

SEWARD HIGHWAY AND SCOOTER AVENUE/ACADEMY DRIVE ROUNDABOUT INTERCHANGE

Project No.: UAA CED 2022.04

DESIGN STUDY REPORT

**ALASKA
DEPARTMENT OF TRANSPORTATION
AND PUBLIC FACILITIES**

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April 2022

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DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES
DESIGN AND ENGINEERING SERVICES – CENTRAL REGION

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For

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LIST OF ACRONYMS

AADT	Annual Average Daily Traffic
AASHTO	American Association of State Highway and Transportation Officials
AHDM	Alaska Highway Drainage Manual
ANSI	American National Standards Institute
APDES	Alaska Pollutant Discharge Elimination System
ATM	Alaska Traffic Manual
ATMS	Alaska Traffic Manual Supplement
BMP	Best Management Practice
DOT	U.S. Department of Transportation
DOT&PF	Alaska Department of Transportation and Public Facilities
DOJ	U.S. Department of Justice
ESCP	Erosion and Sediment Control Plan
FHWA	Federal Highway Administration
FONSI	Finding of No Significant Impact
HMA	Hot Mix Asphalt
HPCM	Alaska Highway Preconstruction Manual
HMCP	Hazardous Material Control Plan
IES	Illuminating Engineering Society
LOS	Level of Service
MOA	Municipality of Anchorage
MPH	Miles per Hour
MS4	Municipal Separate Storm Sewer Systems
MUTCD	Manual on Uniform Traffic Control Devices
PGDHS	A Policy on Geometric Design of Highways and Streets
PIP	Public Information Plan
PROWAG	Proposed Accessibility Standards for Pedestrian Facilities in the Public Right-of-Way
RDG	Roadside Design Guide
ROW	Right-of-Way
SOA	State of Alaska
SWPPP	Storm Water Pollution Prevention Plan
TMP	Traffic Management Plan
TOP	Transportation Operations Plan
TRB	Transportation Research Board

