DOWLING ROAD/SEWARD HIGHWAY INTERCHANGE RECONSTRUCTION

Project No.: CFHWY00359

DRAFT DESIGN STUDY REPORT

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND PUBLIC FACILITIES

PREPARED BY: Lounsbury and Associates, Inc.
5300 A Street
Anchorage, AK 99518

May 23rd, 2019
DRAFT DESIGN STUDY REPORT

For
Dowling Road/Seward Highway Interchange Reconstruction

Project No.: CFHWY00359

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NOTICE TO USERS

This report reflects the thinking and design decisions at the time of publication. Changes frequently occur during the evolution of the design process, so persons who may rely on information contained in this document should check with the Alaska Department of Transportation and Public Facilities for the most current design. Contact the Design Project Manager, Kevin Jackson, at 907-269-0641 for this information.

PLANNING CONSISTENCY

This document has been prepared by the Department of Transportation and Public Facilities according to currently acceptable design standards and Federal regulations, and with the input offered by the local government and public. The Department's Planning Section has reviewed and approved this report as being consistent with present community planning.

CERTIFICATION

We hereby certify that this document was prepared in accordance with Section 520.4.1 of the current edition of the Department's Highway Preconstruction Manual and CFR Title 23, Highway Section 771.111(h).

The Department has considered the project's social and economic effects upon the community, its impacts on the environment and its consistency with planning goals and objectives as approved by the local community. All records are on file with Central Region - Design and Engineering Services Division, Highway Design Section, 4111 Aviation Avenue, Anchorage, AK 99502.

John Linnell, P.E. Date Todd Vanhove Date
Preconstruction Engineer Chief, Planning
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<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
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<tbody>
<tr>
<td>%</td>
<td>Percent</td>
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<tr>
<td>AASHTO</td>
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<td>Alaska Statute</td>
</tr>
<tr>
<td>ATM</td>
<td>Alaska Traffic Manual</td>
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<td>Anchorage Water and Wastewater Utility</td>
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<td>Best Management Practice</td>
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<td>Municipal Separate Storm Sewer System</td>
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<tr>
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<td>Value Engineering</td>
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<tr>
<td>WoUS</td>
<td>Waters of the United States</td>
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Figure 1 Location and Vicinity Map
1.0 PROJECT DESCRIPTION

This design study report has been prepared to document the basis of design and design decisions for the Dowling Road/Seward Highway Interchange Reconstruction project. The limits of the project begin approximately 900 feet east of the Dowling Road / Seward Highway interchange along Dowling Road and extend 1400 feet west along Dowling Road. The Seward Highway mainline and connecting ramps are reconstructed at the interchange. The project reconstructs the interchange roundabout terminals, increasing their size and relocating Dowling Road to the north. The interchange bridge is replaced and the mainline is reconstructed from a narrow, substandard cross section, to a full width cross section that consists of six divided mainline lanes, full width shoulders, and median ditches. Modifications to the ramp and frontage roads, highway lighting, and provision of bike and pedestrian accommodations along Dowling Road complete the major improvements.

1.1 Project Location and Description

The project is located at the intersection of the Seward Highway and Dowling Road in Anchorage, Alaska. Improvements occur in Sections 12 and 13, Township 12N, Range 3W, Seward Meridian, United States Geological Survey (USGS) topographical map, Anchorage A-8; latitude 61.1663°N, longitude 149.8566°W, within the Municipality of Anchorage (MOA), shown in Figure 1 on the previous page.

The proposed reconstruction project includes reconstructing the interchange; replacing the bridge and widening the Seward Highway to a full cross-sectional width over Dowling Road; improving ramps and frontage roads; and improving pedestrian and bicycle facilities along Dowling Road. Work also includes improving ditches and drainage, relocating and reconstructing utilities, improving signage and striping, improving highway lighting and improving roadside barriers.

1.2 Existing Facilities and Land Use

Dowling Road from Old Seward Highway, east to Lake Otis Parkway, is a five-lane minor arterial consisting of two thru lanes in the east and west directions, with a center two-way left turn lane. The interchange between Dowling Road and the Seward Highway has full access provided by four ramps configured in a common diamond form. The ramps connect to Dowling Road with a pair of multi-lane roundabout terminals that are spaced approximately 400 feet apart.

