu x 10^9)
Passenger cars	77.5	403.258	22.3	18,083	2.26
Pickup trucks	16.5	85,854	17.7	4850	0.61
Delivery trucks and recreational vehicles (2 axles)	3.8	19,772	7.3	2708	0.38
Motorcycles	0.5	2,602	5.0	520	0.07
Truck single trailer (5 axles)	0.4	2,081	5.7	365	0.05
Buses	0.4	2,081	6.9	302	0.04
Dump trucks and recreational vehicles (3 axles)	0.4	2,081	7.3	285	0.04
Trucks (3 or 4 axles)	0.2	1,040	5.1	204	0.03
Trucks (6 or more axles)	0.1	520	5.1	102	0.014
Total					**3.48**

[a] The percent of VMT is based on the DOT&PF *Annual Traffic Volume Report* 2003 data for the project area (2004b).

[b] The Daily VMT is based on the design year traffic estimate (2035), CH2M HILL.

[c] The average fuel consumption is taken from the U.S. Department of Transportation, Bureau of Transportation Statistics, *National Transportation Statistics, 2004* (2005).

[d] The daily fuel consumption is calculated by dividing the daily VMT by the average fuel consumption (mpg) for each vehicle type.

[e] The daily energy consumption is calculated by multiplying the daily fuel consumption by 125,000 Btu/gallon for automotive gasoline and 138,700 Btu/gallon for diesel motor fuel.

Btu = British thermal unit

mpg = miles per gallon

VMT = vehicle miles traveled

Build Alternative

Construction of the Build Alternative is expected to result in energy use from vehicles that is lower than the current energy use because of increased overall speed and reduced congestion. As traffic increases over time, however, the fuel use and congestion would increase, negating the short-term increase in efficiency from the highway widening and other improvements. This counteracting effect may not result in the design-year level of energy use being higher than that for the No-Build Alternative because improving emissions from new vehicles could produce less pollution and better average mpg. Table 4.19-2 shows the estimated energy consumed for the Build Alternative, by type of vehicle, based on the estimated VMT for the design year of 2035.

It is likely that the energy use from vehicles would be reduced by the Build Alternative, until such point that average vehicle speeds are again reduced by congestion, resulting in a lower average mpg and higher energy use. This future condition of congestion is not expected to occur until after the design year of 2035 based on the traffic and LOS estimates for the Build Alternative.

The installation of continuous lighting from O'Malley Road to Tudor Road would result in a permanent increase in electrical energy use for the Build Alternative. This increase is estimated at 189,000 kilowatts per year. Electrical power is available along the entire project corridor for this additional lighting.

TABLE 4.19-2
Projected Energy Consumption for the Build Alternative (2035)

Vehicle Type (Use)	Percent of VMT[a]	Daily VMT[b] (560,211)	Average Fuel Consumption[c] (mpg)	Daily Fuel Consumption[d] (gallons)	Daily Energy Consumption[e] (Btu x 10^9)
Passenger cars	77.5	434,163	22.3	19,469	2.43
Pickup trucks	16.5	92,434	17.7	5222	0.65
Delivery trucks and recreational vehicles (2 axles)	3.8	16,806	7.3	2302	0.29
Motorcycles	0.5	2,801	5.0	560	0.07
Truck single trailer (5 axles)	0.4	2,240	5.7	393	0.05
Buses	0.4	2,240	6.9	325	0.04
Dump trucks and recreational vehicles (3 axles)	0.4	2,240	7.3	307	0.04
Trucks (3 or 4 axles)	0.2	1,120	5.1	220	0.03
Trucks (6 or more axles)	0.1	560	5.1	110	0.015
Total					**3.62**

[a] The percent of VMT is based on the DOT&PF *Annual Traffic Volume Report* 2003 data for the project area (2004b).

[b] The daily VMT is based on the design year traffic estimate (2035), CH2M HILL.

[c] The average fuel consumption is taken from the U.S. Department of Transportation, Bureau of Transportation Statistics, *National Transportation Statistics, 2004* (2005).

[d] The daily fuel consumption is calculated by dividing the daily VMT by the average fuel consumption (mpg) for each vehicle type.

[e] The daily energy consumption is calculated by multiplying the daily fuel consumption by 125,000 Btu/gallon for automotive gasoline and 138,700 Btu/gallon for diesel motor fuel.

Btu = British thermal unit

mpg = miles per gallon

VMT = vehicle miles traveled

4.20 Permits and Authorizations

No-Build Alternative
Under the No-Build Alternative, no activities would require permits.

Build Alternative
The Build Alternative would require the permits or approvals listed below.

Federal
- USACE Section 404 (for fill placement in wetlands)
- EPA general permit for construction activity, according to the NPDES
- No U.S. Coast Guard permit for bridge replacement at the Campbell Creek crossing is required because Campbell Creek does not exhibit the characteristics of a navigable water (Helfinstine, 1998).

State
- ADNR, Office of Project Management and Permitting (OPMP), fish habitat permit pursuant to Title 41 of *Alaska Statutes* (for work in Furrow Creek, South Fork of Little Campbell Creek, North Fork of Little Campbell Creek, Campbell Creek, and Fish Creek)
- ADEC Clean Water Act, Section 401 Certification (corresponding with USACE Section 404 permit application)
- ADNR, OPMP, Alaska Coastal Management Program/MOA Coastal Management Plan, consistency determination (for work within the mapped 100-year floodplains of Furrow Creek, South Fork of Little Campbell Creek, North Fork of Little Campbell Creek, Campbell Creek, and Fish Creek)

Local
- Municipal noise permit for any work outside noise ordinance limits
- MOA Flood Hazard Determination (for work within the mapped 100-year floodplains of Furrow Creek, South Fork of Little Campbell Creek, North Fork of Little Campbell Creek, Campbell Creek, and Fish Creek)

Local, State, and Federal
- Determination of conformity under Section 170(c)(4) of the Clean Air Act (for project emission levels)

4.21 Construction Impacts

No Build Alternative
No highway construction impacts would result under the No-Build Alternative.

Build Alternative
Construction activities would disturb daily activities of the general population within the project corridor while also producing jobs and income for the Anchorage area. The impacts

would be temporary and would cease when construction is completed. The anticipated construction impacts—economic, air quality, water quality and floodplain, wetlands, hazardous waste, energy, noise, traffic, and energy—are discussed below.

4.21.1 Economics

Highway projects can increase output, income, and employment from construction spending that would not otherwise have occurred in the region. Project costs are estimated at $125 million and would be incurred on a phased basis during many construction seasons. The extent to which a highway project affects a region depends on the source of project funding and the makeup of work crews used during project construction.

Funds from local or regional sources are transfers that could have been spent by residents and businesses on other economic activities. Typically, only "new money" to a region has a measurable economic effect on employment and income gains resulting from project construction. The proposed project is expected to be funded through a combination of federal and state funds. To the extent that funds that would not otherwise have been spent in the study area are represented, the project funding would result in income and job benefits to the study area.

Effects on Residences and Businesses During Construction. Reductions in the gross revenues of firms affected by construction can result both from overall congestion that affects freight and worker mobility and from the localized effects of restricted access, reduced parking, dust, and noise. Localized effects on businesses were estimated by using the same methods outlined above for operational effects.

Construction Spending Effects. A potential benefit from the Build Alternative is a temporary increase in jobs and income in the region resulting from construction spending. Expenditures during construction would result in demand for construction materials and jobs. These expenditures are considered direct effects. These direct effects lead to indirect effects as the outputs of firms in other industries increase to supply the demand for inputs to the construction industry. Finally, wages paid to workers in construction trades or supporting industries would be spent on other goods and services. The combined wages and related spending are referred to as induced effects. Direct, indirect, and induced effects may occur in the region from construction of the project. The potential for these effects is discussed qualitatively.

During construction, it is likely that most construction-related products would be sourced locally, and that local firms and workers would be involved in construction.

Congestion in the corridor would likely increase because of construction-related activity. It is possible that access to some businesses would be impeded as part of local road construction for grade separations. Although decreased ease of access might result in reduced sales during construction, it is not likely that many businesses would experience substantial losses of sales from this effect.

Mitigation Measures

The construction-related effects would be temporary and minor. Recommended measures to reduce economic effects to existing businesses in the study area during construction include the following:

- Providing public information about construction activities. The public would be informed that businesses are open during construction and encouraged to continue patronage.
- Providing adequate signage to detour access to businesses
- Carefully planning construction to minimize delays on the local road network

4.21.2 Air Quality

Air quality impacts related to construction stem from increased dust, vehicle emissions of construction equipment, and portable asphalt batch plant operations. Fugitive dust could escape from the construction site and from soil blown from uncovered trucks carrying materials. Vehicles leaving the construction area could deposit mud on public streets, which would become a source of dust after drying.

Heavy trucks and construction equipment powered by gasoline and diesel engines would generate CO and NO_x in exhaust emissions. CO emissions from idling vehicles could increase if construction equipment caused delays in traffic movement. These emissions would be temporary and limited to the immediate vicinity of the work taking place.

Mitigation Measures

Air quality impacts would be minimized during construction through implementation of contract specifications such as requirements to water for dust control, conduct regular street sweeping, provide stabilized construction exits, and complete paving of temporary driving lanes and detours.

Construction activities would be conducted in accordance with Chapter 15 of the *Anchorage Municipal Code*, Section 35.090 B, which states:

> Within the boundaries of the municipality no person shall cause, allow or permit a building or its appurtenances or a road to be constructed, altered, repaired or demolished without taking reasonable measures to prevent particulate matter from becoming airborne.

The department will control dust and emissions from construction activities and equipment through the following measures:

- Regular watering of the construction site to reduce dust emissions
- Requiring regular maintenance on construction equipment

Construction equipment, including an asphalt batch plant, would be required to meet applicable local, state, and federal emissions regulations.

4.21.3 Water Quality and Floodplain

The Build Alternative would require some land clearing, topsoil excavation, fill for new lanes and embankments, and roadway paving. Runoff water associated with watering for dust control, water used for compaction, and stormwater runoff are occurrences related to construction activities. Potential construction impacts to water quality include sedimentation, turbidity, and contaminant discovery or spills.

Water quality can be adversely affected and degraded by erosion and sedimentation caused by exposing soil and the use of heavy equipment during construction. These impacts can be minimized by careful equipment operation and by implementation of various erosion control BMPs and techniques. The main impacts on water quality from construction include sedimentation and increased turbidity from erosion and soil disturbance, as well as the increased potential of contamination from equipment oil spills or leaks. The impact from erosion would vary, depending on the soil characteristics of the landscape, surface cover, climate, topography, and rainfall intensity and duration. It is also important to minimize soil compaction from heavy equipment to preserve the infiltration capacity of the soil.

The natural topography of the study area is already highly modified; therefore, additional topographical changes to the landscape would be minor. During excavation and construction of culverts, bridges, and additional lanes, substantial soil area would be exposed and may become susceptible to erosion. Construction adjoining riparian areas and wetlands may encounter shallow groundwater. Dewatering may be required for construction in these areas, and permanent drainage would be needed for structural stability.

Storm water from the newly constructed lanes ramps, bridge, and interchange improvements at 68th Avenue are not expected to have additional water quality impacts on the South Fork of Little Campbell Creek or the North Fork of Little Campbell Creek because of the already highly developed and disturbed condition of the watershed in this area and upstream toward the headwaters.

Mitigation Measures

Construction of New Seward Highway improvements would follow all DOT&PF requirements and guidelines for pollution, erosion, and sediment control. Water quality impacts from construction activities would be minimized and mitigated by the implementation of site-specific BMPs for erosion and sediment control, such as silt fences, sediment traps/basins, inlet protection, erosion control blanketing, and other approved products.

The construction contractor would be required to develop and submit a Storm Water Pollution Prevention Plan (SWPPP) in compliance with the NPDES General Permit. If the contractor would desire to draw water from a non-municipal source for construction use, an ADNR Temporary Water Use Permit would be required.

Waste material sites are required to be stabilized to prevent runoff and erosion. Contractors would be required to obtain all necessary permits and permissions for waste sites. Disposal sites would not be located within 150 feet of any greenbelts, streams, and associated riparian area, wetlands, or any other open water.

Construction equipment would not be allowed outside permitted construction limits in sensitive areas such as wetlands and wildlife and fisheries habitat.

If previously undiscovered contamination were encountering during construction of New Seward Highway road improvements, work in the surrounding area would stop immediately and the ADEC would be contacted. Proper investigation and cleanup would be coordinated with responsible parties and governmental agencies. Any contaminated material would be handled in accordance with an ADEC-approved corrective action plan.

4.21.4 Wetlands

Impacts to wetlands resulting from construction equipment activities would be limited primarily to the temporary 10-foot disturbance width adjacent to the project footprint. Adverse effects would include clearing of vegetation, soil compaction in areas used by heavy equipment, and potential sedimentation into the wetland. Although the temporary impact areas would be restored and revegetated after construction, the vegetation would be unlikely to return to its current composition and the appearance and habitat type of the wetlands could be altered.

The wildlife habitat functions of the wetlands outside the disturbance limits would be degraded temporarily during construction by the proximity of intense human activity and noise.

Mitigation Measures

The following measures would be taken to minimize adverse impacts to wetlands during construction:

- The area outside the project footprint that would be disturbed during construction activities would be limited to 10 feet unless culvert or wall installation required it to be slightly wider. This limited temporary disturbance zone would be restored after construction activities in the area are completed.
- The project specifications would require that erosion and sedimentation control measures be employed during construction and until soils are permanently stabilized.
- Disturbed areas would be revegetated with native plant species.

4.21.5 Hazardous Waste

During construction activities, there is potential for encountering contaminated soil or water during excavation. In addition, construction operations could result in inadvertent leaks and spills of fuel and other hazardous materials.

Mitigation Measures

Current hazardous waste data sources should be reviewed before construction to ensure there are no newly identified sites in the project area.

Detailed BMPs and housekeeping recommendations would be outlined in the contractor's SWPPP and hazardous material control plan. DOT&PF would require regular maintenance of construction equipment and vehicles. The contractor would be required to implement proper hazardous material storage and handling. In addition, the contractor would be familiar with emergency procedures such as spill response and documentation requirements. The response procedures would require that work stop immediately and the site be secured to prevent unauthorized access. In addition, the appropriate regulatory authorities must be notified immediately. Phone numbers of the National Response Center and 911 emergency services would be made accessible at work sites. Individuals responsible for implementing and enforcing the plans requirements would be identified before work began.

4.21.6 Noise

During the construction phase, noise from construction activities and traffic detours to temporary new locations would add to the noise environment in the immediate project area. Activities involved in construction would generate noise levels, as indicated in Table 4.21-1, ranging from 82 to 86 dBA at a distance of 30 meters (100 feet).

TABLE 4.21-1
Construction Equipment Noise

Construction Phase	Loudest Equipment	Maximum Sound Level at 30 Meters (100 feet) (dBA)
Clearing and grubbing	Bulldozer, backhoe	83
Earthwork	Scraper, bulldozer	85
Foundation	Backhoe, loader	82
Superstructure	Crane, loader	83
Base preparation	Truck, bulldozer	85
Paving	Paver, truck	86

Source: U.S. Department of Transportation, 1977

Noise would also be generated during the construction phase by increased truck traffic on area roadways associated with transport of heavy materials and equipment. This noise increase would be of short duration, and would probably occur primarily during daytime hours; however, DOT&PF contracts increasingly are specifying night construction to minimize traffic impacts, which would require adherence to MOA noise ordinances.

Mitigation Measures. Compliance with the MOA noise ordinance is proposed to mitigate construction noise impacts. If night operations were to occur, a noise permit would have to be obtained from the MOA. Intensive coordination and notice to the public of night operations would be implemented.

4.21.7 Traffic

Construction activities would have a temporary impact on traffic and public services, including delays and detours, and as previously mentioned, would occur on a phased basis during many construction seasons.

Minor and temporary economic losses to local businesses may occur during the construction phases because of limited access. These effects would be short term, and every effort would be made to avoid impacts to businesses with the use of temporary signing or detouring to allow alternative routes for consumer access.

Mitigation Measures

The contractor would develop a traffic control plan to minimize delays, provide appropriate detours, maintain roadway safety, and maintain adequate access. Delays can be minimized and safety maintained by using applicable traffic control devices such as detours, flagging, pilot cars, and public notices. Access to all businesses and residences would be maintained during construction activities. Schools within the New Seward Highway corridor would be notified in advance of any temporary road closures that may affect their routes. Facilities that provide emergency services would also be notified in advance of any temporary road closures or detours.

4.21.8 Energy

Fuel required for use of construction equipment and energy required to make graded rock, asphalt, and concrete mix make up the construction energy use for the proposed project.

Mitigation Measures

The energy required during construction would be needed only temporarily and would cease upon completion of construction activities.

4.22 Relationship Between Local Short-Term Uses of Man's Environment and the Maintenance and Enhancement of Long-Term Productivity

No Build Alternative

The No-Build Alternative could affect local short-term uses because of existing access limitations. Maintenance and enhancement of long-term productivity could be limited by access and increased traffic and congestion reducing the ability of the area to efficiently be a productive part of the city.

Build Alternative

Impacts associated with the proposed project are not anticipated to outweigh the substantial short- and long-term benefits that would result from the increased lanes, pedestrian walkways, and ramp improvements that are vital to meet future traffic projections. Impacts include right-of-way acquisition, economic changes, increased noise from increased traffic flow, changes in visual characteristics, loss of natural environment such as riparian and wetland areas, and all other impacts described in this environmental document. New Seward Highway is the primary north-south transportation corridor within the MOA, and the need for the proposed project is supported by local and state planning. The purpose of the proposed improvements to New Seward Highway between Rabbit Creek Road and 36th Avenue is to address future demand and create a safer, more manageable highway.

The short-term impacts and use of resources for the proposed project are consistent with the maintenance and enhancement of long-term sustainability and quality of life for MOA residents and visitors. The proposed project would enhance the long-term productivity and viability of the community, and would both directly and indirectly provide substantial long-term economic benefits.

4.23 Irreversible and Irretrievable Commitments of Resources Which Would be Involved in the Proposed Action

No Build Alternative

The No-Build Alternative would not commit resources that were irreversible or irretrievable. Out-of-direction travel resulting from the lack of east-west connections along the project corridor would continue.

Build Alternative

The Build Alternative would require the commitment and use of a wide range of environmental, physical, human, and financial resources.

Land used for the improved ramps, bridge abutments, and pedestrian pathways, as well as stormwater treatment and storage areas would be considered an irreversible commitment of resources. The land area covered by the proposed project is considered an irreversible commitment as long as it is used as a transportation facility. If a more significant need arises for this land, the land could be converted to another use. This type of conversion from a transportation facility is not anticipated in the reasonably foreseeable future.

Raw and engineered materials, labor, and energy would be needed to complete the proposed improvements. Although gravel is in short supply in the Anchorage Bowl, it is available from the Matanuska-Susitna Valley. These gravel sources require additional use of resources and energy for transport to Anchorage that are not recoverable. Labor and energy resources expended for this project are considered to be irretrievable.

The construction of the Build Alternative would require a one-time expenditure of substantial amounts of federal and state funding, neither of which is retrievable. The proposed project would require the irretrievable commitment of resources. This commitment of resources is warranted, however, because of the numerous benefits that residents and visitors of the MOA would realize from the proposed improvements. Benefits from the improvements include improved traffic flow, economic benefits, greater accessibility to surrounding businesses and neighborhoods, and enhanced public safety. In addition, the pedestrian pathways would offer residents the opportunity to ride bicycles and walk in places that now are extremely difficult to access. These benefits are anticipated to outweigh the commitment of resources required to complete the proposed improvements.

4.24 Cumulative Impacts

Cumulative impacts "result from the incremental consequences of an action when added to other past and reasonably foreseeable future actions" (Council on Environmental Quality, 1987). Cumulative impacts may not always be noticeable at first, but when combined with other disturbances, can lead to considerable changes in the environment. For the purposes of this analysis, cumulative impacts focus on the water quality, wetland, essential fish habitat, and noise impacts of the proposed project between Old Seward Highway and Lake Otis Parkway from Rabbit Creek Road to 36th Avenue. The baseline condition for the Campbell Creek watershed would be prior to its degradation by residential and commercial development activities; in other words, its pristine condition prior to development.