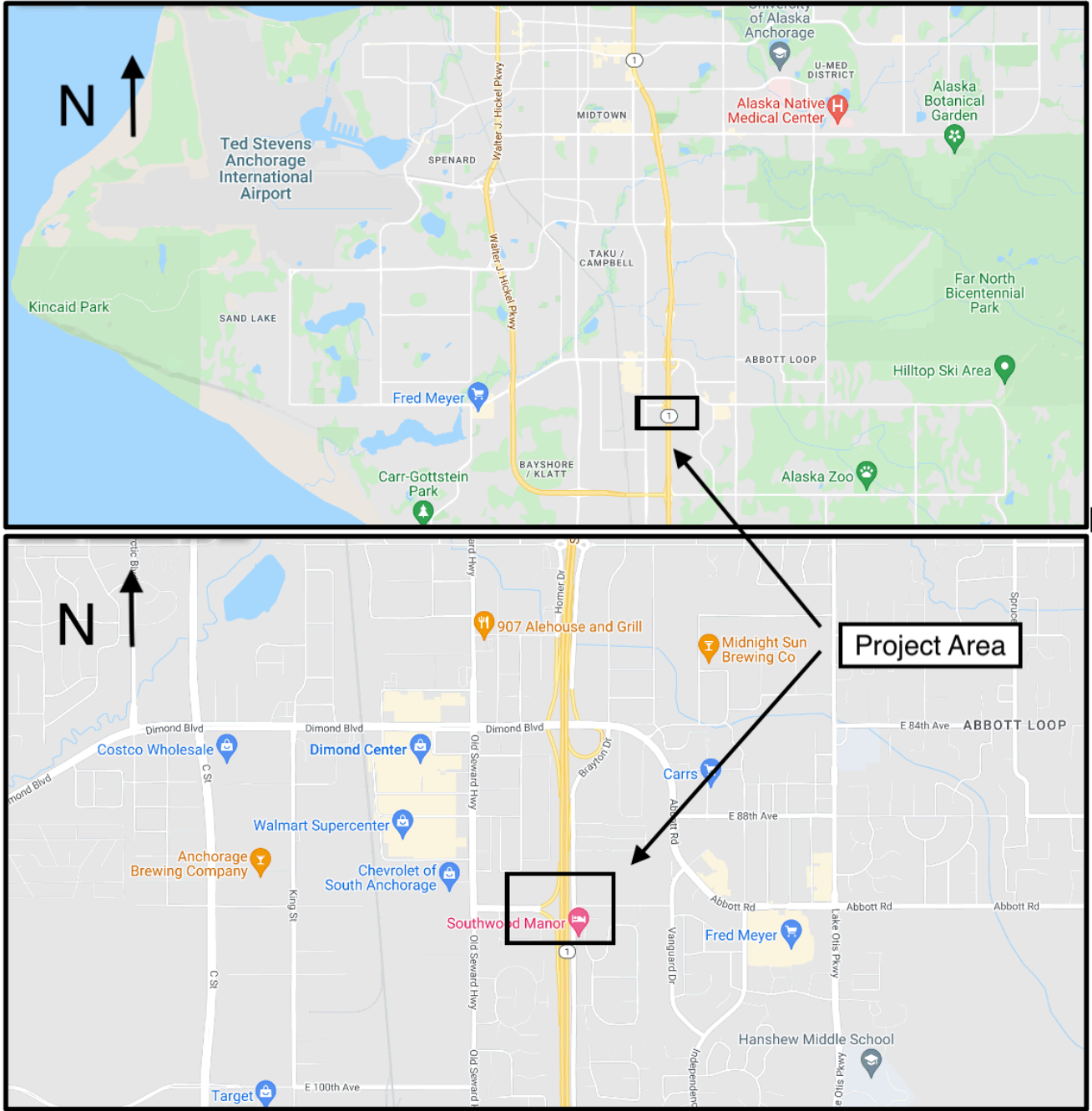


Figure 1: Location and Vicinity Map

1.0 PROJECT DESCRIPTION

1.1 Project Location and Description

The DOT&PF in cooperation with the FHWA proposes the construction of a grade separated interchange to connect Scooter Avenue and Academy Drive across the Seward Highway. The project is located in Sections 8 and 17 Township 12N, Range 3 W: Latitude 61.1375°N, Longitude 149.8561°W, within the Municipality of Anchorage (MOA). See Figure 1 for the Location & Vicinity Map.

The proposed project includes elevating the Seward Highway and constructing single-lane roundabouts beneath the Seward Highway to connect Scooter Avenue and Academy Drive. The roundabout connects to the Seward Highway via slip ramps. Work also includes adding and improving pedestrian facilities leading up to and throughout the interchange, improvements to ditches and drainage, utility relocation, improvements to signing and striping, and frontage road improvements. The pedestrian facilities include crosswalks, sidewalks, and bicycle lanes.

1.2 Existing Facilities and Land Use

There is no current interchange connecting Scooter Avenue and Academy Drive. Scooter Avenue provides access to a large commercial district, including the Dimond Center and a large strip mall. Academy Drive provides access to the Anchorage Korean Full Gospel church, Anchorage Garden Park (the church's soccer field), and a residential area with low-income housing. Vehicular and pedestrian traffic must go to the O'Malley Road-Seward Highway interchange or the Dimond Boulevard-Seward Highway interchange to cross the Seward Highway, which is a controlled access facility. Currently, Brayton Drive exists as a frontage road east of the Seward Highway and acts as a major collector for the residential and commercial areas east of the Seward Highway. It does not have any pedestrian or bicycle facilities beyond the shoulder of the roadway. Traffic from the commercial district west of the Seward Highway must take Old Seward Highway to either one of the neighboring interchanges.

Scooter Avenue is a minor collector with a posted speed limit of 30 mph. Its current pedestrian facilities include pathways on both sides from Old Seward Highway to Seward Highway, but it does not have any bicycle facilities. Academy Drive is also a minor collector with a posted speed limit of 25 mph. Academy Drive does not have any current pedestrian or bicycle facilities. The Seward Highway is an Interstate with two northbound lanes and three southbound lanes with a posted speed limit of 65 mph. It has one existing pathway along the west side but does not have any other pedestrian or bicycle facilities.

The project area is classified as rolling. Scooter Avenue is at a lower grade than Academy Drive. Land use in the project area is primarily commercial and residential (See Figure 2).