The Seward Highway at this interchange carries six lanes of traffic over Dowling Road on a narrow, reduced width cross section. For construction phasing reasons, this substandard section was used as a temporary way to carry six lanes of mainline traffic over Dowling Road on the existing bridge. This was required while the mainline was reconstructed under separate projects between Dowling Road and Tudor Road (2013), and Dimond Boulevard and Dowling Road (2018). These prior projects built the full width cross section that exists immediately to the north and south of this project. Specifically, the mainline cross section consists of six lanes that are divided by a 26-foot-wide median ditch, graded with 5(H) to 1(V) slopes, complete with 10-foot-wide shoulders.
One-way frontage roads Brayton Drive (northbound on the east side of the corridor), and Homer Drive (southbound on the west side of the corridor) provide access to residential and commercial land adjacent to the corridor. The frontage roads are continuous from Dimond Boulevard to the south, all the way north to Tudor Road, utilizing the interchange roundabout terminals to provide northbound and southbound access across Dowling Road. Both frontage roads were reconstructed in the 2013 and 2018 projects to include a continuous stripped shoulder bikeway and a sidewalk attached to the facility with barrier curbing.

One mile north, the project is bounded by a full access diamond form interchange between the highway and Tudor Road. A dedicated grade separated pedestrian trail provides another east-west pedestrian route across the corridor at Campbell Creek, located between Tudor Road and this project.

One mile to the south, this project is bounded by a half diamond interchange that was constructed in 2018 at 76th Avenue. This interchange provides partial access to 76th Avenue from the mainline, and provides a new east-west travel route across the corridor for pedestrians and motorists. A full access interchange exists 1.5 miles to the south at Dimond Boulevard. This interchange is currently being redesigned as part of a major corridor reconstruction project that is scheduled for construction on an overlapping schedule with this project.

Land use in the vicinity of the project consists of mixed use residential and commercial properties. The Anchorage School District operates the Polaris K-12, which is located in the southeast quadrant of the interchange along Brayton Drive.

1.3 Purpose and Need

In 2006, the Federal Highway Administration (FHWA) approved an Environmental Assessment (EA) and Finding of No Significant Impact (FONSI) to upgrade the New Seward Highway (NSH) corridor in the Municipality of Anchorage. The EA/FONSI addressed planned improvements to the NSH corridor from Rabbit Creek Road north to 36th Avenue. The purpose of the NSH reconstruction is to provide additional capacity, connectivity and safety enhancements. The EA identified a Preferred Alternative that expanded the existing NSH mainline from a four lane, divided, controlled access facility to a six lane, divided, controlled access facility. The replacement of the NSH Bridge over Dowling Road was also identified as a preferred action.

The NSH mainline was upgraded north of Dowling Road in 2013 and south of Dowling Road in 2018. The portion of the mainline over Dowling Road, including the existing bridge, was not upgraded with these previous projects. The purpose of this project is to complete the NSH mainline improvements, replace the bridge over Dowling Road, and to provide additional capacity, connectivity and safety enhancements on the corridor by reconstructing the roundabout terminals on Dowling Road.

The NSH reconstruction is needed because the existing peak-hour congestion in the corridor, the result of many years of steady growth, is expected to worsen. Upgrades are needed to meet the travel demands generated by planned growth in the region.
2.0 DESIGN STANDARDS AND GUIDELINES

Design standards and guidelines that apply to the Dowling Road / Seward Highway Interchange Reconstruction project are contained in the following publications:

Standards:

- Design Criteria Manual (DCM), Municipality of Anchorage, Project Management & Engineering Department, 2007 as amended.

Guidelines:

- Diverging Diamond Interchange Informational Guide, FHWA, 2014

Appendix A contains the project Design Criteria and Design Designations.
3.0 DISCUSSION OF ALTERNATIVES

During the Design Study Phase of the Dowling Road to Dimond Boulevard (D2D) Reconstruction project, detailed design options were developed and evaluated for the build alternative. This work was documented in a Dowling Road Interchange Alternative Selection Report (DRIAS) that was completed by DOT&PF in 2013. This project revisited the 2013 work with the added benefit of updated traffic projections and newly acquired ROW.

Nine interchange alternatives were developed to a sketch planning level. The alternatives included options that preserved the existing bridge, replaced the existing bridge, and maintained the continuity of the frontage road system, as well as options that eliminated the frontage road through-movement.

DOT&PF conducted a sketch planning/work session, including functional leaders from within the Department and the Municipality of Anchorage, with planning and interchange expertise from the consultant team. The work session concluded with a decision to replace the Seward Highway Bridge and to preserve the through-movement on the frontage roads.