The geographic boundary of influence for cumulative impacts is the Campbell Creek Watershed, which encompasses the project from O'Malley Road to Tudor Road and extends approximately 8 miles east and approximately 6 miles west. This watershed includes Campbell Creek and its tributaries, the North Fork and South Fork of Campbell Creek, which cross the project between Dimond Boulevard and Tudor Road.

The temporal time frame uses the existing condition to encompass existing and past activities and the design year of 2035 as the future temporal limit for this analysis.

Besides the proposed New Seward Highway project, a number of other transportation improvement projects, identified in the *2006-2008 State Transportation Improvements Program* (DOT&PF, 2006), have been programmed for development. These projects are independent of the proposed project, but may influence cumulative impacts in the study area. These proposed projects are included in Table 4.24-1.

TABLE 4.24-1
Projects Identified in the *2006-2008 State Transportation Improvement Program* Related to New Seward Highway Improvements

Project Description	Project Details as Excerpts from the STIP
New Seward Highway: Potter to Rabbit Creek	Rehabilitate the New Seward Highway from Potter to Rabbit Creek. Evaluate need for passing lanes and/or realignment.
New Seward Highway: Rabbit Creek to 36th Avenue (**This is the proposed project evaluated in this EA**)	Analyze and identify needed transportation improvements in the Seward Highway Corridor between Rabbit Creek and 36th Avenue. Improvements to be considered may include, but are not limited to: widening from four to six lanes; modify existing interchanges; grade separation at 36th Ave.; extend western frontage road between Dimond Blvd. and O'Malley Rd.; overcrossings at 68th, 76th and 92nd Avenues; and pedestrian and bike facilities.

STIP = State Transportation Improvement Program

Source: DOT&PF, 2006.

In addition to these programmed projects, two projects on the DOT&PF "Needs List" could be programmed after 2008: O'Malley Road interchanges at Old Seward Highway and New Seward Highway and the New Seward Highway – 36th Avenue to 20th Avenue.

No-Build Alternative

It is appropriate to discuss the no-build condition as it relates to cumulative impacts on this project because these impacts will continue even if the proposed project is not built. The existing condition, with its roads, highways, and commercial and residential development has negatively affected the watershed to this point in time and is continuing to do so. Impacts have been seen on water quality, wetlands, floodplains, and fish habitat. Both commercial development and residential development are continuing and will add incremental impacts to the watershed in future years. The no-build scenario would result in additional water quality degradation, loss of wetlands and floodplains, and fish habitat impacts. Although the MOA and others strive to limit these losses through their planning process, the impacts are still occurring.

Build Alternative

The cumulative impacts of the Build Alternative are discussed below.

4.24.1 Water Quality

Water resources in the proposed project area have been affected by previous land development for the existing road system and associated residential and commercial uses. This development has resulted in an increase in stormwater runoff, surface water pollution, decreased infiltration, loss of the natural riparian stream buffer, and changes in natural stream flow regimes. Natural pervious ground cover is increasingly being replaced with impervious surfaces throughout the watershed. Loss of natural filtration provided by undisturbed landscapes means less attenuation[1] of urban runoff before it reaches receiving waters, which likely results in a gradual decrease in water quality. This decrease in water quality is already apparent because the North Fork and South Fork of Little Campbell Creek are currently listed as impaired water bodies for fecal coliform bacteria. Impairment of these two creeks is expected to remain or degrade even further as urban development continues. This continued growth will be limited to some degree as the available land within the watershed, which is currently becoming harder to find, is built out.

Water quality would be directly affected by construction activities to replace culverts, build bridges, add lanes, improve ramps, and build multi-use pathways or sidewalks, which increase runoff from increases in impervious surfaces. The water quality issue from these activities is sediment and highway pollutants discharging into streams. The impacts from sedimentation would cease once construction is complete and the disturbed sites are stabilized. Indirect impacts from highway runoff with potential pollutants (oils, greases, asbestos, and fuels, to name a few) are likely to increase as traffic volumes increase over time.

Future residential and commercial development in the Campbell Creek watershed would likely result in additional impacts to surface water quality and runoff characteristics. For a few (less than 10) small properties adjacent to the project, the proposed project may result in more rapid development of the properties than otherwise would have occurred. Stormwater runoff from parking lots, roads, yards, and gardens could carry nutrients (such as phosphate and nitrogen), fecal coliform bacteria, and other substances that are damaging to water quality.

Assessment of the cumulative impacts to water quality from the proposed project, other planned projects in the area, and the degraded condition of the existing stream segments (modified channels, fecal coliform contamination and continued urban development) above and through the proposed project site indicates that additional impacts to water quality will result as development continues within the watershed.

South Fork of Little Campbell Creek. Considering that this stream has maintained the fecal coliform concentration level for the past 20 years at a relatively consistent level, the runoff discharge from the proposed project is not likely to add significant fecal coliform to the stream. The dissolved oxygen, however, was reduced by approximately half for that same

[1] Attenuation occurs when natural subsurface processes such as dilution, volatilization, biodegradation, adsorption, and chemical reactions with subsurface materials reduce contaminant concentrations to acceptable levels.

time period. The dissolved oxygen is an indicator that could be reflecting the increase in nutrient loading from urbanization and resultant organic growth that reduces dissolved oxygen levels in the stream. It is unlikely that the proposed project would add to this problem now or in the future because highway runoff does not normally contain significant nutrients or fecal coliform.

North Fork of Little Campbell Creek. The water quality for this stream has been fairly consistent for the past 20 years. Fecal coliform is also an issue in this stream, and the iron standard also was exceeded. The chloride concentration has doubled during this 20-year period, but is still below the allowable limit. In this stream, the dissolved oxygen concentration is lowering. The proposed project and its runoff are unlikely to contribute a significant amount of pollutants of concern to this creek.

Campbell Creek. The creek has not shown any exceedances of water quality standards even though it receives the drainage from the South Fork of Little Campbell Creek and the North Fork of Little Campbell Creek through Little Campbell Creek.

The runoff discharge from the proposed project should not contain significant pollutants of concern to any of these streams. The majority of the pollution found currently and into the future are likely to come from urban development and not the proposed New Seward Highway project. The proposed project is a small contributor of discharge to these streams and the urban area that discharges to these streams covers many square miles. This project should result in improved water quality.

4.24.2 Wetlands

Wetlands in the project area and the Campbell Creek basin have been affected by urban development. Many wetland areas have been filled for development during the past 50 years. This past wetland development in the Anchorage Bowl has been authorized project by project, or in a "piecemeal" fashion (U.S. Department of Interior, 1993), although it is now guided by the AWMP (1996a). The impacts of each individual project often appear insignificant, but the sum of all the isolated actions is important. The functions of some existing wetlands become more important as overall wetland acreage decreases.

The combined effect of projects has reduced the wetland areas of watersheds, wildlife habitat associated with wetlands, and the beneficial treatment wetlands perform on storm water and flood flow mediation. Remaining wetlands include large areas along upstream reaches of Campbell Creek, in the park and greenbelt that border it through the urbanized area, and the south half of Connors Bog. Because the floodplain of the main stem of Campbell Creek has long been protected by designation as greenbelt, it has experienced less wetland loss than have the South Fork of Little Campbell Creek and the North Fork of Little Campbell Creek.

Because of past development practices, wetlands in the MOA, including the Campbell Creek watershed, are afforded protection under current MOA laws and regulations and the AWMP (MOA, 1996a). The AWMP has categorized each remaining wetland to reflect its value to the community, and has defined management measures to retain important values. Following the AWMP recommendations and ensuring that impacts of each project are mitigated to the extent possible should limit the cumulative impacts of wetland loss. The rules, however, do allow Class B and C wetlands to be developed with conditions, such as retaining wetland functions for Class B wetlands. The AWMP has stated that development of Class C wetlands in accordance with the policies presented in that plan "should have an insignificant cumulative impact on overall functions and values of Municipality of Anchorage wetlands." The USACE also regulates wetlands in the Anchorage Bowl under the authority of the Clean Water Act, and impacts must also meet applicable requirements. Impacts expected to occur to wetlands from road construction projects or other development projects are controlled by federal, state, and local jurisdictions through permitting procedures.

The proposed project would affect wetlands as indicated in the Wetlands section (4.4) in this chapter. A total of 1.59 acres would be permanently affected. These impacts would come from fill for adding lanes, ramp improvements, multi-use pathways, sidewalks, bridge construction, and culvert replacement. The functional loss of wetlands caused by the proposed New Seward Highway project would contribute to a drainage-wide trend of increasing the amounts of impervious surface. The loss of the wetlands in the Campbell Creek watershed in the future would be limited by the land use and wetland designations; losses caused by the proposed project would not be in conflict with the AWMP.

Wetlands within the proposed footprints of future construction projects would likely be filled, and those adjacent to the future projects would be affected by runoff or alterations to existing hydrologic patterns. However, wetlands are recognized as a valuable natural resource and are protected by federal, state, and local regulations. Minimization of wetland fills can be accomplished through engineering design and a variety of BMPs. These techniques would be employed during construction and operation of projects in wetlands to protect water quality and minimize deposition of sediments and other pollutants in wetlands. Stormwater runoff could be appropriately treated to minimize introduction of nutrients. In addition, drainage systems and culvert designs could be implemented to maintain natural flow patterns of the surface water systems.

As a result of the protection wetlands now receive and the mitigation included in the proposed project for direct wetland impacts, the cumulative impacts on wetlands are expected to be minor.

4.24.3 Fish Habitat

Fish habitat in the Campbell Creek watershed has been affected by past development of roads and by commercial and residential development. These impacts have included channelizing the fish-bearing streams into straight linear features to match block property lines and roads. Some stream segments have been placed in storm drain pipe systems and culverts. Lower base flows in streams result from development of storm drain systems. Reduced stream flow decreases the amount and quality of available fish habitat. Overall urban development has resulted in discharges of pollutants such as sediment, chemical nutrients from lawn and garden activities, and fecal coliform from various urban sources into streams. Although most of the future proposed urban development would meet government regulations and plans concerning control of erosion and sediments during construction, it is likely that some developments would not. Urban development has increased impervious area, creating higher peak flows in streams, changing creek morphology and affecting fish habitat. The proposed project would involve the construction of additional travel lanes, improvement of frontage roads and ramps, and additional multi-use pathways and sidewalks that would cross over the anadromous fish-bearing streams that make up the fish habitat. The proposed project actions at these stream crossings are described below.

South Fork of Little Campbell Creek. This creek crosses under the existing roadway facility in a culvert. This culvert would be replaced with a culvert meeting the fish passage requirements of the Memorandum of Agreement between DOT&PF and ADF&G (2001), and provide for a minimum of the 100-year storm flow. This improvement would enhance fish passage.

North Fork of Little Campbell Creek. This creek also crosses under the existing roadway facility in a culvert. This culvert also would be replaced with a culvert meeting the fish passage requirements of the Memorandum of Agreement between DOT&PF and ADF&G (2001), and provide for a minimum of the 100-year storm flow. This improvement would enhance fish passage.

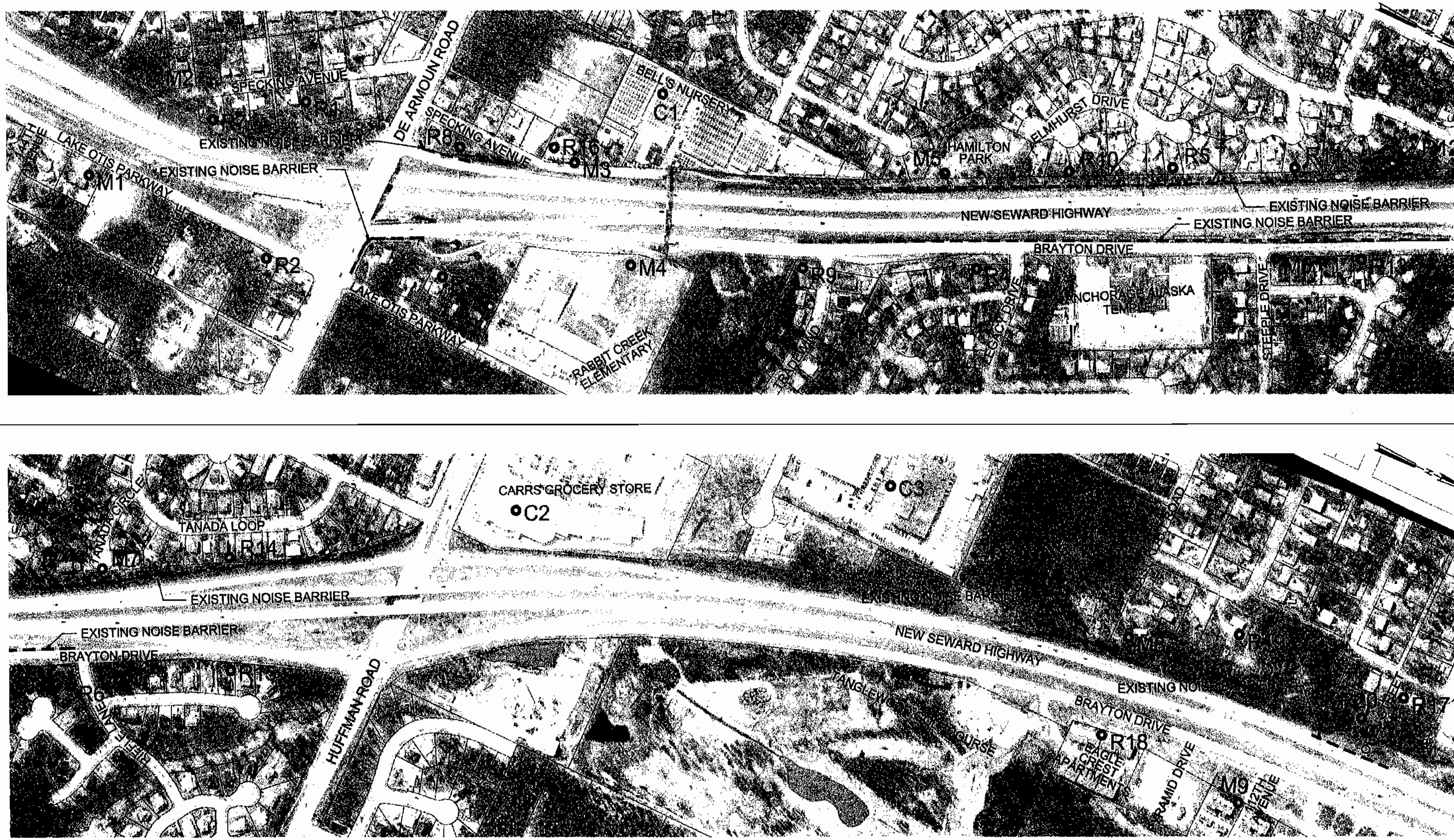
Campbell Creek. Bridges (143-foot open spans) would be constructed to replace the existing bridges 61- to 72-foot open spans). The new bridges would span the creek and create a new floodplain/wetland area on each side of the creek. These new floodplain/wetland areas would be revegetated to provide banks that are similar to those found upstream and downstream from the bridge crossing. These improvements would enhance fish habitat.

The proposed project would have ground-disturbing activities that could temporarily discharge sediment to these fish-bearing streams during construction. BMPs would be used to minimize impact. Revegetation would also be used in drainage swales and ditches and on detention pond slopes to minimize sediment reaching the fish streams and to mediate flow volume and peaks of storm runoff.

All stream design features for the proposed project would improve the current stream conditions for fish and result in positive benefits for these fish streams into the design year. Considering the continued development in the Campbell Creek watershed and the improvements that the project would have on the streams crossing it, the proposed project is unlikely to have a significant cumulative effect on essential fish habitat.

4.24.4 Noise

Noise impacts have accrued over time as traffic volumes have grown since the beginning of the New Seward Highway reconstruction in 1967. Noise abatement measures have been applied intermittently along the corridor. The proposed project provides the first opportunity for a comprehensive review of the entire corridor with respect to current DOT&PF Noise Abatement Policy (1996). As a result of proposed new noise barriers and expansion and reconstruction of existing noise barriers, the cumulative noise impacts within the project corridor would be mitigated.