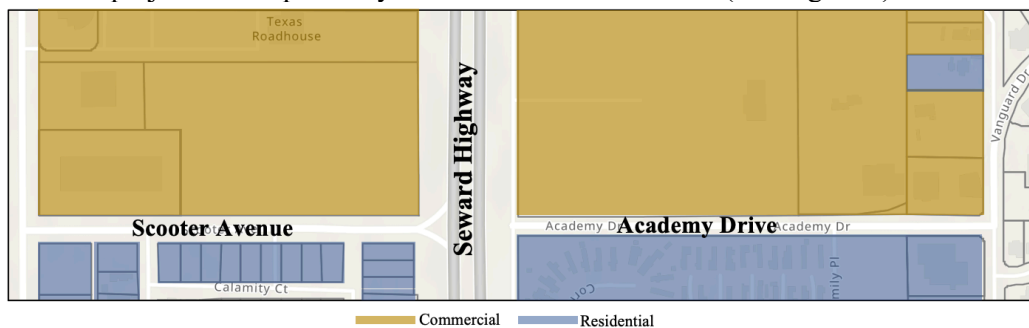


Figure 2: Land Use Map (Provided by Matanuska-Susitna Borough, GIS, MOA, SOA)

1.3 Purpose and Need

The purpose and need of this project are to increase east-west connectivity across the Seward Highway for vehicular and pedestrian traffic and to improve pedestrian safety in the project area. The increased connectivity from the commercial area (Scooter Avenue) to the residential area (Academy Drive) will allow pedestrians to safely cross the Seward Highway via sidewalks and bicycle lanes. Currently, pedestrians in this area must walk 0.5 miles north to cross the Seward Highway at the Dimond or O'Malley interchanges. However, pedestrians have been choosing to cross the Seward Highway illegally, which has caused safety concerns.

This project also benefits vehicular traffic in the area. Residential areas such as Independence Park and Southwood Manor trailer court can use this connection to access the commercial area to the west without having to use the Dimond Boulevard or O'Malley Road intersections, decreasing congestion at these locations.

2.0 DESIGN STANDARDS AND GUIDELINES

Design standards and guidelines that apply to the Seward Highway and Scooter Avenue/Academy Drive Roundabout Interchange are contained in the following publications:

Standards:

- A Policy on Geometric Design of Highways and Streets (PGDHS), 6th Edition, AASHTO, 2011.
- Roadside Design Guide (RDG), 4th Edition, AASHTO, 2011.
- Alaska Highway Preconstruction Manual (HPCM), DOT&PF, 2020 as amended.
- Alaska Highway Drainage Manual (AHDM), DOT&PF, 2006.
- The Alaska Traffic Manual (ATM), consisting of the Manual on Uniform Traffic Control Devices (MUTCD), 2009 as amended, U.S. DOT, FHWA) and the Alaska Traffic Manual Supplement (ATMS), DOT&PF, 2016.
- ADA Standards for Transportation Facilities, DOT, 2006.
- ADA Standards for Accessible Design, DOJ, 2010.
- Guide for the Development of Bicycle Facilities, 4th Edition, AASHTO, 2012.
- Recommended Practice for Roadway Lighting (RP-8-14), ANSI / IES, 2014.
- Highway Capacity Manual (HCM), 5th Edition, TRB, 2010.
- Guidelines for Geometric Design of Very Low-Volume Local Roads (ADT ≤ 400), AASHTO, 2001.
- Design Criteria Manual (DCM), MOA, Project Management & Engineering Department, 2007 with 2018 revision.

Guidelines:

- Proposed Accessibility Standards for Pedestrian Facilities in the Public Right-of-Way (PROWAG), U.S. Access Board, 2011.
- Guide for the Planning, Design, and Operation of Pedestrian Facilities, 1st Edition, AASHTO, 2004. Appendix A contains the project Design Criteria and Design Designation.

3.0 DISCUSSION OF ALTERNATIVES

3.1 Alternative I---No-Build

The first alternative is a No-Build alternative. This alternative will not establish a connection between Scooter Avenue and Academy Drive, so the goal of increasing connectivity across the Seward Highway for vehicular and pedestrian traffic would not be achieved.

3.2 Alternative II---Roundabouts Above the Seward Highway

The second alternative proposes a roundabout interchange above the existing Seward Highway. The elevation of the Seward Highway will not change in this design. Instead, a bridge connecting Scooter Avenue and Academy Drive will be constructed above. An undesirable grade is required to bring pedestrians and vehicles from the neighborhood and shopping centers up to the bridge elevation. This design will also consist of slip ramps that connect the roundabouts to the Seward Highway on the west.