A tight diamond interchange with signalized terminals and a compressed diamond interchange with roundabout terminals were advanced to detailed design. The design efforts considered design year level of service, pedestrian and non-motorized accommodations, construction cost, maintenance requirements, ROW impacts, environmental impacts and corridor consistency.

Both alternatives were found to be viable and reasonable interchange types that could be selected to meet the travel demand in the design year (2040). The roundabout alternative was found to be less expensive to construct, does not require long term maintenance of signals, is consistent with other interchange types on the corridor and, meets both driver and agency expectations for the interchange. It was selected as the build alternative.

Further details pertaining to the sketch planning workshop, corridor alternatives development and preliminary design and cost estimating are contained in the Dowling Road/Seward Highway Interchange Reconstruction Preliminary Engineering Report completed by DOT&PF in August 2018.

4.0 PREFERRED ALTERNATIVE

The Seward Highway mainline is expanded to a full width six-lane, divided mainline with ten foot inside and outside shoulders and a 26 foot wide center median graded with 5(H):1(V) median slopes and 6(H):1(V) exterior embankment slopes. A new deck bulb-tee girder bridge carries the highway over Dowling Road.

A diamond interchange with roundabout terminals was selected at Dowling Road. This interchange maintains the frontage road through movement and limits the extents of cross street reconstruction. Changes to the frontage road and ramp horizontal and vertical geometry are required in all four quadrants of the interchange in order to accommodate the expanded width mainline.
5.0 TYPICAL SECTIONS

This section describes typical sections as designed for the Dowling Road / Seward Highway Interchange Reconstruction project. The typical sections are provided in Appendix B.

5.1 Dowling Road

The typical section for the proposed Dowling Road consists of variable lane widths that are sloped to the outside where the drainage is collected by curb and gutter or other drainage structures. Both the west and east approaches include four 12-foot lanes with two in each direction that are separated by a variable width median or two-way-left-turn lane.

The roundabout intersection circulatory roadways consist of two 16-foot wide lanes. The central islands include a truck apron to allow for large vehicle off-tracking. The section under the mainline bridge includes four 14-foot lanes, two in each direction that are separated by a variable width median.

The central islands will consist of landscaping features to improve intersection visibility, reduce headlight glare, and limit excessive sight distance. Landscaping will include an earthen berm, with vegetation and plantings.

On the both sides of Dowling Road, variable foreslopes and backslopes will be used to meet existing grade and reduce right-of-way impacts.

A combination of concrete and asphalt sidewalks and multi-use pathways are provided along Dowling Road to maintain the pedestrian facilities in use prior to this project.

The separation between the pathways and roadway, in combination with the lane and median widths, provides forward compatibility to add an additional eastbound lane beyond the design life of the interchange if required for future capacity. A future signalized tight diamond interchange could also be accommodated with this footprint.

5.2 Mainline

The mainline typical section consists of six 12-foot lanes, three in each travel direction with ten-foot shoulders and a 26-foot wide central median with 5:1 side slopes. The side slopes are used within the median to provide adequate ditch depth while providing space for snow storage. Lane and shoulder widths are maintained over the bridge crossing. This section completes the link in the mainline that was not reconstructed with the D2T or D2D projects.

Roadside slopes are 6:1 within the clear zone, and 2:1 outside the clear zone with a 3-foot-deep (minimum) ditch where space allows. Where these flat slopes are impractical, 2:1 slopes or retaining walls with traffic barriers or guardrail treatments are used.

5.3 Frontage Roads

The frontage road sections consists of a single 12-foot lane, a 2-foot inside shoulder and 4-foot outside shoulder. A five-foot-wide concrete sidewalk is attached to the outside shoulder.
Between the frontage road and mainline, 4:1 foreslopes are used within the clear zone in combination with a 3:1 (or flatter) backslope to meet the adjacent roadway. In locations where this is impractical, 2:1 slopes are used with traffic barriers.

Ditching on the outside of the frontage roads is intended to match existing depth and consists of a 3-foot-deep (minimum) ditch where space allows, with foreslope and cut slopes designed for appropriate clear zone considerations.

5.4 Ramps

Both the one-lane and two-lane ramp typical sections consist of 12-foot lanes with an 8-foot outside shoulder and 4-foot inside shoulder.

Within the clear zone, 4:1 foreslopes are used in combination with a 3:1 (or flatter) backslope to meet the adjacent roadway. In locations where this is impractical, a 2:1 foreslope and backslope is used in combination with guardrail.