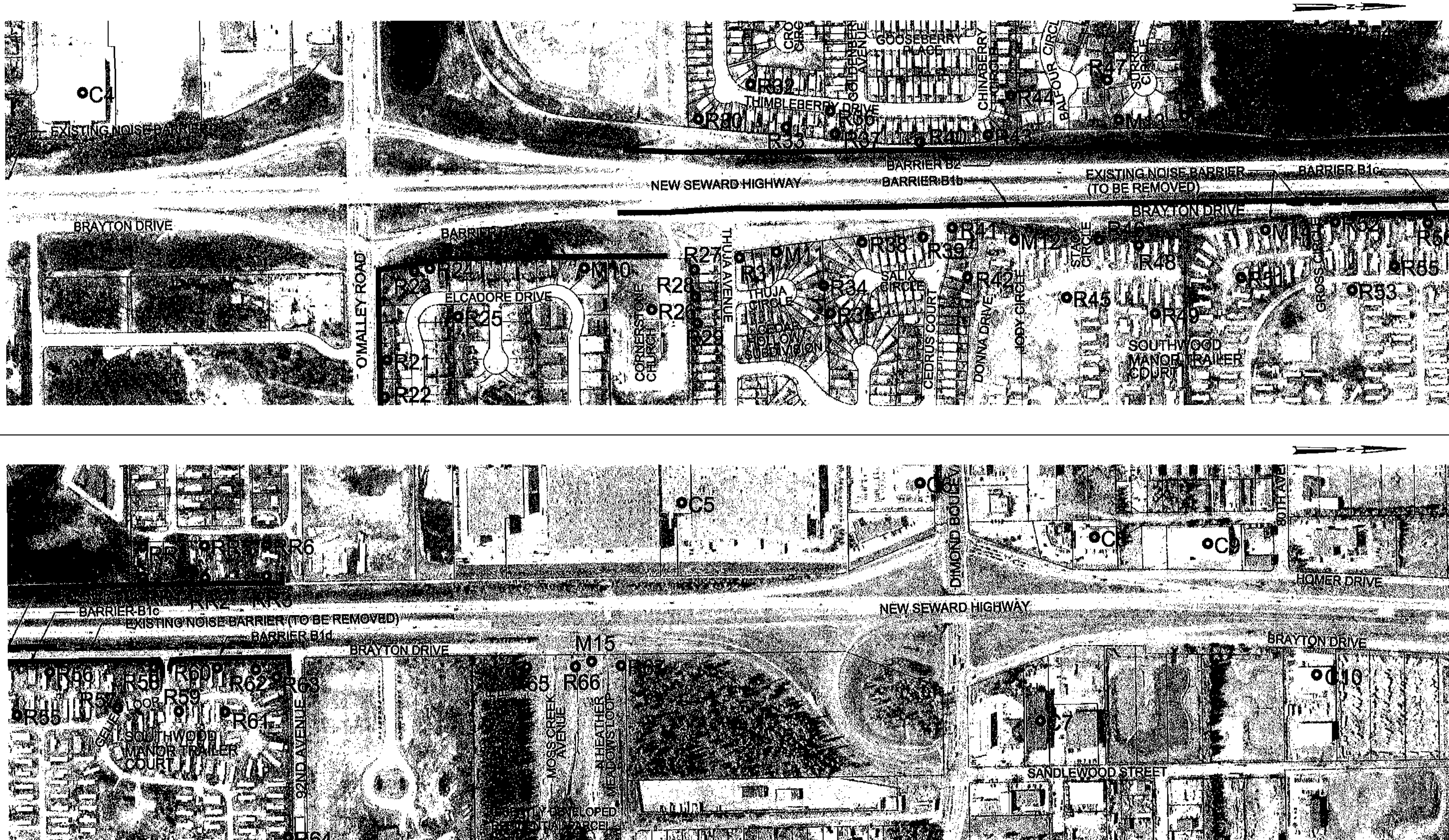


0 200 400 800
SCALE

LEGEND

- M2 FIELD RECEPTOR
- R2 TEST/MODEL RECEPTOR
- C2 COMMERCIAL RECEPTOR

FIGURE 4.10-1
NOISE RECEPTOR AND
PROPOSED NOISE BARRIER LOCATIONS

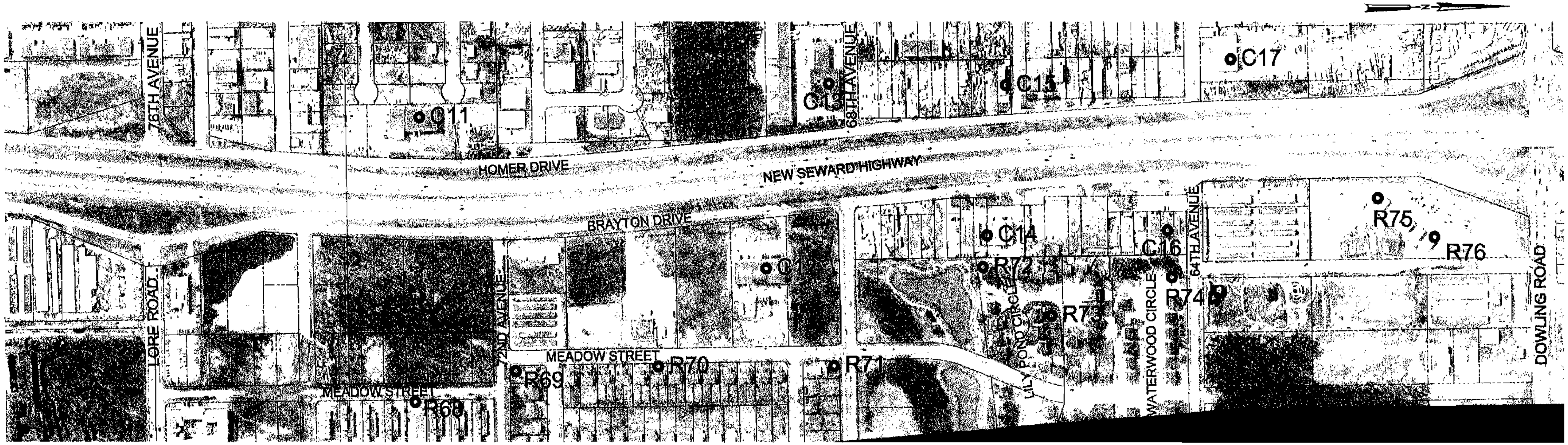


LEGEND

- M2 FIELD RECEPTOR
- R2 TEST/MODEL RECEPTOR
- C2 COMMERCIAL RECEPTOR

0 200 400 600
SCALE

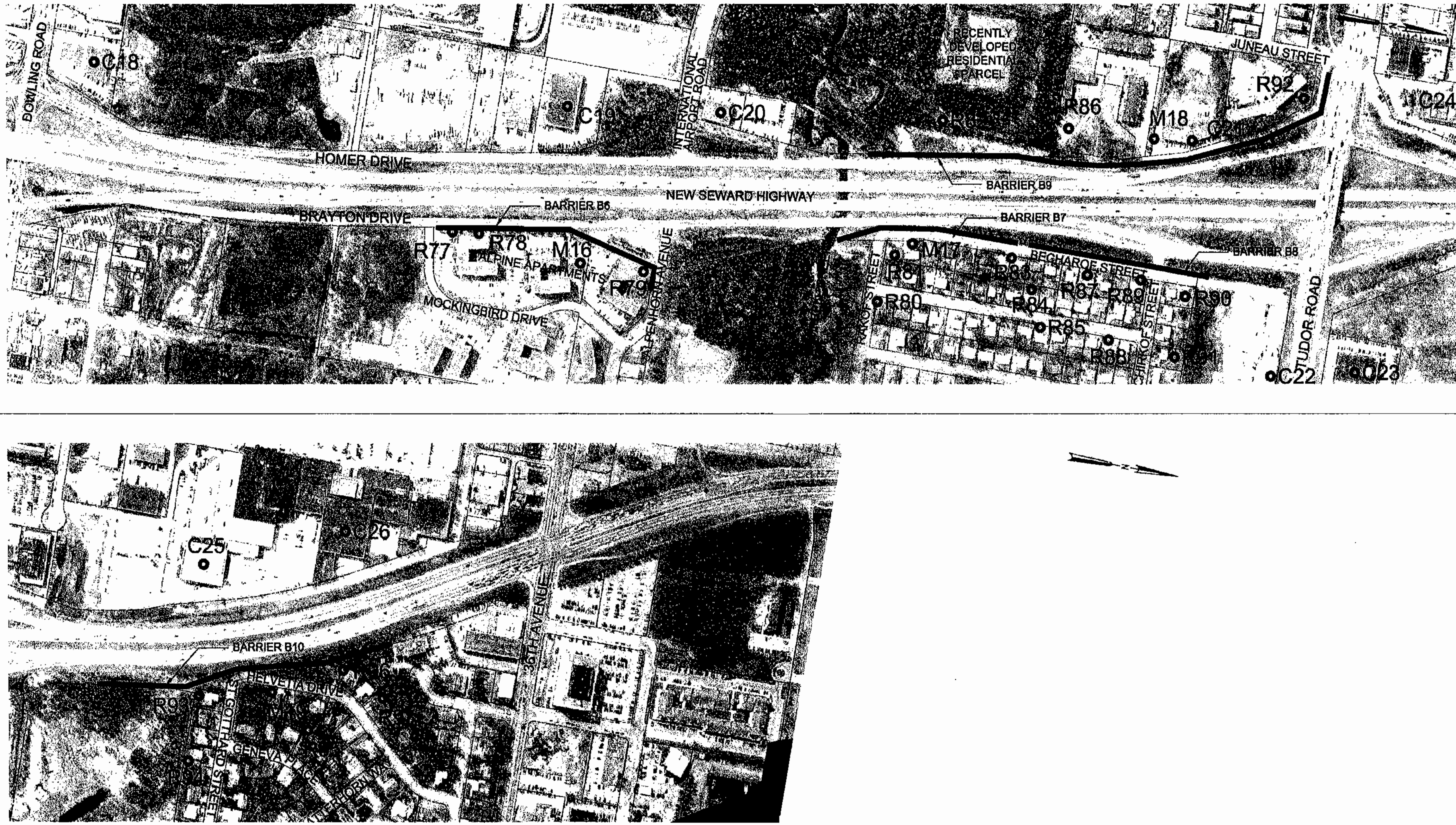
FIGURE 4.10-2
NOISE RECEPTOR AND
PROPOSED NOISE BARRIER LOCATIONS



0 200 400 600
SCALE

- M2 FIELD RECEPTOR
- R2 TEST/MODEL RECEPTOR
- C2 COMMERCIAL RECEPTOR

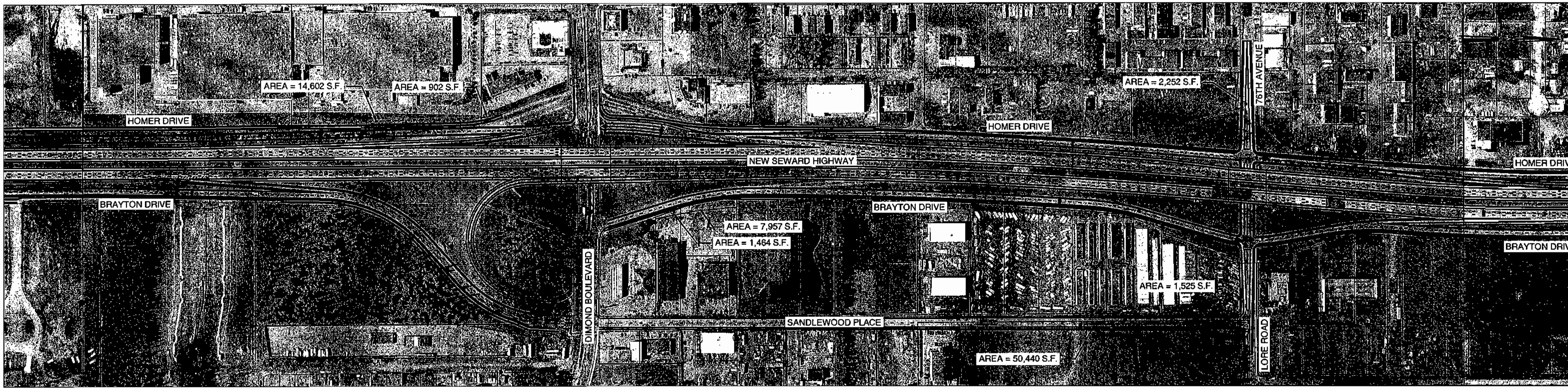
FIGURE 4.10-3
NOISE RECEPTOR AND
PROPOSED NOISE BARRIER LOCATIONS



0 200 400 600
SCALE

- M2 FIELD RECEPTOR
- R2 TEST/MODEL RECEPTOR
- C2 COMMERCIAL RECEPTOR

FIGURE 4.10-4
NOISE RECEPTOR AND
PROPOSED NOISE BARRIER LOCATIONS



SEE BELOW LEFT

SEE ABOVE RIGHT

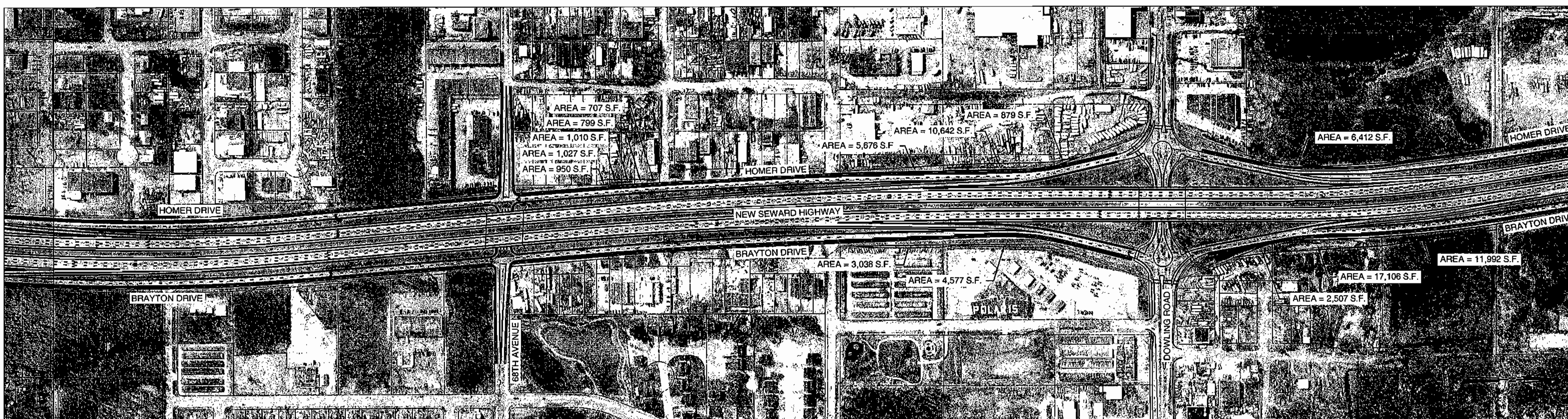
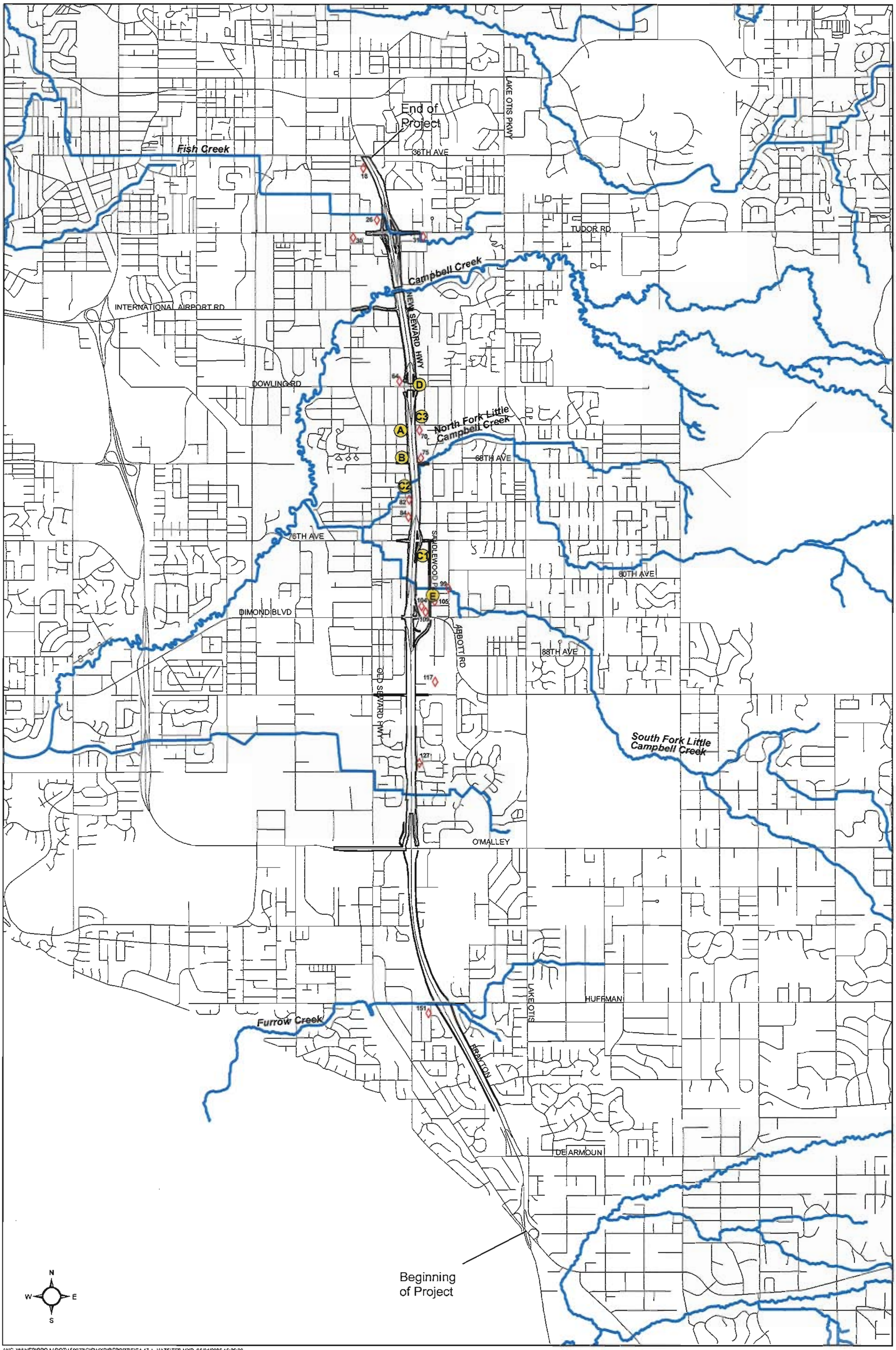


FIGURE 4.14-1
RIGHT-OF-WAY IMPACTS
DIMOND BLVD. TO DOWLING RD.



ANC WMINER\PROJ\ADOT\159972\GIS\MXD\REPORT\FIG4-17-1_HAZSITES.MXD 05/04/2005 16:25:20

Legend

- Listed Database Site
- Proposed Footprint
- Streams
- Roads
- Unlisted Database Sites

A	6446 Homer Drive
B	1321 E. 68th Avenue
C1	7741 Brayton Drive
C2	1341 E. 70th Avenue
C3	6305 Brayton Drive
D	Corner of Dowling & New Seward Highway, at northbound on ramp
E	Corner of 82nd & Sandlewood

0 1,000 2,000 3,000 4,000 Feet

FIGURE 4.18-1
Hazardous Waste/Material Sites with Potential Project Impacts

CHAPTER 5

Comments and Coordination

This chapter provides a brief overview of the planning process for improvements to the New Seward Highway, Rabbit Creek Road to 36th Avenue. It also summarizes (1) the methodology used to identify and reach all potentially affected interests (PAIs) and (2) the issues and concerns identified by PAIs in the general public and in federal, state, and local public agencies. Additional information is available in the *New Seward Highway, Rabbit Creek Road to 36th Avenue, Scoping Summary Report* (CH2M HILL, 2002), which provides initial scoping and coordination during the major investment study and early environmental document process.

The Alaska Department of Transportation and Public Facilities (DOT&PF), in collaboration with the Municipality of Anchorage (MOA), initiated planning studies to evaluate ways to meet current and future travel needs along the New Seward Highway corridor. The planning studies are guided by a transportation planning process framework known as a "major investment study" (MIS) as well as by the principles stipulated in the National Environmental Protection Act (NEPA), which applies to transportation investments supported by federal aid. The MIS and NEPA planning framework guiding the New Seward Highway project is designed to examine all reasonable strategies and alternative improvements that meet current and future transportation needs and contribute to the goals and quality of the community while reinforcing the goals of *Anchorage 2020: Anchorage Bowl Comprehensive Plan* (MOA, 2001a).

5.1 Methodology

The scoping process was initiated with compilation and review of the available background material on New Seward Highway, including studies, engineering investigations, the *Anchorage 2020: Anchorage Bowl Comprehensive Plan* (MOA, 2001a); *Anchorage Bowl Long Range Transportation Plan* (MOA, 2001b); *Public Transportation Development Plan, 2000–2004* (MOA, 2000); and *Areawide Trails Plan* (MOA, 1997).

The *New Seward Highway, Rabbit Creek Road to 36th Avenue, Project Prospectus* (2001b) (included in Appendix J) was developed as a concise document to explain the project background, goals, and objectives. Additional data were gathered on safety, accidents, and traffic volumes. Interviews and meetings with the public, elected officials, and interested transportation providers were instrumental in determining the community desires. This background work was summarized and made available to the public as the *New Seward Highway, Rabbit Creek Road to 36th Avenue, Background & Overview Document* (CH2M HILL, 2001).

With this information, the study team drafted a work plan for the New Seward Highway MIS/NEPA Study and presented it to Anchorage Metropolitan Area Transportation Solutions (AMATS) for approval. This work plan describes the development of a preliminary purpose and need statement, a final public involvement plan, and an integrated evaluation of the

C Street transit corridor impact on New Seward Highway. The team also worked with the MOA traffic planners to refine their new MOA traffic model to support the Anchorage Comprehensive Plan. Recent efforts (2004 and 2005) included verification of consistency with the *Anchorage Bowl 2025 Long-Range Transportation Plan* (MOA, DOT&PF, and AMATS, 2005).

During a scoping work session, team members developed a matrix of PAIs and the issues likely to be of concern to them. Once identified, the PAIs (identified in Appendix J) were contacted to (1) inform them about the proposed scope of the project and (2) solicit suggestions about how best to reach all interested and potentially affected members of the general public. Following identification of the PAIs, a public involvement program was designed to solicit input from the public and agencies to further refine the scope of the study and to ensure that their concerns and objectives would be addressed early in the planning process.