3.3 Alternative III---Roundabouts Below the Seward Highway

The third alternative is a design for a roundabout interchange below the Seward Highway connecting Scooter Avenue and Academy Drive. The Seward Highway will be elevated to allow room for the interchange to be constructed. This design will also consist of slip ramps that connect the roundabouts to the Seward Highway on the west.

4.0 PREFERRED ALTERNATIVE

Alternative III, Roundabouts Below the Seward Highway, is the preferred alternative. This alternative is a more desirable design due to less ROW impacts and a more desirable pedestrian crossing. By raising the Seward Highway and constructing the roundabouts underneath, pedestrians have a more direct route from one side of the highway to the other. This design is also less of a disturbance to the surrounding areas because the elevation from east to west remains close to the existing level and having the Seward Highway above the roundabouts, instead of the roundabouts above the highway, minimizes ROW impacts and forms a more desirable geometric design.

5.0 TYPICAL SECTIONS

The Seward Highway will adhere to existing typical design and will consist of two roads, a northbound and southbound, separated by a 26-ft median. The northbound road will have two lanes while the southbound road will have three lanes. Lanes will be 12-ft with 10-ft shoulders. Highway cross slope grade will be 2% and embankment foreslopes are designed for 4:1 with backslopes of 2:1.

The roundabout will consist of a single 12-ft lane with 5-ft shoulders and 5-ft sidewalks. Roundabout roads will consist of 2% cross slope grade and embankment foreslopes are designed for 4:1 and backslopes of 2:1. Shoulder widths will vary on intersection approaches and between intersections.

6.0 HORIZONTAL AND VERTICAL ALIGNMENT

6.1 Horizontal Alignment

Seward Highway:

The horizontal alignment of the Seward Highway will remain the same. The existing alignment taken at its center line will serve as the design alignment when constructing the elevated highway.

Scooter Avenue/Academy Drive:

The horizontal alignment of Scooter Avenue and Academy Drive connects each minor road with a dual roundabout spanning the width of the Seward Highway. The western roundabout has two slip-ramp connections to the southbound Seward Highway and connections to Scooter and the eastern roundabout. The eastern roundabout has two connections to the frontage road, Brayton Drive, as well as connections to Academy Drive and the western roundabout.

6.2 Vertical Alignment

Seward Highway:

The Seward Highway is designed to be elevated by 15-ft, from existing to finished grade, for adequate clearance between the highway and the roundabouts. The Seward Highway alignment is 1925-ft long with an average grade of 3%. The highway is designed to a speed of 70 mph.

Scooter Avenue/Academy Drive:

The Scooter to Academy roundabout alignment cuts under the existing ground to ensure adequate clearance for the Seward Highway Bridge above the alignment. The roundabout alignment is 1225-ft long and has an average grade of 2%. The roundabout alignment is designed to a speed of 35 mph.

7.0 EROSION AND SEDIMENT CONTROL

The project includes temporary and permanent measures to control or prevent erosion and sedimentation during and post project construction. The contractor will prepare a Storm Water Pollution Prevention Plan (SWPPP) prior to construction that conforms to the DOT&PF Best Management Practices (BMPs) for Erosion and Sediment Control in accordance with the DOT&PF contract specifications and follows the guidelines of the Erosion and Sediment Control Plan (ESCP) provided to the contractor. The contractor will submit the SWPPP for approval by the Construction Project Engineer. The contractor will conduct construction activities in accordance with the approved SWPPP. Appropriate erosion and siltation controls will be used and maintained in optimal condition during construction and all other exposed soils/fills will be permanently stabilized. Temporary BMP's will remain in place until permanent erosion and sediment control measures are in place and soil is permanently stabilized.

8.0 DRAINAGE

Efforts to maintain the existing drainage patterns with minimal impact have been taken. General drainage philosophy for this project includes ensuring that all paved surfaces with motorized vehicular traffic is drained through approved water quality and low impact development (LID) facilities to achieve Municipal Separate Storm Sewer System (MS4) regulations regarding water quality at surface water discharge locations. Attempts to minimize the impacts to downstream facilities will be taken to the maximum extent practicable in accordance with the recent Memorandum of Understanding between the MOA and DOT&PF.