Ditching on the outside of the ramps consist of a 3-foot-deep (minimum) ditch where space allows, with foreslopes and backslopes designed for appropriate clear zone considerations.

Sidewalks and Pathways are included along the outside of the ramps where the frontage roads have terminated and connect to the cross-street facility. Four-foot-wide shoulders and attached sidewalks are provided.
6.0 HORIZONTAL AND VERTICAL ALIGNMENT

The mainline horizontal and vertical alignments closely mimic the alignment of the existing facility. All four ramp and frontage road alignments shift to the east and west to connect into the larger roundabout end terminals and to provide space for the widened mainline cross section. This following describes the proposed alignments and notes where they deviate from the existing alignments.

6.1 Mainline

The mainline horizontal alignment matches the alignment of the existing Seward Highway. The horizontal curvature meets the criteria for 70 miles per hour (mph). The mainline features a single left hand curve north of Dowling Road that requires superelevation treatments.

The vertical alignment closely mimics the existing mainline profile, with nominal adjustments made north of Dowling Road necessary to maintain adequate ditch depth while the mainline is in superelevation.

6.2 Dowling Road

The horizontal alignment of Dowling Road as it crosses the Seward Highway is realigned approximately 50 feet to the north. This takes advantage of available ROW in the northeast and northwest quadrant of the project. The realignment also provides distance from the transmission main that aids with project constructability. Curvature is provided in the approaches to the roundabout terminals in order to facilitate speed control that is required for proper roundabout operation.

6.3 Ramps

Northbound On-ramp (DO-1)

The on-ramp horizontal alignment at Dowling Road shifts to the east to accommodate the widened mainline cross sections and larger diameter roundabouts. It merges back into the existing alignment by the gore with the frontage road. The ramp maintains the single-lane parallel on ramp configuration at the mainline and moves the ramp/frontage road divergence point north.

The vertical alignment of Ramp DO-1 rises from the roundabout terminal with a grade of about 2.5% to meet the widened mainline and existing frontage road. A crest vertical curve provides geometry that closely matches the existing grades at the merge point with Brayton Drive. A 2% downgrade completes the ramp/mainline merger.

Northbound Off-ramp (DO-2)

The northbound off-ramp horizontal alignment shifts to the east to accommodate the widened mainline. It joins the roundabout terminals at Dowling Road with a series of horizontal curves that are provided at the roundabout approach to control speed. The ramp maintains a one-lane configuration until the frontage road (Brayton Drive) adds an additional lane at the ramp/frontage gore. Medians and turning lanes are added at the ramp/roundabout intersection.
Vertically, Ramp DO-2 begins at grade with the existing mainline. A slight raise in grade and vertical curve facilitates the departure of the ramp from the mainline, where the ramp begins a gradual decent to Dowling Road utilizing modest grades between 1% and 2%.

**Southbound On-ramp (DO-3)**

The southbound on-ramp horizontal alignment moves west with the new interchange. The ramp retains the existing one-lane parallel on-ramp configuration at the mainline. A large radius right hand curve connects the departure tangent from the roundabout terminal with the mainline alignment.

Vertically, Ramp DO-3 begins close to the grade of the existing mainline and rises immediately with a 3% grade to join the existing frontage road. A gentle crest curve with an exit grade of approximately 1% is used to depart the ramp from the mainline. A second crest curve with a downgrade of approximately 3% brings the ramp down to Dowling Road, completing the ramp.

**Southbound Off-ramp (DO-4)**

The southbound off-ramp is realigned to the west to accommodate the widened mainline cross section. This realignment requires impacts to 2 of the 3 private parcels that are impacted on the project.

The ramp departs from the mainline north of the existing departure point, which relocates the ramp/mainline gore to the north. This, along with relocating the ramp/frontage road gore north, provides the maximum practical weaving distance possible for eastbound and westbound Dowling Road traffic.

Vertically, Ramp DO-4 begins close to grade at its intersection with Dowling Road. A crest curve with 1% entrance and exit grades brings the ramp profile up to meet the southbound lanes of the Seward Highway. A sag curve with grades less than a half of a percent completes the ramp profile.