The public involvement program included interviews, meetings, an open house, and website updates to keep the public informed about the project and its progress. Following is a list of public involvement activities that have occurred during the course of studies for the New Seward Highway, Rabbit Creek to 36th Avenue, project:

- MIS agency consultation meeting, May 8, 2001
- AMATS Technical Advisory Committee presentation on the New Seward Highway MIS, May 24, 2001
- Abbott Loop Community Council meeting, June 28, 2001
- AMATS Technical Advisory Committee presentation on the New Seward Highway Work Plan, June 28, 2001
- Spenard Community Council meeting, July 11, 2001
- Rabbit Creek Community Council meeting, July 12, 2001
- Huffman/O'Malley Community Council meeting, July 19, 2001
- AMATS Policy Committee presentation, July 19, 2001
- Open house public meeting, September 11, 2001
- Roger’s Park Community Council meeting, November 12, 2001
- Follow-up phone calls to community council, November 30, 2001, to December 19, 2001
- Stakeholder interviews, May 8, 2001, to July 10, 2001
- AMATS Technical Advisory Committee presentation, February 28, 2002
- AMATS Policy Committee scoping presentation, March 14, 2002
- Public meeting at CH2M HILL on the Scoping Summary Report, March 15, 2002
- Abbott Loop Community Council meeting, a New Seward Highway project update, April 25, 2002

- AMATS Policy Committee and Technical Advisory Committee meeting, November 20, 2002
- Public scoping meeting, January 22, 2003
- Agency scoping meeting, January 23, 2003
- Interview with Channel 11, January 30, 2003
- Response to agency scoping meeting, November 18, 2004
- State Historic Preservation Office and Tribal consultation letters, May 24, 2005
- State Historic Preservation Office and Tribal findings letters, February 23, 2006

5.2 Public Issues and Concerns

The predominant issues identified through meetings with elected representatives, transportation providers, transit officials, the public, and Assembly members representing communities along the project corridor and the responses to those comments (how the proposed Build Alternative addresses the issues) are described below:

Issue	Response
Traffic intrusion and trucks make navigation by foot and bike unsafe.	Pedestrian and bicycle improvements are incorporated into the proposed design. In addition, improved connections and multi-use pathways would facilitate foot and bike travel in and through the project corridor.
East and west connections, mainly 68th Avenue, 76th Avenue, 92nd Avenue, and International Airport Road, are very important. Almost every public meeting ended with a comment for an interchange at International Airport Road.	The Build Alternative provides east-west intersection improvements at 92nd, 76th, and 68th avenues and International Airport Road and extensions of these roads to join the frontage roads.
• People, especially children, run across the highway from the trailer park area around 92nd Avenue.	The proposed grade separation at 92nd Avenue would provide a safe facility for pedestrians crossing the New Seward Highway.
• The lack of connection of International Airport Road with New Seward Highway is a problem and increases traffic—and congestion—at Dowling Road.	The Build Alternative proposes a grade separation of International Airport Road and the New Seward Highway. The extension of International Airport Road from Homer Drive to Brayton Drive, under the raised New Seward Highway, would provide better access to and from the New Seward Highway via the Dowling Road and Tudor Road Interchanges.
The use of transit and high-occupancy lanes involve park-and-ride systems. The project should address this need, especially in communities along the Hillside, where it is a long walk to the nearest bus stop.	Dedication of a lane to express bus service or high-occupancy vehicles would not attract the ridership to offset normal lane use. The added connections provided by grade separations at 92nd, 76th and 68th avenues and International Airport Road would provide new opportunities for transit routing, and a park-and-ride lot is proposed near the O'Malley Road interchange.

Issue	Response
Aesthetics are important to communities. People want their town to be a source of pride and a place to which their children will want to come home.	Study of the Build Alternative included evaluation of visual impacts. The design would include noise barriers, landscaping, fence replacement, and seeding for areas disturbed by construction.
Features should incorporate urban amenities, pedestrian amenities, and unique character at each intersection or underpass.	Pedestrian and non-motorized facilities have been proposed for the full length of the project as well as for those east west connections at 92nd, 78th and 68th avenues and International Airport Road. The pedestrian and bicycle amenities would be coordinated with local jurisdictions to ensure continuity of facilities.
This project needs to take into consideration all the other highway studies being conducted currently in Anchorage, such as the East Anchorage Transportation Study and the Glenn Highway MIS.	The findings and objectives of other studies were reviewed for consistency with the proposed project.
Separate bike paths should be included.	Separated paths and sidewalks (where right-of-way constraints do not allow for separation) would be included for the full length of the project. Shoulders with a minimum 4-foot width on all frontage roads would provide for commuter bicycles.
New Seward Highway should be raised above Campbell Creek for a bike trail.	As part of elevating the New Seward Highway mainline over International Airport Road, the bridges over the nearby Campbell Creek for the mainline and frontage roads also would be reconstructed. Replacement of the Campbell Creek bridges would provide adequate clearance for a future trail extension along Campbell Creek under New Seward Highway.
The Areawide Trails Plan recommends recreational and multi-use trails along the length of the study corridor to the east and a system of bicycle commuter routes.	Separated paths and sidewalks (where right-of-way constraints do not allow for separation) would be included for the full length of the project. Shoulders with a minimum 4-foot width on all frontage roads would provide for commuter bicycles.
Current on-ramp tapers are not long enough; sight distance is not adequate.	All geometric features would be upgraded to current design standards.
Rumble strips are icy.	Rumble Strips are not proposed for this urban project.
The opening to the northbound on-ramp at Rabbit Creek should be made wider.	All geometric features would be upgraded to current design standards.
A dedicated southbound off-ramp at Dimond Boulevard is needed.	The southbound ramp exiting New Seward Highway at Dimond Boulevard would be expanded to two lanes, and the ramp intersection would be relocated to align with the extension of Homer Drive from Dimond Boulevard to O'Malley Road.
Noise impacts should be mitigated. Concerns include an increase in noise at 36th Avenue and at 68th Avenue from the raised roadbed on nearby neighborhoods.	Noise barriers would be installed in accordance with DOT&PF Noise Abatement Policy (1996). See Section 4.10, Noise Impacts, and Figures 4.10-1 through 4.10-4.
Emergency service access is a concern for the Abbott Loop community.	The grade separations at 76th and 68th avenue, half-diamond interchanges joining 92nd Avenue and 76th Avenue with new Seward Highway, and extensions of these roads under the mainline would enhance emergency service access and response time.

Issue	Response
Light impacts to residential areas from use of high-tower lighting along highway should be studied.	High-mast lighting towers would be shielded to mitigate lighting impacts to residential areas.
The severity of accidents could increase if the road is widened into the median; median space must be maintained for safety.	The proposed design maintains the median.
The roads 76th Avenue and King Street are being used by drivers to avoid the congestion at Dimond Boulevard and Old Seward Highway. This cut-through traffic creates a neighborhood safety hazard.	The extension of streets under the mainline of New Seward Highway would reduce out-of-direction travel through the Dimond Boulevard and Old Seward Highway intersection.
Congestion needs to be addressed, particularly at the O'Malley Road ramps during peak traffic.	The 92nd Avenue extension and slip rams would reduce out-of-direction travel involving O'Malley Road and the ramps at New Seward Highway.
Southside ramps should be considered at DeArmoun Road.	The distance between Rabbit Creek Road and DeArmoun Road is one-half mile. This spacing is less than the 1 mile minimum distance required between full interchanges that would allow addition of on/off ramps on the south side of DeArmoun Road.
New Seward Highway should be connected to the Glenn Highway.	Connection of the New Seward Highway to the Glenn Highway has been included in the *Anchorage Bowl 2025 Long-Range Transportation Plan* (MOA, DOT&PF, and AMATS, 2005).

Comments also were received through the project website. Issues and concerns brought up in this forum are summarized below:

Issue	Response
Ramps onto and off of New Seward Highway south of the Sports Authority would alleviate congestion at the intersections of Old Seward Highway and Dimond Boulevard and at New Seward Highway and Dimond Boulevard.	The 92nd Avenue extension and slip rams would reduce out-of-direction travel in the area south of Dimond Boulevard.
Increasing highway lanes does not make sense. The problem begins at 36th Avenue and north. Another bypass like Minnesota Drive, only to the north, is needed.	Traffic projections demonstrate the need for improvements south of 36th Avenue within the project planning window of year 2035. Improvements from 36th Avenue north will be addresses in the Highway-to-Highway project as described in the *Anchorage Bowl 2025 Long-Range Transportation Plan* (MOA, DOT&PF, and AMATS, 2005).
The New Seward Highway corridor suddenly transitions from a freeway to an arterial at 36th Avenue. This area is subject to vehicles sliding in winter as drivers have to transition from highway speeds to stopping at the light at 36th Avenue.	The approach to 36th Avenue would be designed to current standards with advance warning signs alerting northbound drivers to the upcoming signalized intersection.
Pedestrian and bicycle facilities are lacking for safe travel along and across the highway. Overpasses and underpasses for pedestrian and bicycle facilities should permit crossing the highway.	The proposed Build Alternative incorporates improved pedestrian and bicycle facilities and connections along the corridor and under the New Seward Highway mainline at 92nd, 76th, and 68th avenues and International Airport Road.

Issue	Response
A grade-separated intersection should be considered for 36th Avenue and New Seward Highway.	A grade-separation at 36th Avenue will be considered in the upcoming Highway-to-Highway project envisioned as a controlled-access facility connecting New Seward Highway to the Glenn Highway.

5.3 Agency Issues and Concerns

The comments from agencies are summarized below:

Issue	Response
Areas of concern include creek crossings, visual and scenic resources, park access and locations, trail connections, wetlands, and water quality.	These issues have been characterized in terms of existing conditions in Chapter 3 and examined in terms of project impacts and efforts to avoid, minimize, or mitigate those impacts as described in Chapter 4.
Trails should connect with trails envisioned in the Anchorage Bowl Park, Natural Resource, and Recreation Facility Plan (MOA, 2005a).	Non-motorized facilities would be included along the project corridor and at east-west crossings in accordance with the *Areawide Trails Plan* (MOA, 1997), and as referenced in the *Anchorage Bowl Park, Natural Resource, and Recreation Facility Plan* (MOA 2005a, Draft)
New Seward Highway is designated an All American Road by the National Park Service; therefore, visual and aesthetic values are important.	Visual resources were identified in Chapter 3, Affected Environment, Section 3.13, Visual Resources, and project impacts were addressed in Chapter 4, Environmental Consequences, Section 4.15, Visual Impacts.
The project should incorporate landscaping enhancements, creating an aesthetic buffer. The highway screening ordinance must be followed.	Landscaping would be incorporated in the design phase, which will adhere to all MOA ordinances.
Seven stream crossings have been identified: Furrow Creek, two branches near Huffman and New Seward Highway; Unnamed Creek (near 100th Avenue and New Seward Highway); South Fork and North Fork of Little Campbell Creek; Campbell Creek; and Fish Creek.	All streams have been identified in Chapter 3, Affected Environment in the following sections: 3.2, Water Quality; 3.3, Wetlands; 3.4, Water Body Modifications; 3.5, Fish and Wildlife; and 3.6, Floodplains. Project impacts have been addressed in Chapter 4, Environmental Consequences, in the following sections: 4.3, Water Quality Impacts; 4.4, Wetland Impacts; 4.5, Floodplain Impacts; and 4.6, Water Body Modification Impacts.
Project design should consider daylighting creeks that are currently in pipes.	The possibility of daylighting creeks that are currently in pipes has been addressed in Chapter 4, Environmental Consequences, Section 4.6, Water Body Modifications.
How will the potential acquisition of the parcel north of Tudor Road by the Greatland Trust be dealt with?	No right-of-way would be acquired from the Helen Louise McDowell Sanctuary Conservation Easement under the Build Alternative.
The Dowling Road crossing is an area of concern.	The Dowling Road interchange at New Seward Highway would remain essentially as it exists.
For locations where right-of-way is acquired near a creek, greenbelt should be added.	No right-of-way would be acquired in the vicinity of the streams and greenbelts.

Issue	Response
If improvements result in fragmentation of wetlands, the function of those wetlands must be replaced.	Project impacts to wetlands have been addressed in Chapter 4, Environmental Consequences, Section 4.4, Wetland Impacts.
Sediment retention and stormwater handling are concerns.	Sediment retention and stormwater runoff issues have been addressed in Chapter 4, Environmental Consequences, in the following sections: 4.3, Water Quality Impacts; 4.4, Wetland Impacts; 4.5, Floodplain Impacts; and 4.6, Water Body Modification Impacts.
Anadromous fish, fish passage, replacing culverts with daylight crossings, protecting riparian areas, and replacing inadequate culverts are concerns.	Project impacts to fish, water bodies, and floodplains have been addressed in Chapter 4, Environmental Consequences. See sections: 4.3, Water Quality Impacts; 4.4, Wetland Impacts; 4.5, Floodplain Impacts; 4.6, Water Body Modification Impacts; and 4.7 Fish and Wildlife Impacts.
Bridges should be wide enough to allow streams to meander naturally underneath. Central bridge piers in the water may be allowed if the design can incorporate a bridge with a wider span.	The bridges over Campbell Creek would be lengthened generally from about 60 feet to 143 feet to allow for stream meander and a future path near the northern bridge pier, as shown in Figure 2.2-5.
Pedestrian and bicycle trails should be located away from the creeks and to the edge of greenbelts.	The future path under the proposed Campbell Creek Bridges would be located near the northern bridge pier, as shown in Figure 2.2-5.
Moose collisions along the New Seward Highway corridor are a concern. Bridges should be high enough to allow moose to cross underneath.	Fencing along the project corridor would inhibit moose conflicts and the proposed Campbell Creek bridges would provide a minimum clearance of 12 feet as shown in Figure 2.2-5. In addition, the grade separations at 92nd, 76th and 68th avenues would allow moose to cross under New Seward Highway in a lower-volume, lower-speed environment. See Section 4.7.3.

5.4 Summary

Bicycle and pedestrian improvements were among the many issues and concerns that were collected and reviewed during the public involvement process. These improvements are important to the community and are relevant to sustainable development in light of the continued population growth in Anchorage. Both the public and agencies would like to see trails connected.

Many comments supported the project to relieve the congestion currently experienced on the highway. Building into the median was a concern, however, particularly because of safety-related issues. East and west connections across New Seward Highway were considered important to facilitating traffic flow. Several comments were received on connecting New Seward Highway to Glenn Highway.

Aesthetic issues were important to both the public and agencies. Landscaping and creating vegetative buffers were suggested.

Daylighting streams that are currently in pipes was brought up by every agency involved in the agency scoping process. Concern was also expressed for building wider bridges to allow spanning of the creek and bridges that are high enough to allow moose to cross under.

Noise was also an important issue that many residents would like to see addressed.

Overall there was much support for the project as long as the design is good and environmental and social issues are addressed.

CHAPTER 6

List of Preparers

Preparer/Role	Education	Years of Experience	Technical Expertise
CH2M HILL			
Mark Assam, A.I.C.P. Task Lead, Environmental Justice	Community Planning Certificate B.S., Biology	14	Project Management, Land Use, Environmental Planning, and Environmental Justice
Raena Ballantyne Historic and Archeological Resources	B.S. Anthropology	7	Cultural Resources
Jim Bard, Ph.D. Historic and Archeological Resources	Ph.D., Anthropology M.A., Anthropology B.A., Anthropology	30	Cultural Resources
Mike Behn, A.I.C.P Land Use, Social, Relocation, Considerations Relating to Pedestrians and Bicyclists, Coastal Zones, Energy	B.A., Planning, Public Policy, and Management	7	Land Use and Environmental Planning
Erin Cox Threatened and Endangered Species, Water Body Modification, Navigable Waters, Wild and Scenic Rivers, Water Quality Impacts, Floodplain Impacts, Joint Development, Short-Term Use/Long Term Productivity, Secondary and Cumulate	B.S., Biology M.S., Water Resources and Environmental Engineering	5	Water Resources, National Environmental Policy Act Documentation
Linda Cyra-Korsgaard Visual Resources	B.S., Landscape Architecture	21	Planning, Landscape Architecture
Marian McDermott Hazardous Waste Sites	M.S., Geochemistry, B.S., Geology	12	Hazardous Waste
Derek Doell, P.E. Water Quality; Floodplains; Wild and Scenic Rivers	M.S., Civil Engineering B.S., Civil Engineering	11	Environmental Engineering
Farshad Farhang Noise	M.B.A., Business Administration B.S., Electrical Engineering	13	Noise
Judith Griffin Technical Editing	B.A., Sociology	25	Technical Editing, Publication Management
Fred Koethke Energy	B.S. Environmental Science	27	NEPA, Environmental and Transportation Planning

Preparer/Role	Education	Years of Experience	Technical Expertise
Deborah Moore Land Use, Relocation, Social, Coastal Zones, Considerations Relating to Pedestrians and Bicyclists, Permits and Authorizations, Construction Impacts, Secondary and Cumulative	M.S.E.L., Master of Studies in Environmental Law B.S., Environmental Planning	4	Environmental Planning, Permitting
Lorie Parker Deputy Project Manager	J.D., M.A., Library Science B.A., English	25	Project Management, Environmental Review and Decision Processes, and Permitting
Dan Pitzler Economics	M.A. Economics B.A. Economics	20	Economic Analysis
Kurt Playstead Economics	B.A. Economics	6	Economic Analysis
Ed Powell Air Quality	B.S., Civil Engineering B.S., Naval Science	30	Air Quality
Dan Sterley Project Manager	B.S., Civil Engineering	29	Project Management, Transportation Engineering
Mary Beth Yansura Air Quality	B.A., Chemistry	14	Air Quality
HDR Alaska, Inc.			
Erin Cunningham Environmental Consequences: Wetlands	B.S, Earth Science/Biology	5	Biological Analyses
Amy Hansen Affected Environment: Wetlands, Water Body Modifications, Fish and Wildlife, Essential Fish Habitat, Threatened and Endangered Species, Environmental Permits	B.S., Natural Resources	3	Botany, Soil Science
Anne Leggett Lead: Wetlands, Water Body Modifications, Fish and Wildlife, Essential Fish Habitat, Threatened and Endangered Species, Environmental Permits	M.S. Plant Ecology B.A., Environmental Studies/Economics	21	Wetland Science and Regulation, NEPA and Permitting Processes, Plant Ecology
Rebecca Moore EFH Assessment; Environmental Consequences: Water Body Modification, Fish and Wildlife Impacts	B.S. Natural Resources Management	7	Fisheries
Jen Dillon Sivils Wetland Technical Report	B.A. Biology M.S. Biology (pending)	6	Wetlands, Wildlife

Preparer/Role	Education	Years of Experience	Technical Expertise
DOT&PF			
Jim Childers, P.E. Project Manager	B.S., Civil Engineering	28	Project Management
Jerry Ruehle Document Review and Preparation Supervision	B.S., Wildlife Management	25	Document Review
Susan Wick Document Review and Preparation Supervision	B.S., Environmental Science	20	Document Review
FHWA			
Edrie Vinson FHWA Guidance, Participation, and Evaluation of Environmental Document	M.S., History and Archeology	30	Project Management and Document Review

CHAPTER 7

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APPENDIX E: Bridge Design Summary

Scooter Avenue/Academy Drive Undercrossing

A new bridge will accommodate the new Scooter Avenue/Academy Drive undercrossing.

Bridge Number 2239, Scooter Avenue/Academy Drive Undercrossing, will be similar to other bridges in the corridor. It is envisioned as a single-span bridge of 145 feet, 6 inches long and 140 feet, 6 inches wide, with three lanes northbound and southbound. The new bridge is substantially wider than the adjacent structures to match the full-width highway median. One wide structure will be constructed as opposed to two narrower structures to provide flexibility for adding lanes to the highway median in the future and to mitigate snow thrown onto the undercrossing.