8.1 Drainage within the Municipality of Anchorage (MOA) and MS4 Permit Compliance

The proposed measures for mitigating water quality impacts and aide in MS4 permit compliance include the following:

- Construction of grassed ditches for stormwater drainage rather than constructed piped drainage where feasible,
- Construction of grassed drainage swales where feasible to provide some stormwater detention and pretreatment before discharge to the storm drain system,
- Construction of a depressed, vegetated median between northbound and southbound lanes of the Seward Highway,

- Construction of peak flow attenuating features such as detention ponds, and
- Use of BMPs during construction for APDES permitting.

9.0 SOIL CONDITIONS

Existing geotechnical information shows that the project corridor is underlain by unconsolidated geologic deposits, including glacial drift (till, outwash, stream and lake deposits), alluvial deposits, estuarine lake deposits, peat, and wind-laid silt (loess). In general, the area consists of a thick sequence of glacial till deposits overlain by veneer of post-glacial deposits that consist of clay, silt, sand, occasional gravel, and peat deposits. Areas within the project corridor were historically surrounded by a flat poorly drained peat swamp. During construction, surficial peat deposits were excavated beneath the Seward Highway. The peat deposits beneath the ramps were overlain by granular embankment material. Native soil located beneath the current fill material consists of some organic gravelly silt overlying firm silt.

The Scooter Avenue bridge will be supported on MSE-retained approach fills with spread footing foundations supporting the bridge girders. The MSE approach fills will be constructed on the native soil to the south and north of the Scooter Avenue Undercrossing. Soil along the Seward Highway south of Scooter Avenue/Academy Drive are gravels with varying amounts of sand and silt. The soil along the Seward Highway north of Scooter Avenue/Academy Drive are silty sand or silty gravel with peat in some areas. The soils along Scooter Avenue/Academy Drive are silty sand and gravel with clay and peat in some areas. The soils on Academy Drive are gravel with sand or silt. These soils are suitable for constructing MSE approach fills though as noted for the retaining wall discussions before, upper layers of silts and organic soils may have to be removed and groundwater may be encountered at the bottom of the excavations.

10.0 ACCESS CONTROL FEATURES

The Seward Highway will be accessible through on and off ramps connecting to the western roundabout. Direct access to these ramps will be prohibited and access to Brayton Drive will be provided for existing approaches.

11.0 TRAFFIC ANALYSIS

A single-lane roundabout was chosen after the completion of a traffic analysis. The Scooter Avenue and Academy Drive connection will function as a minor arterial. The primary users of this interchange will be the residents from Independence Park and the trailer court on the east side of the Seward Highway. Based on the current AADT (800 for Scooter Avenue and 1,500 for Academy Drive) and the projected AADT (20,000) of the new road, a single-lane roundabout is sufficient. The interchange will function at an acceptable level of service (LOS) throughout its design life.

12.0 SAFETY IMPROVEMENTS

The interchange design will improve the safety for pedestrians and bicyclists. Currently, a chain link fence is placed between Brayton Drive and the Seward Highway in an attempt to mitigate pedestrian crossing of the Seward Highway. However, the fence is not serving as a big enough deterrent to illegal and unsafe pedestrian crossing of the Seward Highway as many pedestrians, including teenagers and kids, continue to cross the Seward Highway. Additionally, a study area crash analysis, performed by the DOT&PF, found that there was a total of 7 crashes over a 5-year period (2008-2012) at the intersection of Brayton Drive and Academy Drive. The interchange between Scooter Avenue and Academy Drive will mitigate illegal pedestrian crossings by providing a grade separated facility with pedestrian facilities.

13.0 RIGHT-OF-WAY REQUIREMENTS

The ROW acquisitions for this project impact the area to the east of the Seward Highway. Due to the roundabout designed underneath the Seward Highway, partial ROW acquisitions are anticipated from the nearby church property and the residential area on Academy Drive. Trailer relocations are anticipated based on the ROW acquisition in the residential area to the east.

14.0 PEDESTRIAN AND BICYCLE FACILITIES

The geometric design of the roundabout will be the primary feature in promoting pedestrian and bicyclist safety. The roundabouts also feature crosswalks, a shared path, and signage to increase the safety. By constructing roundabouts with a large offset turn when entering the roundabout and tighter turning radii within the roundabout vehicles are forced to travel at slower speeds. Positioning crosswalks that are set back from the yield line by one or more car lengths and creating two-stage crossing for pedestrians via islands allow for one direction of traffic to be crossed at a time. All sidewalks, crosswalks, and curb ramps are compliant with the current ADA requirements. Pedestrian crossing signs will be at each crosswalk to warn approaching vehicles, along with crosswalk striping. The sidewalk approaching, as well as in the roundabout interchange, will be a shared pathway between bicycles and pedestrians. Signage for bicyclists and pedestrians to use the sidewalk will be displayed. In summary, the design geometry, in addition to proper signage and road markings, facilitates motor vehicles safely yielding to pedestrians and bicyclists.