**6.4 Frontage Roads**

One-way frontage roads Brayton Drive (northbound) and Homer Drive (southbound) parallel the Seward Highway. This project is maintaining the connectivity and through movements of the frontage roads across Dowling Road. This maintains access to local businesses and residents and provides system redundancy in the event that the Seward Highway or associated bridge become temporarily unavailable to the traveling public. The frontage road work is limited to re-establishing the connections with the realigned ramps in all four quadrants of the interchange. No significant changes to the horizontal or vertical alignments are proposed.
7.0 EROSION AND SEDIMENT CONTROL

Proper implementation of temporary and permanent erosion and sediment control measures will play a critical role in the successful construction and commission of the project. A stormwater pollution prevention plan (SWPPP) conforming to the project’s erosion and sediment control plan (ESCP) will be required from the construction contractor. The ESCP outlines the best management practices (BMPs) during construction and provides detail on areas in need of additional protection. The contractor will submit the SWPPP for approval to the construction project engineer. All construction activities will be conducted in accordance with the approved SWPPP. Technologies and techniques implemented for erosion and sediment control include, but are not limited to, the following:

- Seeding and mulching
- Geotextile
- Construction Entrance/Exits
- Street Sweeper
- Watering for Dust Control
- Concrete Washout Pit
- Fiber roll barriers and silt fences
- Storm drain outlet and inlet protection
- Vegetative buffer strips and vegetation protection

8.0 DRAINAGE

The project maintains the existing drainage patterns and minimizes increases in stormwater runoff. 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 regulations regarding water quality at discharge locations. Attempts to minimize the impacts to downstream facilities are taken to the maximum extent practicable in accordance with the recent Memorandum of Understanding between the MOA and DOT&PF signed on March 17, 2017.

This section of the Dowling Road corridor includes a mixture of offsite (outside of ROW limits) and onsite (within ROW limits) surface runoff. No major river or stream (anadromous or otherwise) crossings exist within this project. Hydrologic and hydraulic analyses were conducted to ensure proposed discharge rates meet project discharge design criteria. Conveyance analysis was conducted utilizing the 25-year, 24-hour design storm event. Emergency overflow analysis conducted on any attenuating drainage features such as detention ponds utilize the 100-year, 24-hour design storm event. Onsite drainage facilities are located and sized utilizing the required design storm event based on the proposed roadway feature. Water quality analysis will be completed utilizing the Municipal Separate Storm Sewer System (MS4) permit identified rainfall depth of 0.52 inches.

Project kickoff coordination occurred between the design team and DOT&PF regional hydrologist and on November 6th, 2018, an onsite field visit was conducted with maintenance staff from DOT&PF. This correspondence and the minutes from these meetings are attached in Appendix I. These meetings meet the requirements laid out in MOA Policy and Procedure’s Memorandum regarding Stormwater Facilities, also attached in Appendix I.
8.1 Existing Conditions

In general, surface runoff drains north or south on the Seward Highway, and east to west on Dowling Road. Runoff headed north on the Seward Highway ultimately ends up in Campbell Creek. Runoff headed south on the Seward Highway is conveyed to the North Fork of Little Campbell Creek. Dowling Road runoff heads south in the Juneau Street ROW, then west in 64th Avenue to Campbell Creek.

Most of the runoff within the project limits discharges to the Dowling stormwater system. Runoff headed north along the Seward Highway will be treated by BMP’s before entering the existing vegetated swales. The Campbell Creek outfall is approximately 2,100 linear feet north of the project boundary. Runoff headed south will be treated by BMP’s before entering the existing vegetated swales. The North Fork Little Campbell Creek outfall is 1,700 linear feet south of the project boundary. Runoff in the Dowling Road system is collected in catch basins and conveyed west until it heads south in a 30-inch CMP. When the runoff heads south it leaves the project limits.

The existing stormwater system is comprised of a 24-inch CMP mainline and 18-inch catch basin leads. A field visit was conducted with DOT&PF Maintenance staff that determined there were no critical issues with the existing system. The system is less than 20 years old and a detailed inspection was not required. Visual inspections on the outfall pipe in the Juneau Street ROW and one in the existing roundabout indicate that the system is in good condition as the galvanizing layer is still intact and manholes are in acceptable condition.

The project H&H report contains a map of the existing conditions stormwater system.

8.2 Proposed Conditions

Proposed roadway drainage aims to maintain the existing drainage patterns to the maximum extent practicable. The proposed roadway conditions include a horizontally realigned Dowling Road, frontage roads and interchange ramps.

Roadside ditches along the ROW limits are proposed to be replaced in-kind with efforts to maintain the existing hydraulic capacity. The proposed roadways will be crowned, directing water to the curb and gutter on the edge of the road. Offsite runoff will be directed to the roadside ditches or stormwater system to maintain existing drainage patterns and to apply low impact development solutions efficiently.