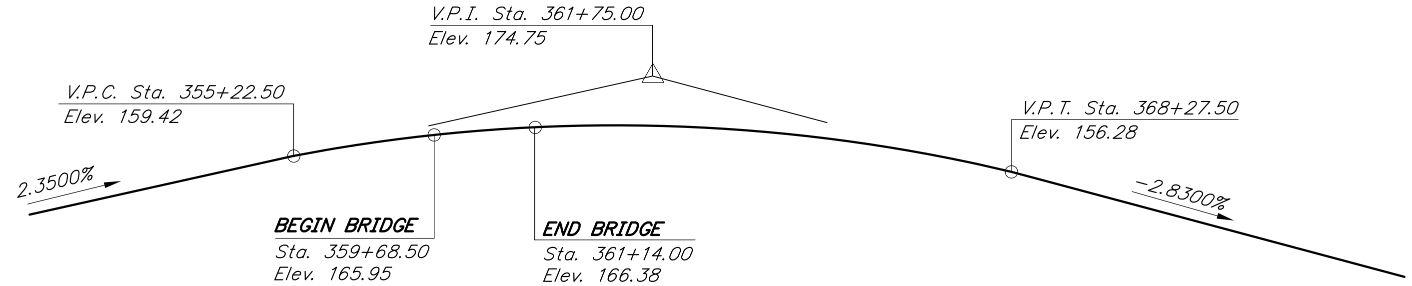
The substructure is anticipated to be spread footings located on an MSE abutment. The superstructure is proposed to consist of twenty-five 66-inch-deep, pre-stressed concrete decked bulb-tee girders overlaid with waterproofing membrane and asphalt.

The cross street is planned to have one through lane in each direction separated by a raised median, with provision for pathways on both sides.

The clearance will meet the minimum requirements (16 feet, 6 inches) per the DOT&PF HPCM.

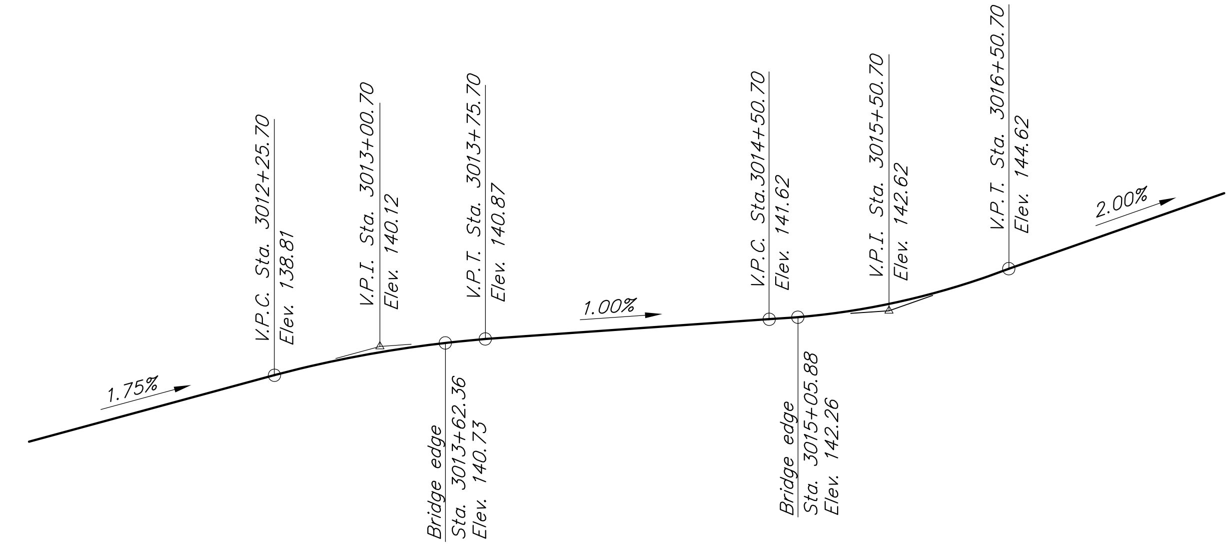
The proposed bridge will be designed in accordance with state and federal standards. Specifically, the new bridge will be designed in accordance with the most current edition of the AASHTO LRFD Bridge Design Specifications and the AASHTO Guide Specifications for LRFD Seismic Bridge Design. These documents are the national standards. They address both the demands (loads) acting on bridges and the capacities (resistance) of supporting members. The AASHTO LRFD Bridge Design Specifications are a statistical based code that accounts for the uncertainty in the loads and resistance while targeting a uniform level of risk. The current design highway loading is designated HL-93 and encompasses a wide range of commercial truck configurations used throughout the country. The national AASHTO standards are supplemented by the DOT&PF Bridges and Structures Manual that addresses design issues specific to Alaska. These state-specific requirements primarily address region construction practices, cold climate considerations, and project development. These design documents help DOT&PF to provide safe, durable and economical highway bridges.

STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
ALASKA		2018		



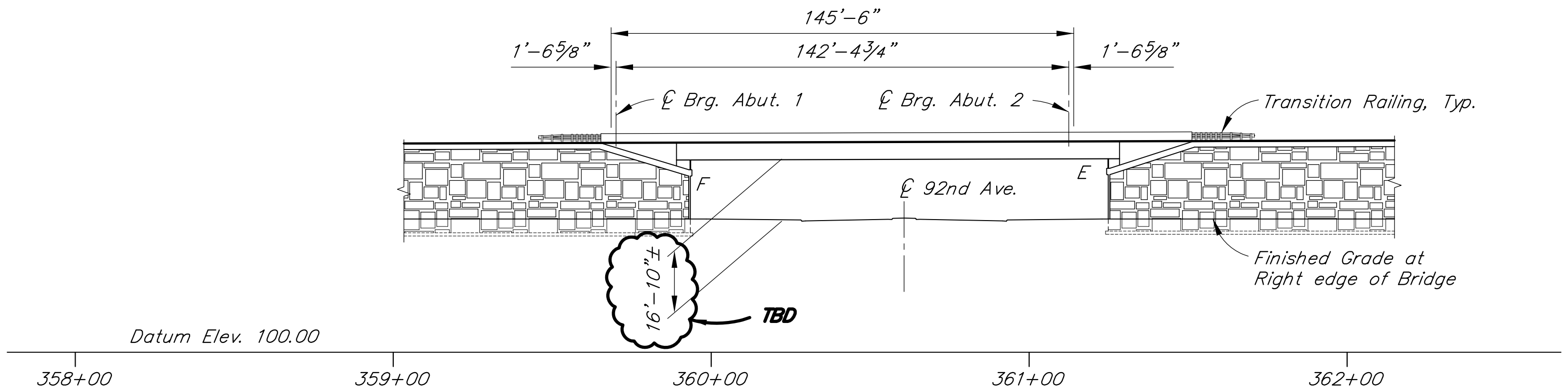
SEWARD HIGHWAY PROFILE GRADE DATA

No Scale



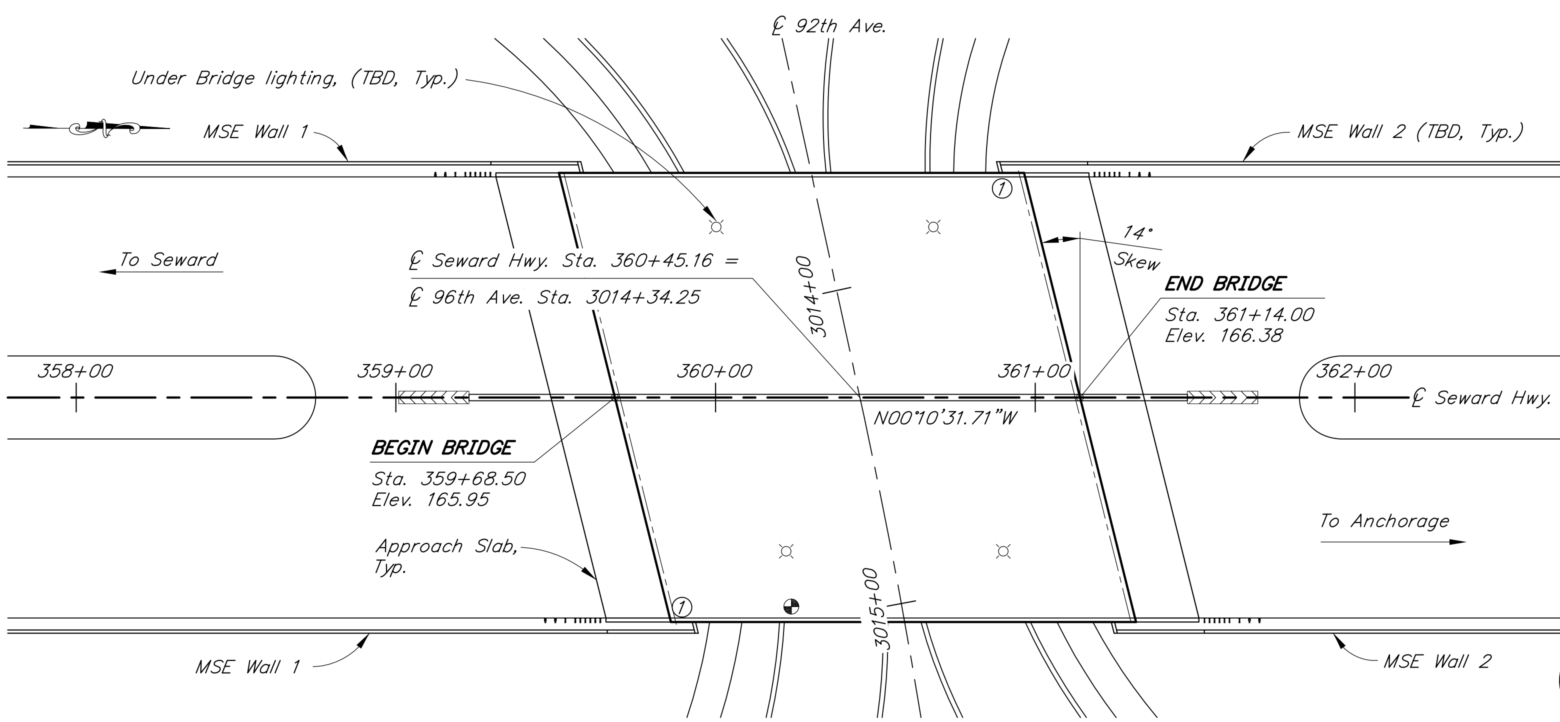
92nd AVE. PROFILE GRADE DATA

No Scale



ELEVATION

30 20 10 0 30 60
Feet



PLAN

30 20 10 0 30 60
Feet

BRIDGE DRAWING INDEX	
TITLE	DWG. NO.
GENERAL LAYOUT	1
TYPICAL SECTION	2
SITE PLAN	3
MSE WALLS	4
ABUTMENT 1	5
ABUTMENT 2	6
ABUTMENT DETAILS	7
WINGWALLS	8
TYPICAL SECTION	9
FRAMING PLAN	10
GIRDERS	11
GIRDER DETAILS	12
APPROACH SLABS	13
CABLE SAFETY RAIL	14
CONCRETE BRIDGE BARRIER	15
THRIE BEAM TRANSITION	16
TEST HOLE LOGS AND LOCATIONS	17-

TBD

92nd CURVE DATA:

PI =
Δ =
D =
T =
L = 667.3827'
R = 1800'

PRELIMINARY PLAN

① – Approximate location of Bridge Number Plate.

◐ = Low Clearance

DESIGNED BY: Elmer Marx	CHECKED: Checker	LAYOUT BY: Elmer Marx	CHECKED BY: Checker		
DRAWN BY: Sam Sollie	CHECKED: Elmer Marx	SPECIFICATIONS BY: Elmer Marx	P S & E COMPARED: Checker		
QUANTITIES BY: Elmer Marx	CHECKED: Checker	APPROVAL RECOMMENDED BY: Rich Pratt			

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES
BRIDGE SECTION
3132 Channel Drive
Juneau, Alaska 99801
907-465-2975

92nd AVENUE OVERCROSSING

SEWARD HIGHWAY

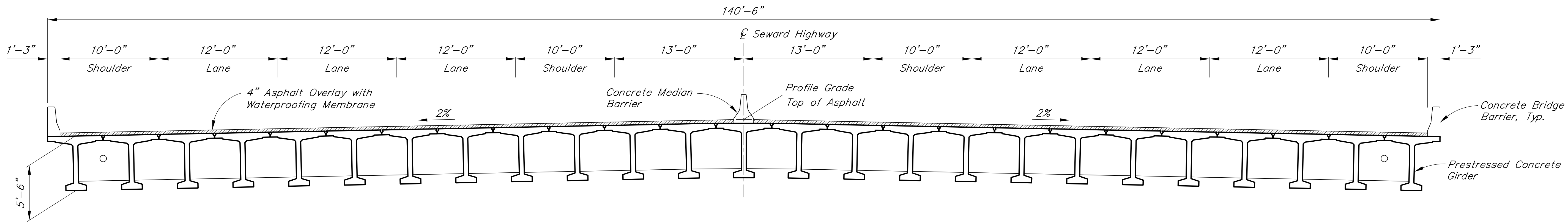
GENERAL LAYOUT

BRIDGE NO. 2239

DWG. NO. 1

R:\cad\2239\2239-GENERAL LAYOUT Mon. Jun/05/17 11:24am

STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
ALASKA		2018		



TYPICAL SECTION

12 0 5 10
In. Feet

R:\cad\2239\2239–TYPICAL Mon, Jun/05/17 11:24am

DESIGNED BY: Elmer Marx	CHECKED: Checker
DRAWN BY: Sam Sollie	CHECKED: Elmer Marx
QUANTITIES BY: Elmer Marx	CHECKED: Checker

PRELIMINARY PLAN

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES
BRIDGE SECTION
3132 Channel Drive
Juneau, Alaska 99801
907–465–2975

92nd AVENUE OVERCROSSING

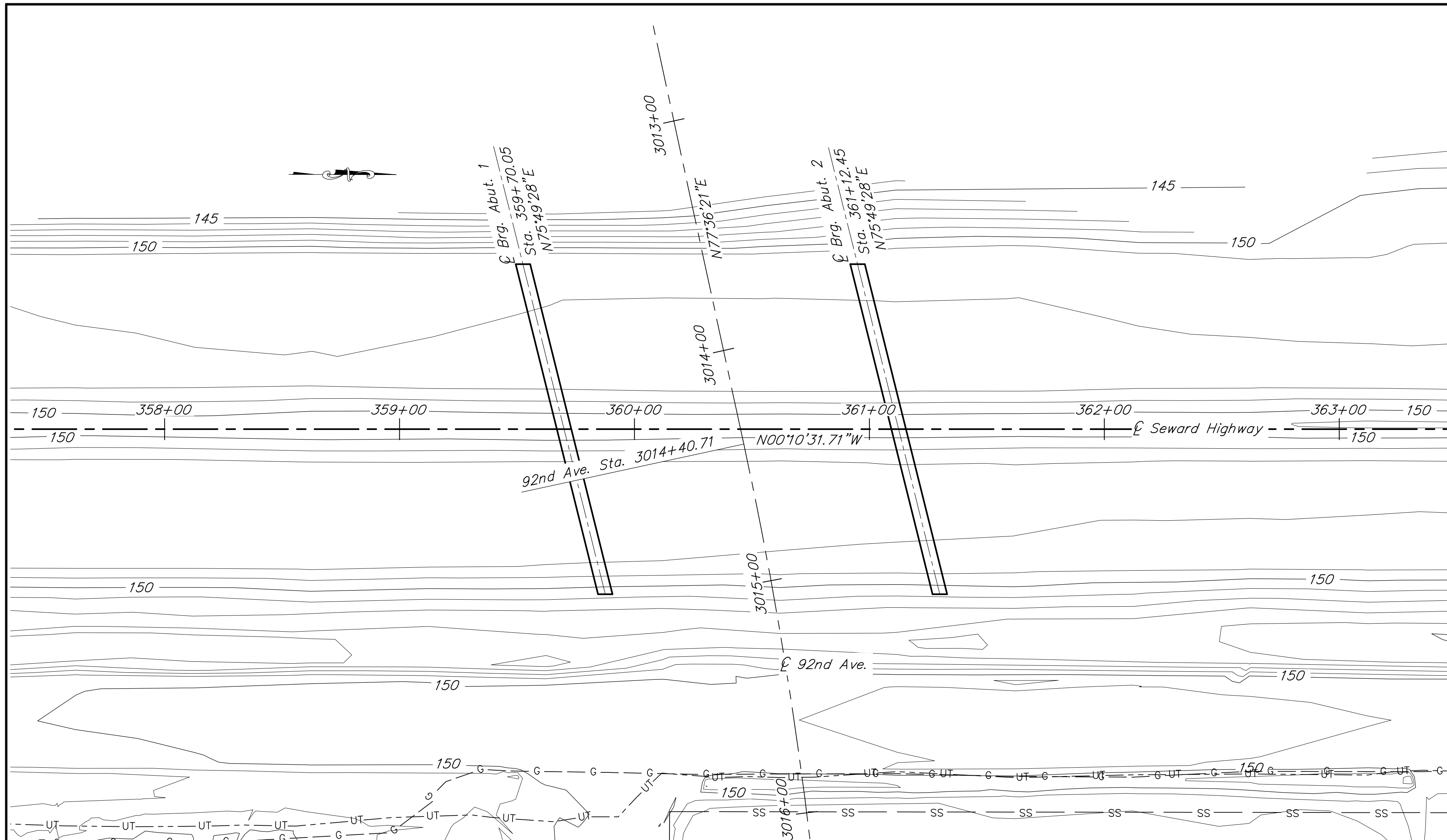
SEWARD HIGHWAY

TYPICAL SECTION

BRIDGE NO. 2239

DWG. NO. 2

STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
ALASKA		2018		



SITE PLAN

30 20 10 0 30 60
Feet

GENERAL NOTES

DESIGN: AASHTO LRFD Bridge Design Specifications, 2014 Edition, with latest interim specifications.

Seismic design per AASHTO Guide Specifications for LRFD Seismic Bridge Design, 2011 with latest interim revisions.

LIVE LOAD: HL-93

DEAD LOAD: Includes 50 psf for all wearing surfaces.

SEISMIC PARAMETERS:
PGA = 0.54
Ss = 1.18
S_1 = 0.46
Site Class = D
Liquefaction Potential = Low
AASHTO 7% probability of exceedance in 75 years.

REINFORCEMENT: ASTM A706, Grade 60, Fy = 60,000 psi
ASTM A970 Headed bars, Class HA.
Space reinforcement evenly unless otherwise noted.

PRESTRESSED CONCRETE: See "GIRDERS" Dwg.

CONCRETE: Class A Concrete unless otherwise noted, f'c = 4000 psi

STRUCTURAL STEEL: ASTM A709, Grade 36T3, Fy = 36,000 psi
Galvanize structural steel in accordance with AASHTO M111 unless shown otherwise.

FOOTING PRESSURE TABLE

LOCATION	STRENGTH I FACTORED LOAD (KSF)	NOMINAL BEARING RESISTANCE (KSF)	BEARING RESISTANCE FACTOR, φ
Abutment 1			
Abutment 2			

BRIDGE BASIS OF ESTIMATE

ITEM NO.	ITEM	PAY UNIT	ESTIMATING UNIT	SUBST.	SUPERST.	TOTAL
205(6)	Structural Fill	CY	CY			
501(1)	Class A Concrete	LS	CY			
501(7)	Precast Concrete Member (144'x66" Decked Bulb-Tee)	EA	EA			
503(1)	Reinforcing Steel	LS	LBS			
503(2)	Epoxy-Coated Reinforcing Steel	LS	LBS			
507(4)	Concrete Barrier	LF	LF			
507(6)	Cable Safety Railing	LF	LF			
508(1)	Waterproofing Membrane	LS	SY			
511(1)	Mechanically Stabilized Earth Wall	SF	SF			
606(16)	Transition Rail	EA	EA			

Item numbers are for reference only. Quantities shown are not necessarily the pay quantities nor the total quantity of the particular item.