15.0 UTILITY RELOCATION AND COORDINATION

Utility companies with facilities in the project limits include Anchorage Water and Wastewater Utility, Chugach Electric Association Inc., ENSTAR Natural Gas Company, General Communication Inc., and Alaska Communications. Utilities will require relocation and agreements will need to be developed at select locations throughout the project to address conflicts.

16.0 PRELIMINARY WORK ZONE TRAFFIC CONTROL

The HPCM, Section 1400.2 sets forth the criteria for determining if a project is to be classified as a “Significant Project” for purposes of determining the level of effort required in developing a TMP. This project meets the definition of “Significant” and therefore requires a Traffic Management Plan. The TMP herein addresses delays and queuing times by limiting road closures to nighttime on weekdays only. Components of the TMP that are required include a Traffic Control Plan, Public Information Plan, and Transportation Operations Plan.

16.1 Traffic Control Plan (TCP)

The contractor will develop a TCP during construction, to safely guide and protect the traveling public in work zones, in accordance with the ATM and the project specifications. The plan will be assessed and approved by the Construction Project Engineer and the Traffic Control Engineer.

The contractor is responsible for providing advance notice to the public, including local businesses, residents, and road travelers, of construction activities that could cause delays, detours, or affect access to adjacent properties.

16.2 Public Information Plan (PIP)

A PIP will be developed prior to beginning construction that will specify the ways and means that the contractor will use to inform the public of upcoming activities that will impact local stakeholders, the roadway users and public entities. The PIP will contain measures to inform stakeholders of project

scope, expected work zone impacts, closure details, and recommended action to avoid impacts and changing conditions during construction. Measures to disseminate information include:

- Contractor’s Worksite Traffic Supervisor
- Department’s Construction section through the department’s 511 system
- Department’s Navigator website
- Television, Radio, and/or newspaper
- Other location-specific communication tools

The public will be notified of future closures, detours, delays, night work, or any potentially disruptive activity.

16.3 Transportation Operations Plan (TOP)

The department will coordinate with relevant public agencies and event organizers to incorporate means and methods for minimizing traffic impacts with the contractor not covered by the TCP or the PIP within the project plans.

17.0 STRUCTURAL SECTION AND PAVEMENT DESIGN

Structural sections are similar to recently constructed projects in the area. Further pavement recommendations are provided in Appendix C.

18.0 COST ESTIMATE

The project cost estimate is as follows:

Preliminary Engineering	\$	75,000
Right-of-Way	\$	50,000
Utility Relocation	\$	100,000
Construction	\$	40,000,000
Total	\$	40,225,000

A Value Engineering (VE) Study will be completed in the future.

19.0 ENVIRONMENTAL COMMITMENTS AND CONSIDERATIONS

The environmental assessment for the New Seward Highway from Rabbit Creek Road to 36th Avenue was completed in 2006. The proposed project does not involve any unusual circumstances and a FONSI was issued. A reevaluation of the environmental assessment will be completed for the proposed project.

20.0 BRIDGES

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 128 feet, 6 inches wide, with two lanes northbound and three lanes 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-three 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, with provision for pathways on both sides.

The clearance will meet the minimum requirements (16 feet, 6 inches) per the DOT&PF HPCM.

Appendix E contains the Bridge Design Summary and Preliminary Bridge Design from the DOT&PF Bridge Section.

21.0 EXCEPTIONS TO DESIGN STANDARDS

There are no exceptions to design standards for this project.

22.0 MAINTENANCE CONSIDERATIONS

Maintenance will remain the responsibility of the State of Alaska and the local DOT&PF Maintenance and Operations Station located at 4111 Aviation Avenue, Anchorage, AK 99519-6900.

The project will increase maintenance efforts by increasing the amount of pavement that will have to be plowed. Maintenance efforts will be reduced due to improved drainage features, improved roadside barriers, and low maintenance landscaping.

23.0 ITS FEATURES

No significant ITS features expected.