PRELIMINARY PLAN

ABBREVIATIONS:

℄	= centerline	f'c	= specified concrete compressive strength
℘	= plate	Fy	= yield stress
&	= and	Glav.	= galvanize
@	= at	H.S.	= high strength
ø	= diameter	Hwy.	= highway
±	= approximate	ksf	= 1000 pounds per square foot
AASHTO	= American Association of State Highway and Transportation Officials	LB	= pound
		LF	= linear foot
ASTM	= American Society for Testing and Materials	LS	= lump sum
		Lt.	= left
Abut.	= abutment	max.	= maximum
Approx.	= approximate	min.	= minimum
b.f.	= back/dirt face	n.f.	= near face
bot.	= bottom	No.	= number
Br.	= bridge	o.c.	= on center
btwn.	= between	O.H.W.	= ordinary high water
Brg.	= Bearings	pcf	= pounds per cubic foot
C.I.P.	= cast in place	psf	= pounds per square foot
Clr.	= clear, clearance	psi	= pounds per square inch
CY	= cubic yard	PVC	= point of vertical curve
dia.	= diameter	PVI	= point of vertical intersection
Dwg.	= drawing	PVT	= point of vertical tangent
E	= expansion	R.O.W.	= right of way
(E)	= existing	Rt.	= right
EA	= each	Rd.	= road
Elev.	= elevation	spc.	= space, spaces
e.f.	= each face	Sta.	= station
e.w.	= each way	SF	= square feet
F	= fixed	Symm.	= symmetric
f.f.	= front/air face	Typ.	= typical
		w/	= with

R:\cad\2239\2239-SITE PLAN Mon, Jun/05/17 11:24am

DESIGNED BY: Elmer Marx	CHECKED: Checker	HYDRAULICS BY: Engineer	CHECKED BY: Engineer
DRAWN BY: Sam Sollie	CHECKED: Elmer Marx	FOUNDATIONS REVIEWED BY: Engineer	
QUANTITIES BY: Elmer Marx	CHECKED: Checker		

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES
BRIDGE SECTION
3132 Channel Drive
Juneau, Alaska 99801
907-465-2975

92nd AVENUE OVERCROSSING
SEWARD HIGHWAY
SITE PLAN

BRIDGE NO. 2239
DWG. NO. 3

APPENDIX F: Design Memos

This section is not applicable to this project.

APPENDIX G: Plans & Profiles

DESIGNED BY	CHECKED BY	DRAFTED BY

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DATE	TIME
4/18/2022	8:54 AM

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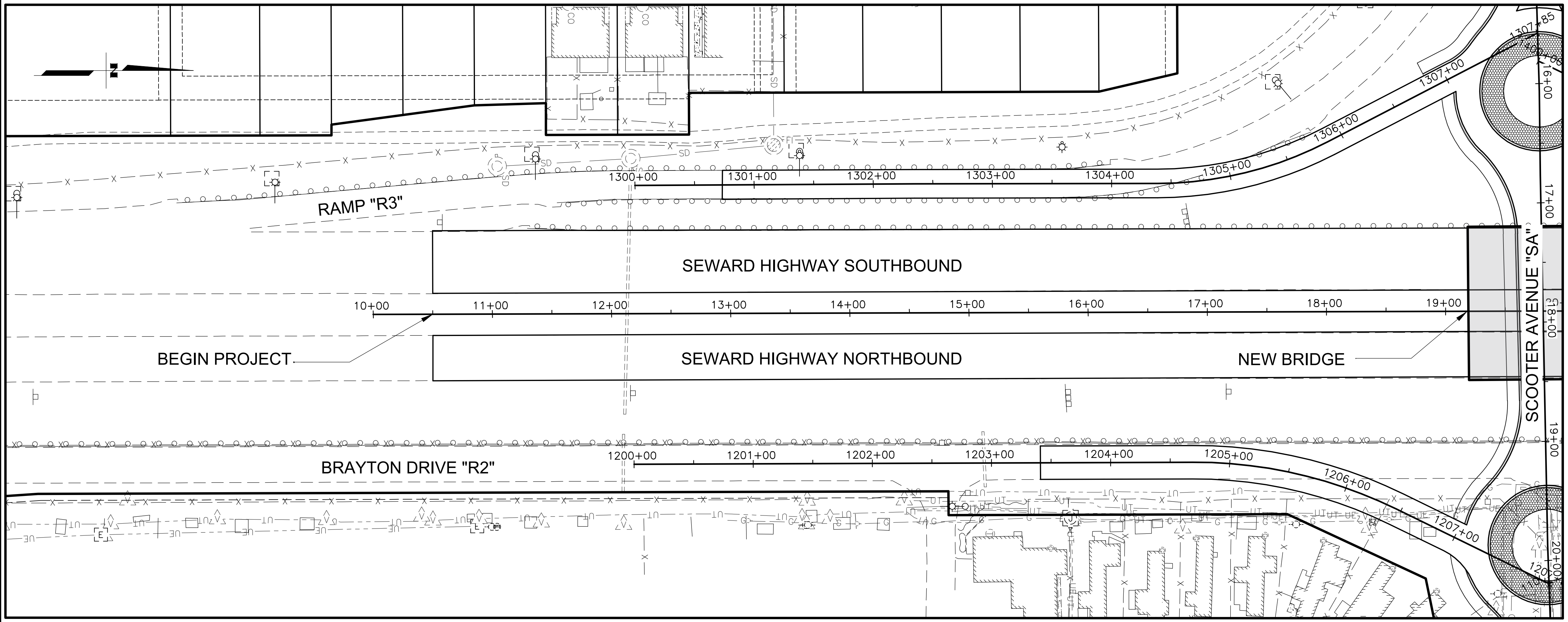

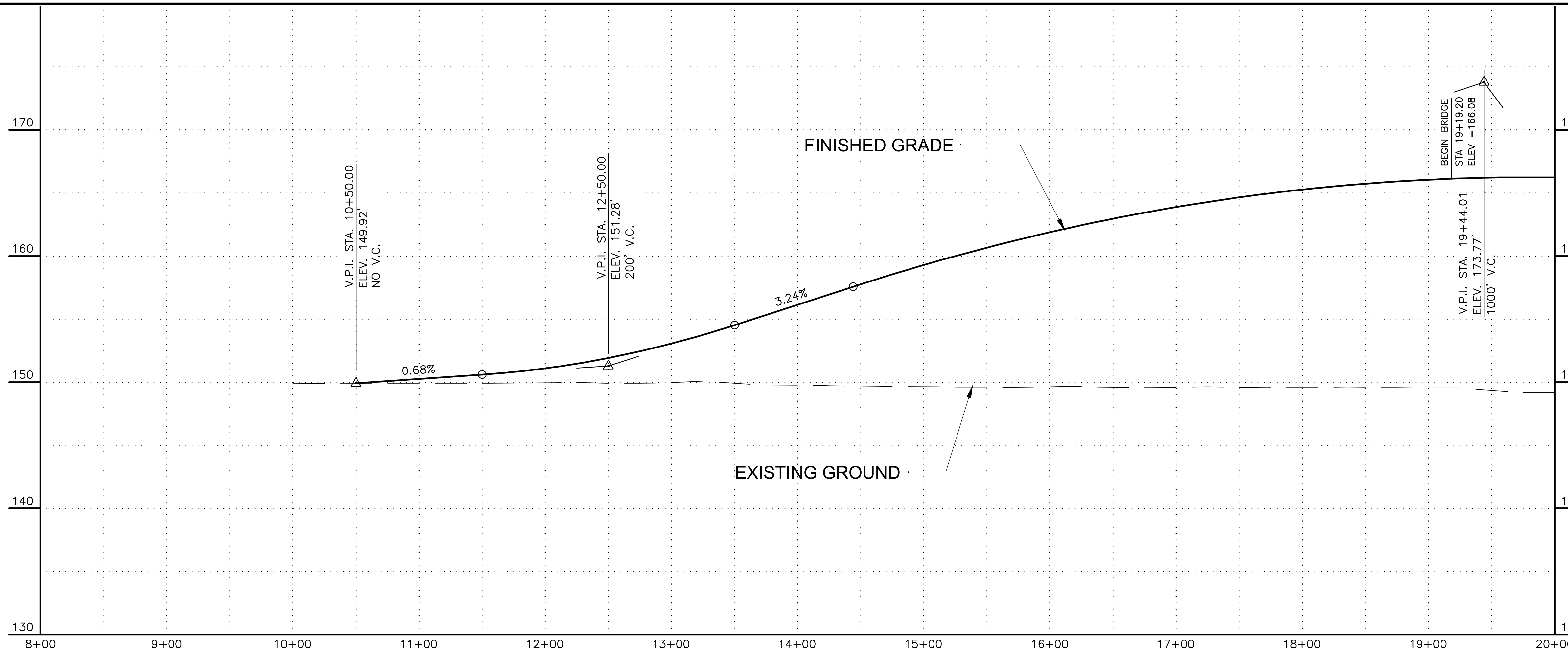

SHEET NO.	TOTAL SHEETS
F01	F08

STATE	YEAR
ALASKA	2022

PROJECT DESIGNATION

CED 2022.04

NO.	REVISION
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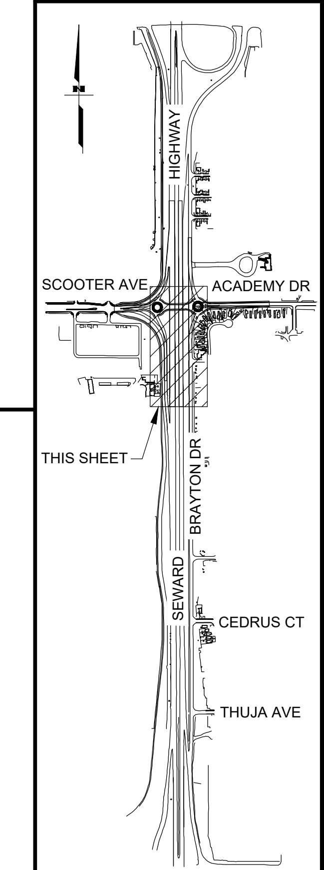
NO.	REVISION
DATE	
NO.	REVISION
DATE	



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STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND PUBLIC FACILITIES

SEWARD HIGHWAY SCOOTER AVENUE TO ACADEMY DRIVE

SEWARD HIGHWAY "SH"
PLAN AND PROFILE
STA 10+00 TO
STA 20+00

SHEET NO.	TOTAL SHEETS
F02	F08
STATE	YEAR
ALASKA	2022

PROJECT DESIGNATION

CED 2022.04

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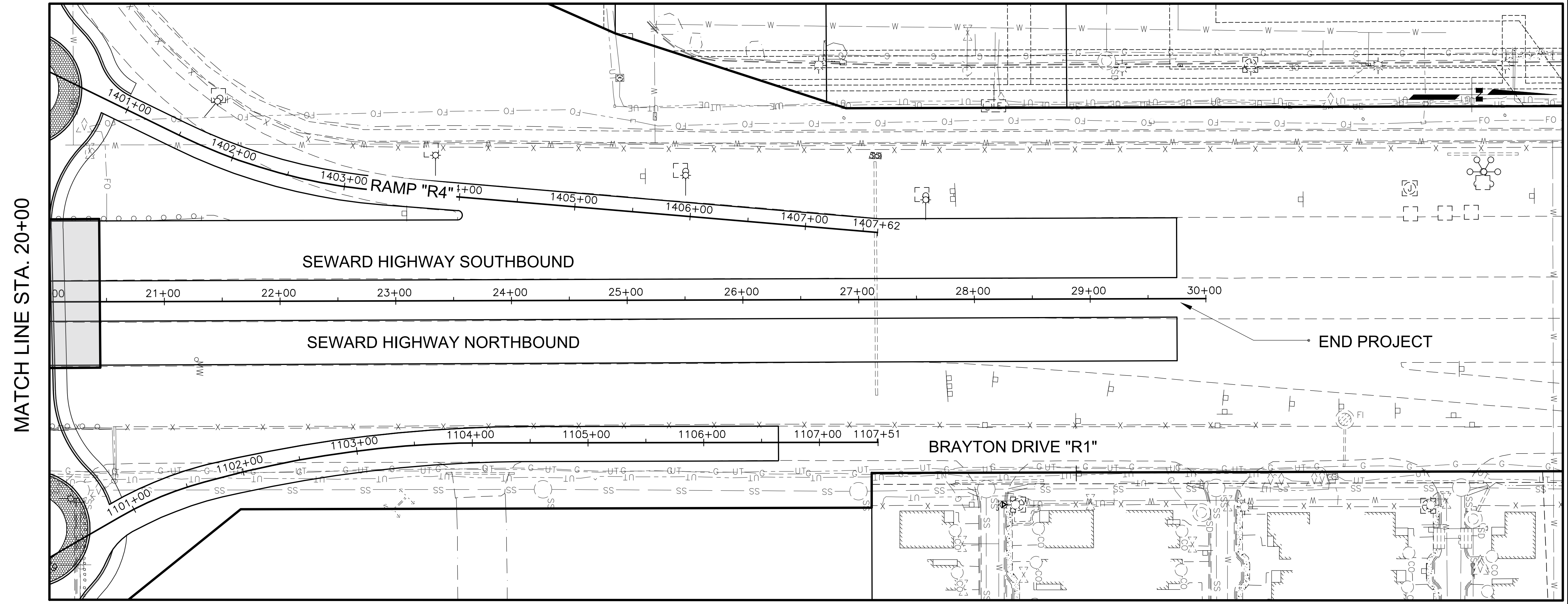

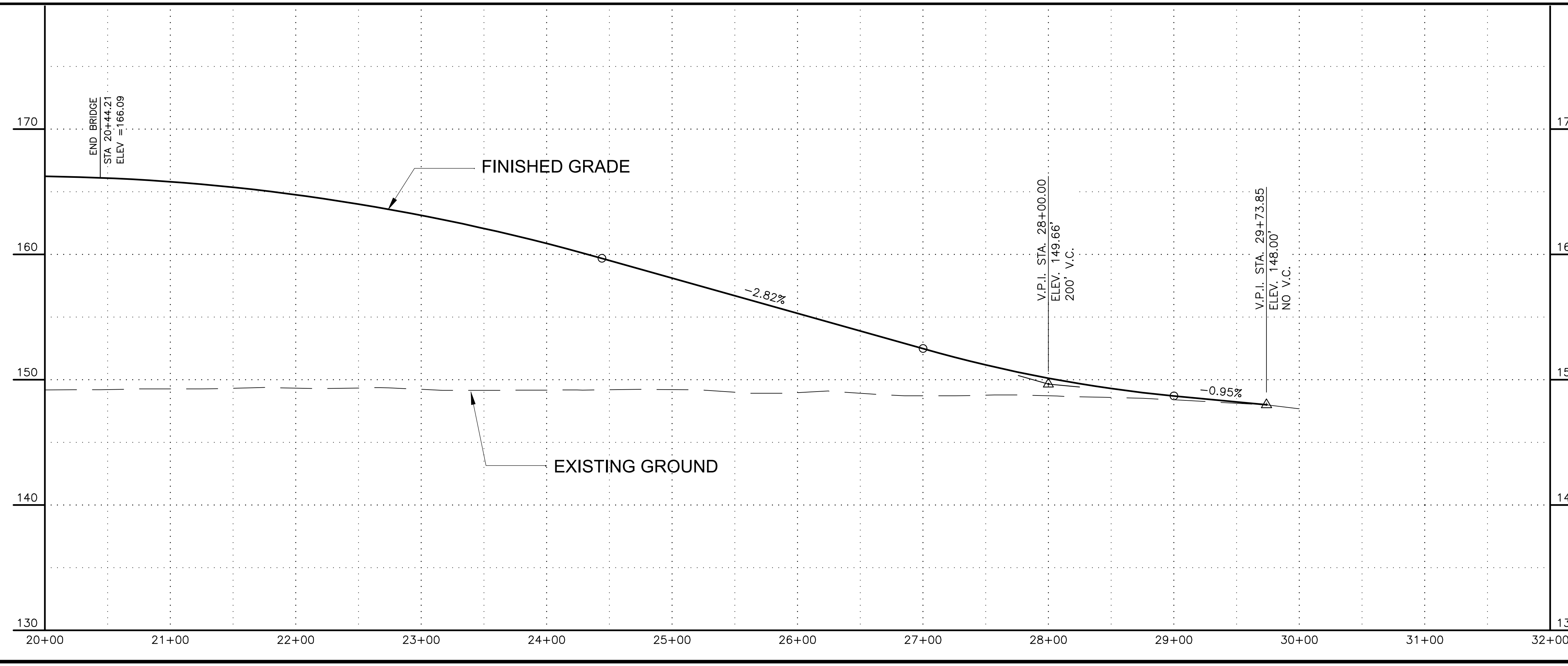

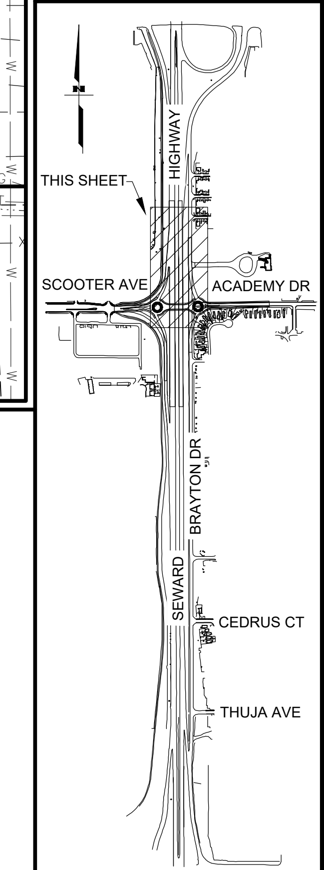

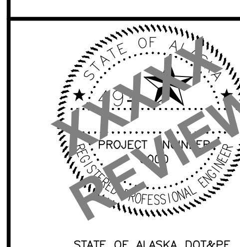

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SEWARD HIGHWAY SCOOTER AVENUE TO ACADEMY DRIVE

SEWARD HIGHWAY "SH"
PLAN AND PROFILE
STA 20+00 TO
STA 30+00

DESIGNED BY	CHECKED BY	DRAFTED BY
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SHEET NO.	TOTAL SHEETS
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STATE	YEAR
ALASKA	2022

PROJECT DESIGNATION

CED 2022.04

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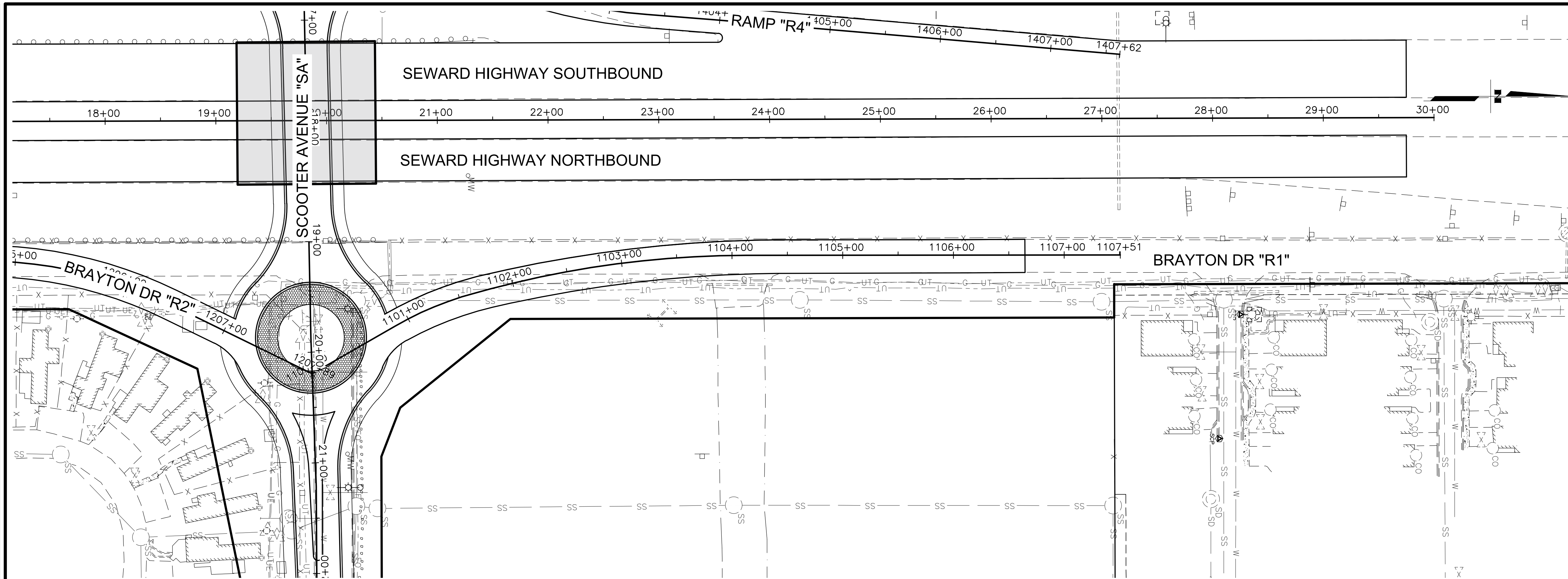
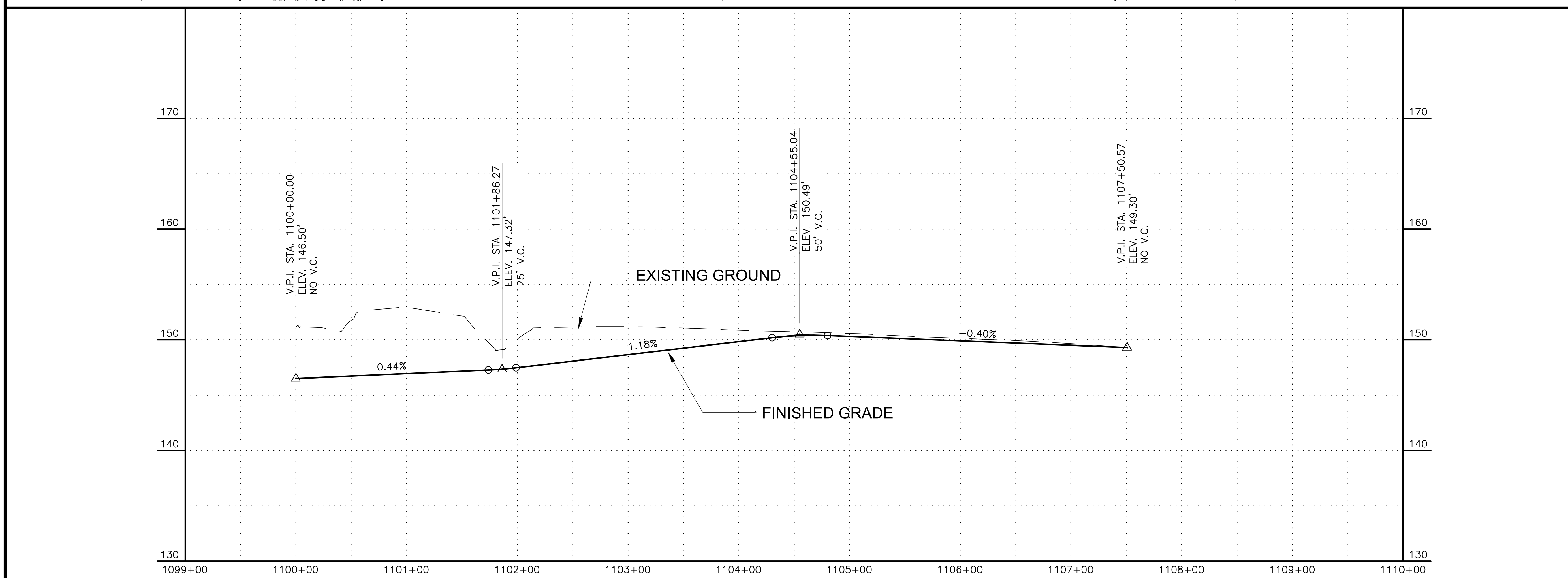
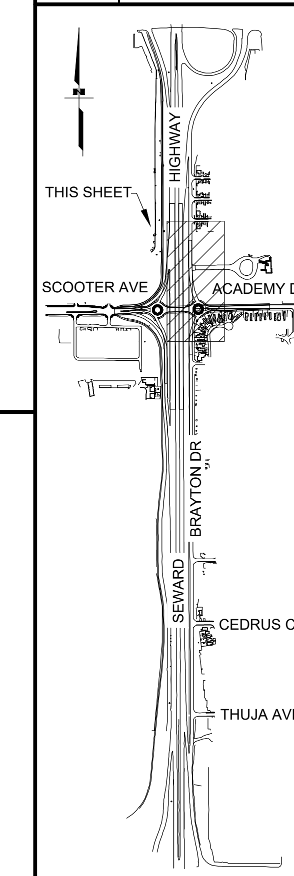
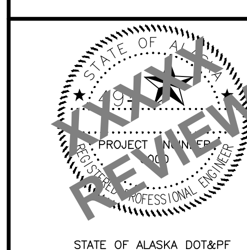
DATE	









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SEWARD HIGHWAY SCOOTER AVENUE TO ACADEMY DRIVE

BRAYTON DRIVE "R1" PLAN AND PROFILE STA 1100+00 TO STA 1107+50

DESIGNED BY
CHECKED BY
DRAFTED BY

SCALE
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DATE 4/18/2022
TIME 8:55 AM

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DESIGNED BY
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DRAFTED BY

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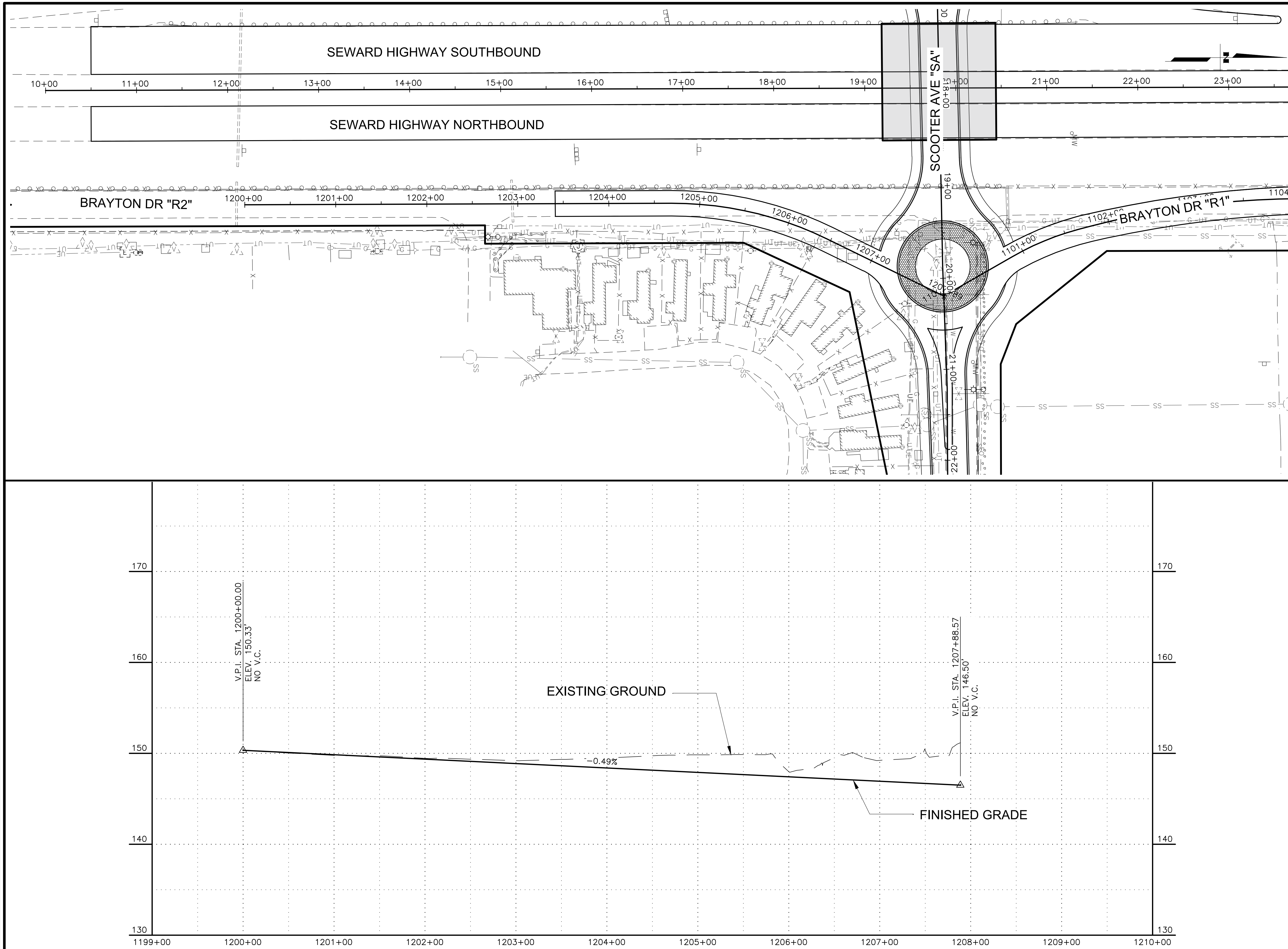

SHEET NO.	TOTAL SHEETS
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STATE	YEAR
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PROJECT DESIGNATION

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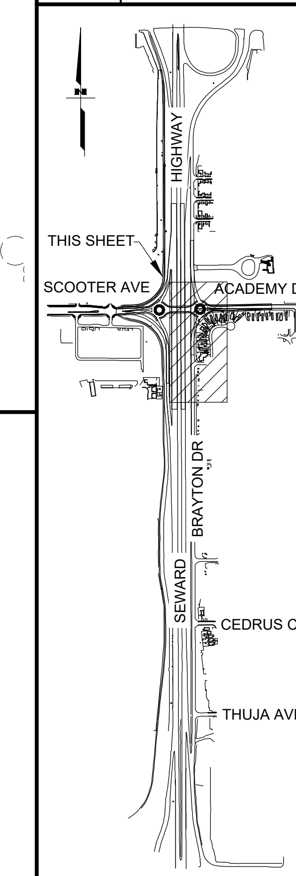

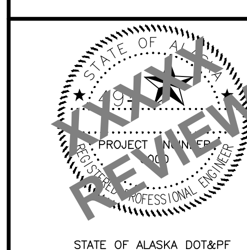

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SEWARD HIGHWAY SCOOTER AVENUE TO ACADEMY DRIVE

BRAYTON DRIVE "R2" PLAN AND PROFILE STA 1200+00 TO STA 1207+88

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CHECKED BY
DRAFTED BY

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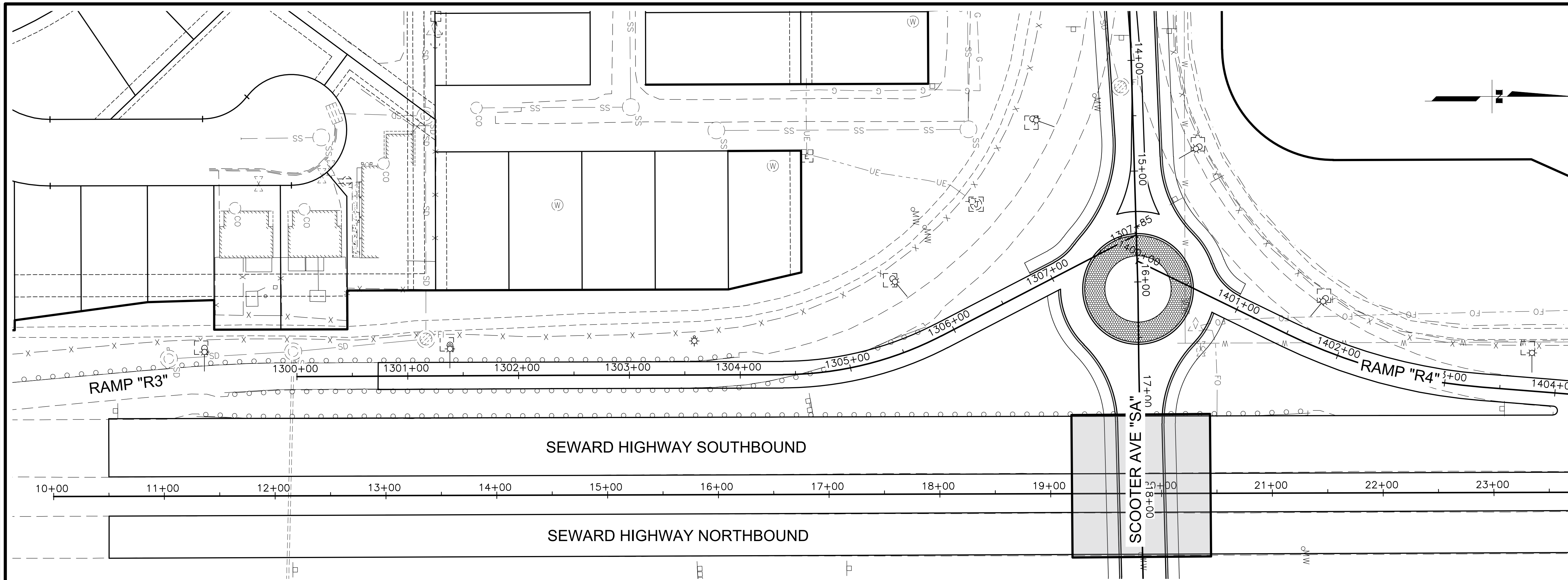

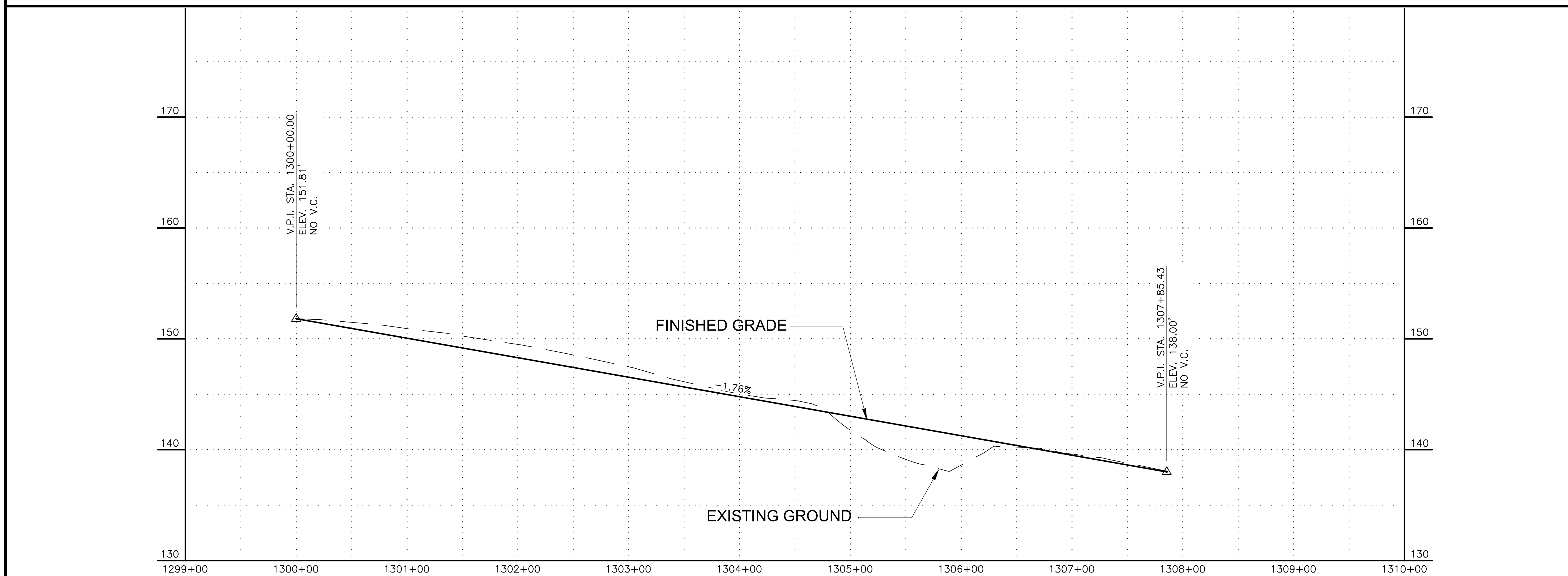

SHEET NO.	TOTAL SHEETS
F05	F08
STATE	YEAR
ALASKA	2022

PROJECT DESIGNATION

CED 2022.04

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NO.	REVISION
DATE	
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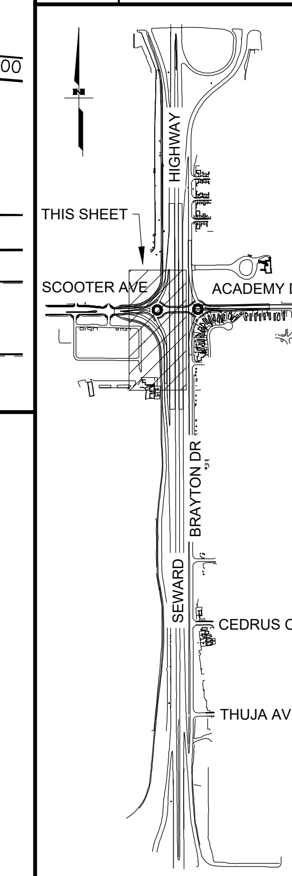
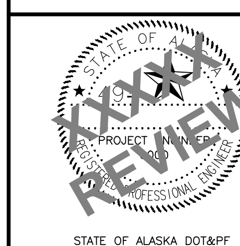
DATE	





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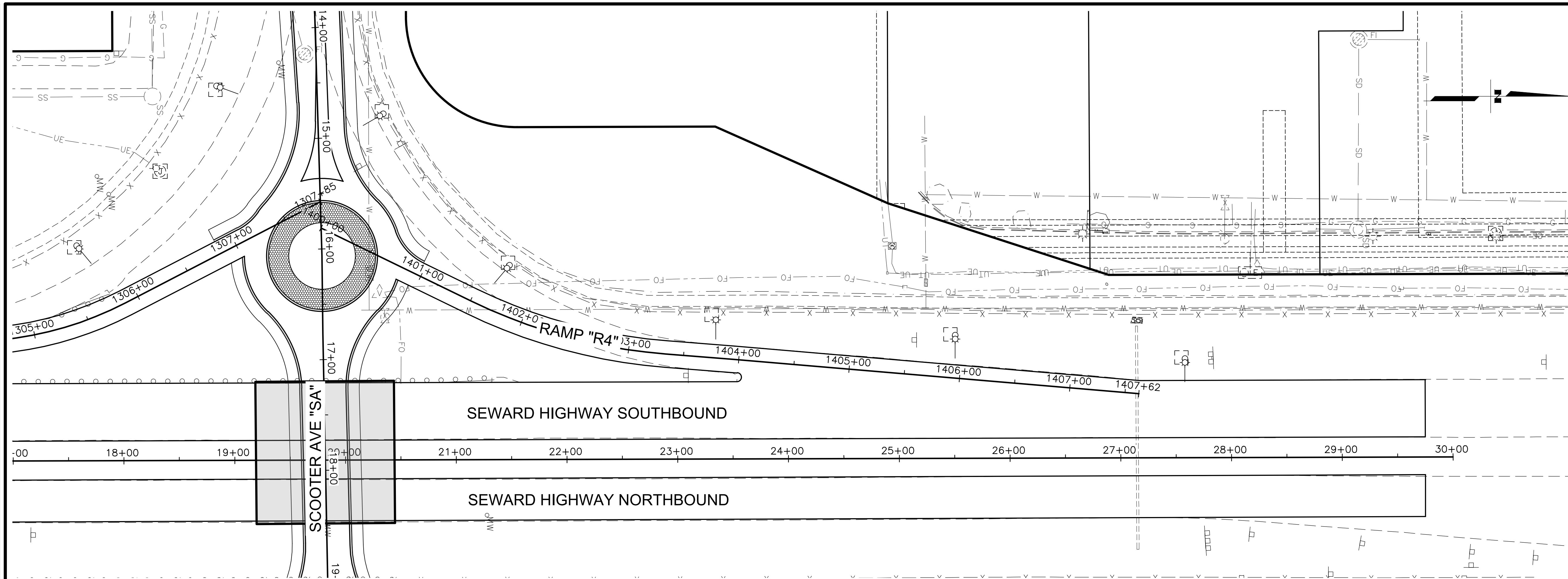
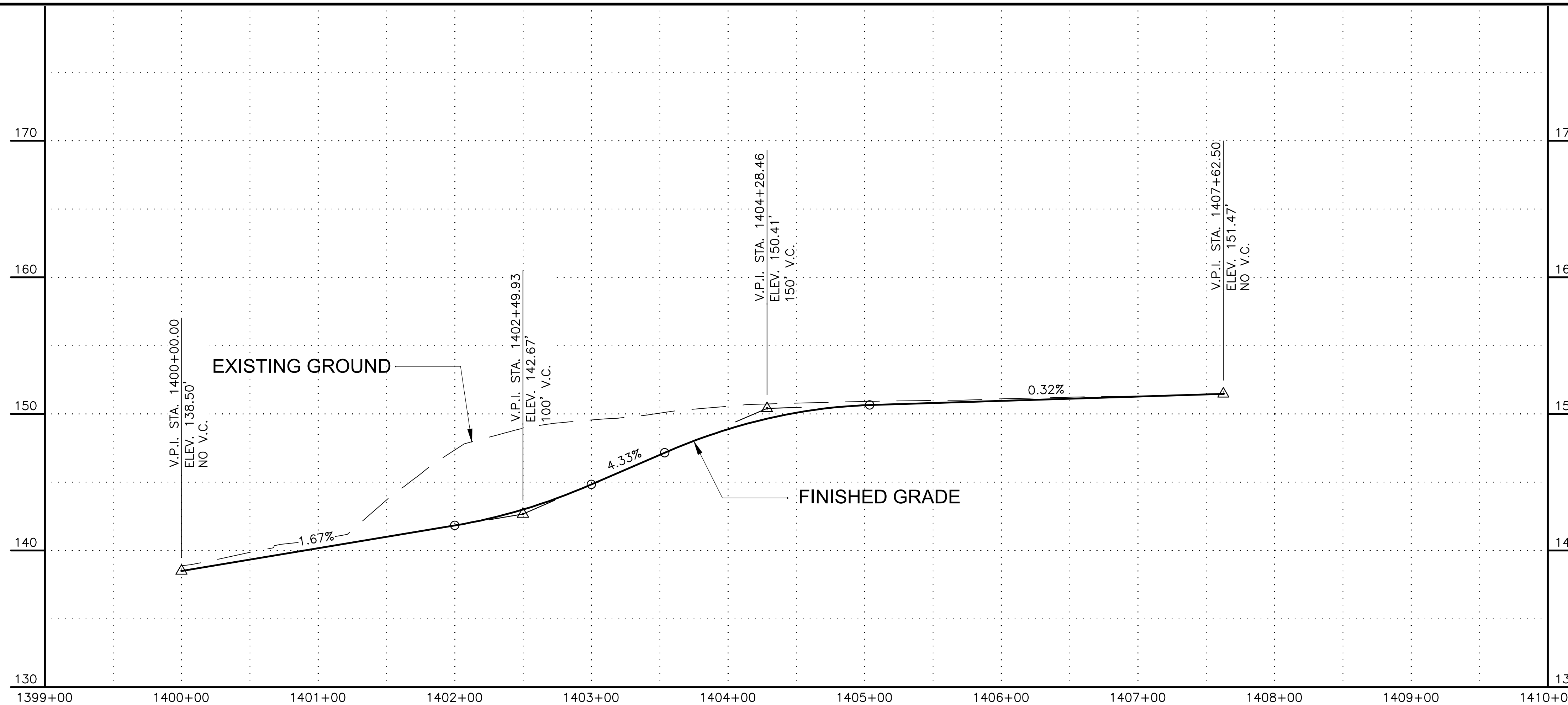
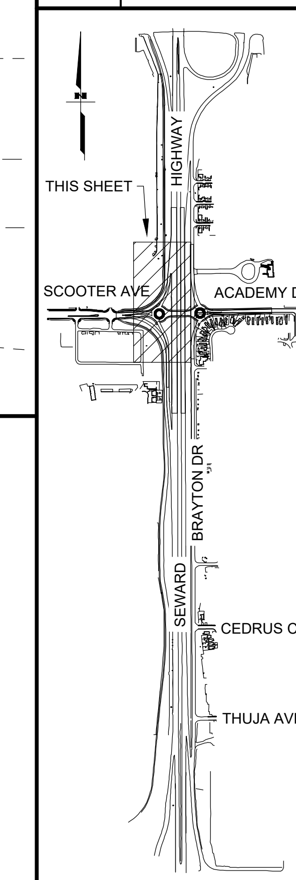
DEPARTMENT OF TRANSPORTATION
AND PUBLIC FACILITIES

SEWARD HIGHWAY SCOOTER
AVENUE TO ACADEMY DRIVE

RAMP "R3"
PLAN AND PROFILE
STA 1300+00 TO
STA 1307+85







SHEET NO.	TOTAL SHEETS
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STATE	YEAR
ALASKA	2022

PROJECT DESIGNATION

CED 2022.04

NO.	REVISION
DATE	
NO.	REVISION
DATE	
NO.	REVISION
DATE	

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STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
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SEWARD HIGHWAY SCOOTER AVENUE TO ACADEMY DRIVE

RAMP "R4"
PLAN AND PROFILE
STA 1400+00 TO
STA 1407+62

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F07	F08
STATE	YEAR
ALASKA	2022

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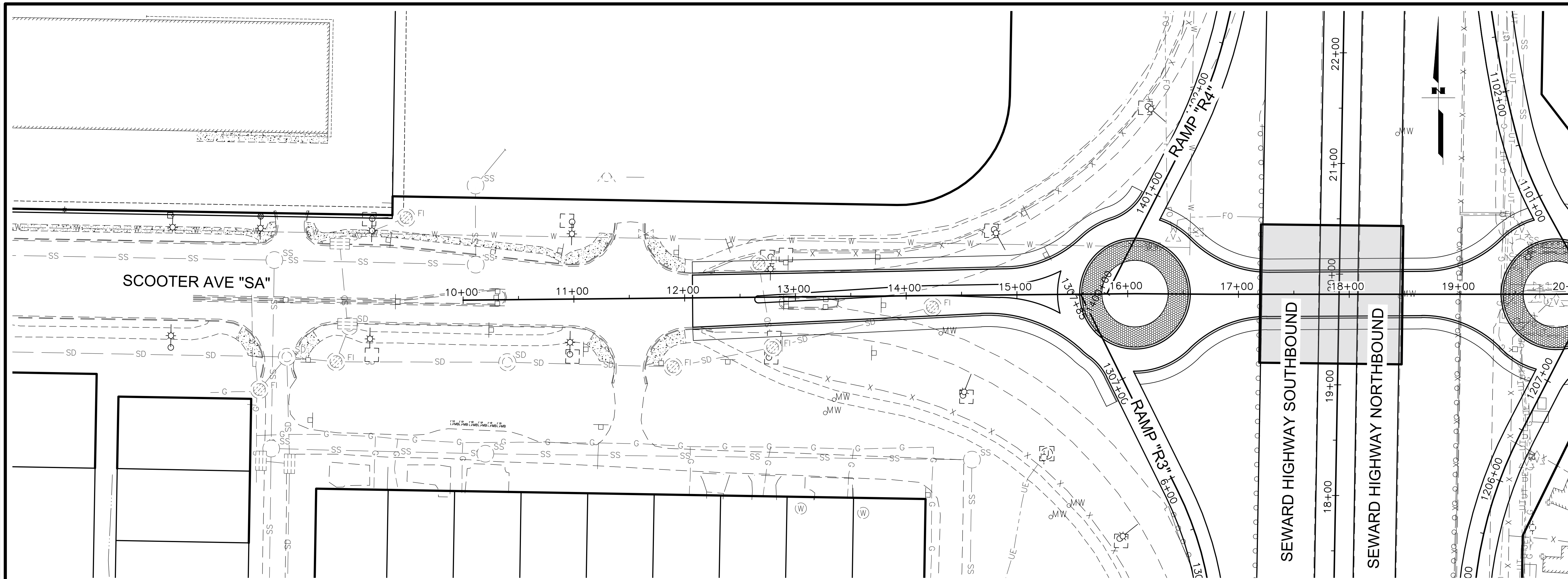

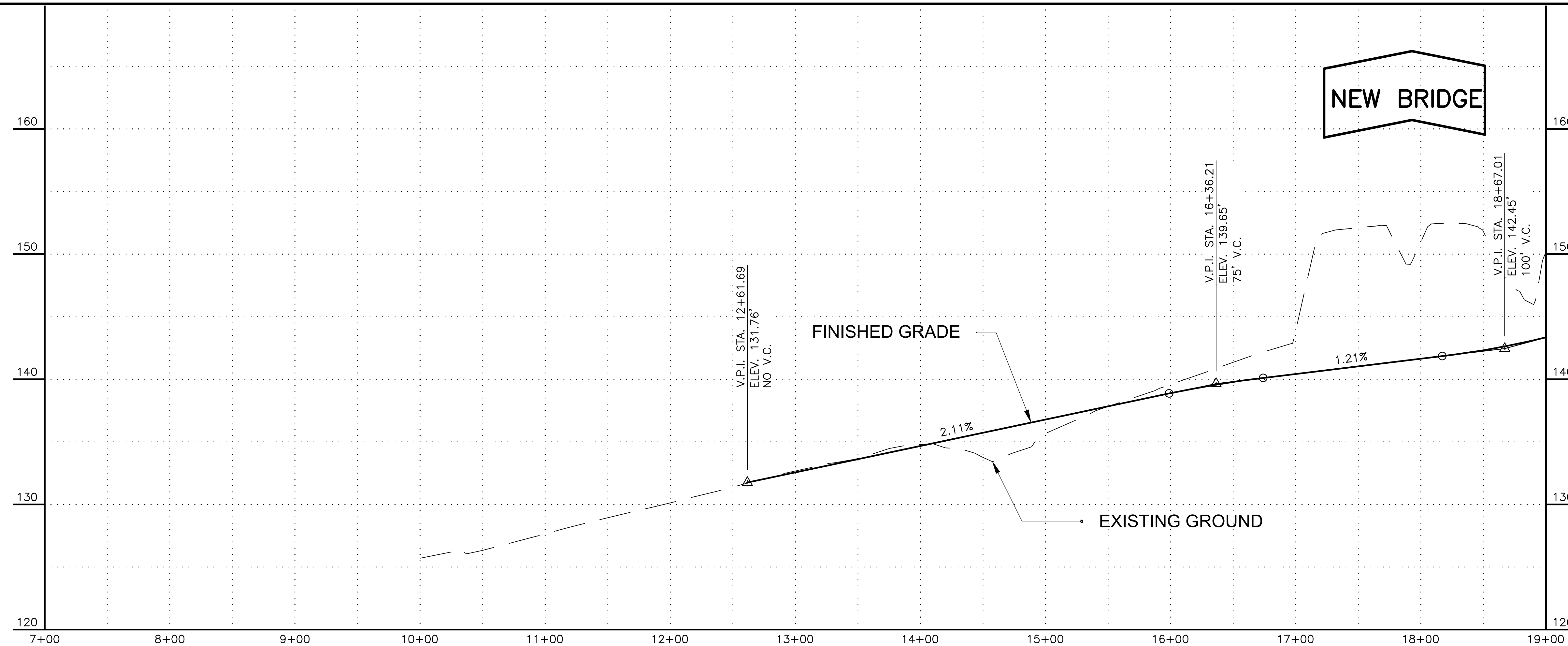

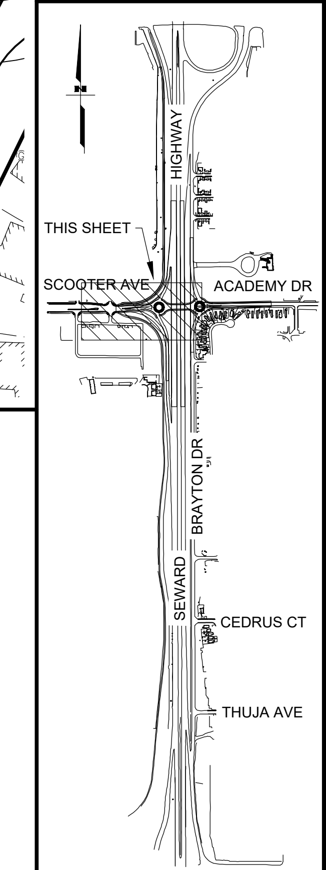

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DEPARTMENT OF TRANSPORTATION
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SEWARD HIGHWAY SCOOTER AVENUE TO ACADEMY DRIVE

SCOOTER AVENUE "SA"
PLAN AND PROFILE
STA 12+61 TO
STA 19+00

DESIGNED BY	--
CHECKED BY	--
DRAFTED BY	--
SCALE	X" = XX'
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TIME	8:59 AM

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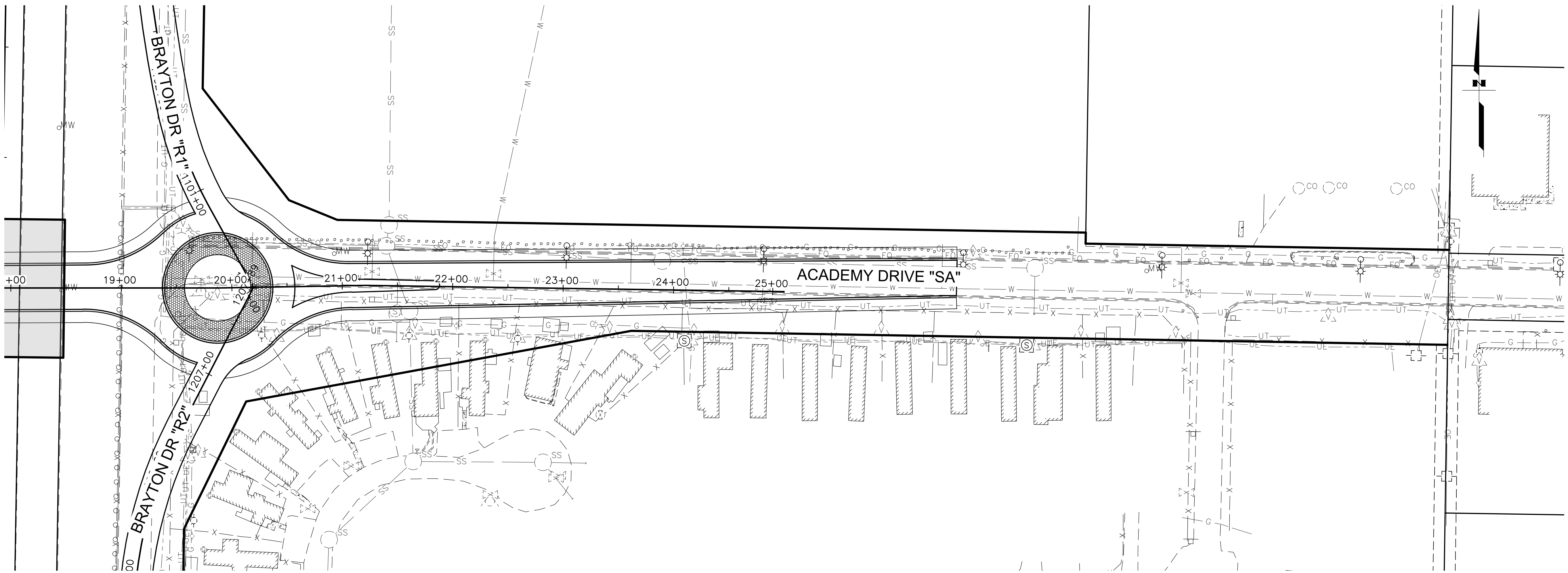

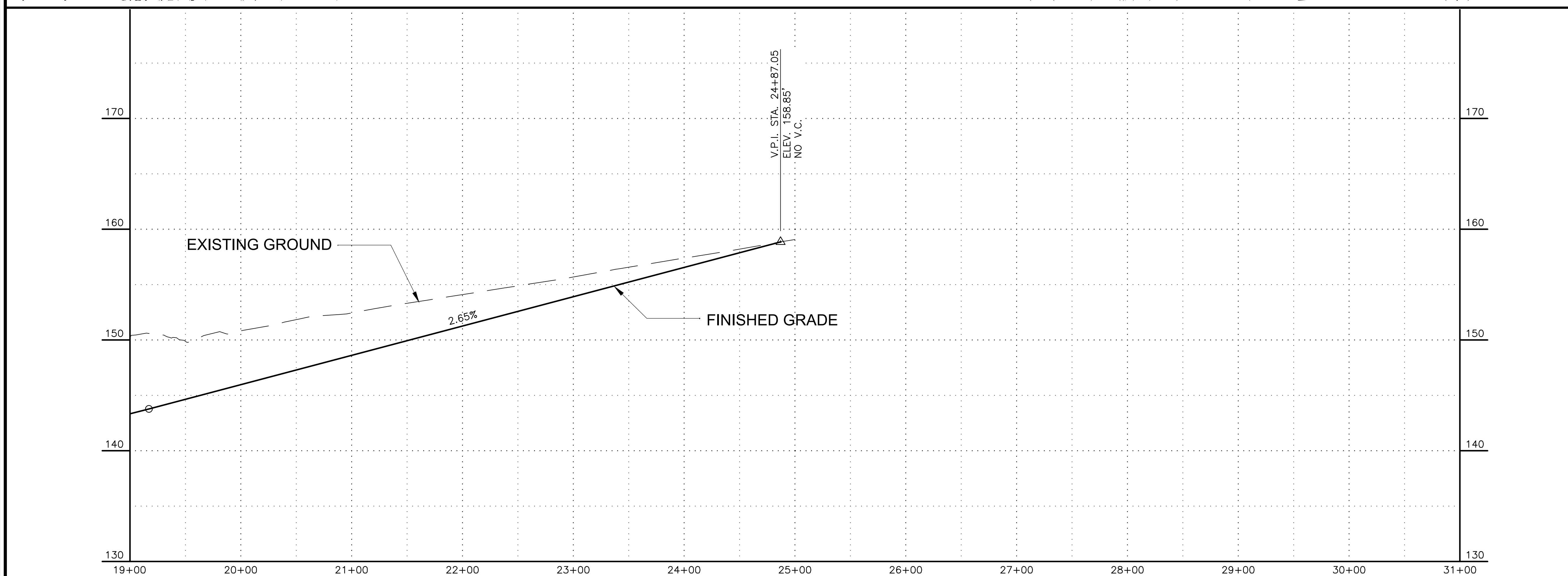

SHEET NO.	TOTAL SHEETS
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STATE	YEAR
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PROJECT DESIGNATION

CED 2022.04

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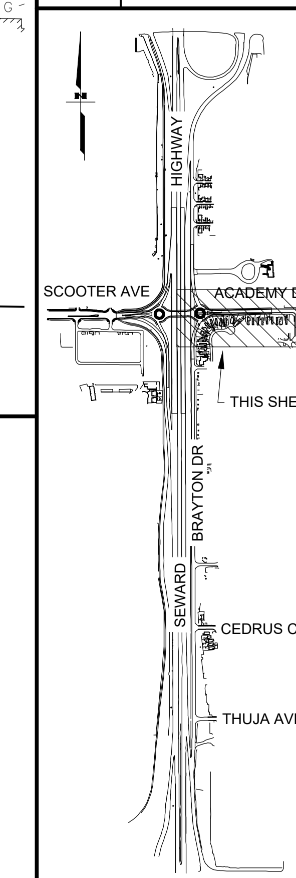

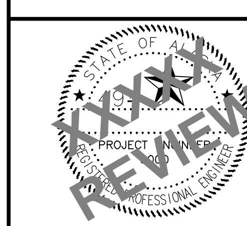

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STATE OF ALASKA
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SEWARD HIGHWAY SCOOTER
AVENUE TO ACADEMY DRIVE

SCOOTER AVENUE "SA"
PLAN AND PROFILE
STA 19+00 TO
STA 24+87