With the roadway improvements, a significant amount of new impervious surfaces will exist within the proposed roundabouts. If left un-mitigated, these proposed roadway improvements are anticipated to increase peak runoff flow rates at the Dowling Road outfall. Additionally, new design storm runoff values have increased significantly with the inclusion of recent historical rainfall data for the Anchorage area. This results in increasing pipe sizes for proposed conditions. Some mainline pipes will increase in size to up to 42-inch diameter pipes. The proposed drainage design increases post-developed peak flow rates compared to pre-developed conditions at the project limits where runoff is conveyed south into the Juneau Street ROW. This increase in runoff is due to the fact that the proposed system is being upsized to prevent pipe surcharging during the 25-year design storm. A downstream impact analysis has been requested by DOT&PF and will be conducted before the design process for this project is completed. As a result of that analysis, the pipe in the Juneau Street ROW will likely be upsized all the way to Old Seward Highway.
Green infrastructure requirements will be met by installing infiltration/retention facilities where feasible. Hydrologic and hydraulic analysis of the proposed outfall peak discharges can be found in the H&H Report. The infiltration basins, in conjunction with a proposed oil and grit separator, will meet required water quality standards.

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

The Alaska Pollutant Discharge Elimination System (APDES) program originated under section 402 of the Clean Water Act (33 United States Code §1251), requires that pollutant discharges to surface water be authorized by permit. Together, the MOA and the DOT&PF are authorized to do so through an Authorization to Discharge permit under the APDES. This authorization, APDES Permit AKS 052558, is effective from August 1, 2015, to July 31, 2020. This permit applies to projects within the MOA. The permit requires that the initial 0.52 inch of rainfall be 100 percent managed and treated prior to discharge to adjacent surface waters.

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

- Construction of grassed swales or filter strips for stormwater drainage rather than constructed, piped drainage where feasible
- Construction of a depressed, vegetated median between northbound and southbound lanes of the Seward Highway
- Construction of peak flow attenuating features such as infiltration basins
- Use of BMPs during construction for APDES permitting.

The project’s proposed drainage design meets the APDES U.S. Environmental Protection Agency (EPA) MS4 permit compliance criteria throughout the project corridor. Each relevant project outfall has been identified to direct stormwater runoff discharges toward a stormwater treatment BMP prior to discharge to surface waters. A description of these treatment BMP’s is provided in the H&H Report.

The direction that is taken on this project regarding water quality is to comply with the MS4 permit criteria to the extent practicable. Efforts to meet these requirements will be taken at a project level to account for the hydrologic changes that the project poses on the watershed.

To comply with the intent of the permit; the project will use, at a minimum, control measures to comply with BMPs and the Storm Water Management Program (SWMP), and follow the Authorization to Discharge under the APDES Permit number 052558.

In addition to MS4 permit compliance, drainage within the MOA requires compliance with the design criteria and general guidelines outlined in the Drainage Project Coordination Policy for the Municipality of Anchorage and the Alaska Department of Transportation and Public Facilities Memorandum of Understanding (MOU). Compliance with this MOU involves the incorporation of peak flow discharge attenuation to the maximum extent feasible. As outlined above, infiltration basin facilities are proposed to minimize downstream impacts. Analysis and calculations of these facilities as well as resulting modeling calculations are presented in the H&H Report.

DOT&PF has recommended the incorporation of nonstationary conditions within our hydrologic and hydraulic analysis related to FHWA guidelines within HEC-17 – Highways in the River Environment-Floodplains, Extreme Events, Risk and Resilience.
DOT&PF has recommended a Level 2 procedure outlined in HEC-17 be conducted. This Level 2 procedure considers uncertainty within the use of historical data to identify an appropriate range of conditions to aide in a more resilient design of drainage facilities. A Level 2 procedure was incorporated within the rainfall parameters utilizing a 90% confidence interval (MOA design storms use the 90% confidence intervals from NOAA Atlas 14) on the precipitation values obtained for hydrologic analysis. A detailed description and resulting modeling calculations showing the probable outfall peak discharges are presented in the H&H Report.

9.0 SOIL CONDITIONS

The geotechnical report, including site specific borings, structural engineering foundation recommendations, muck excavation recommendations and approximate groundwater depth for this project was not available at the time this Draft DSR was developed. However, DOT&PF have recently conducted geotechnical investigations in or around this interchange to support the D2T and D2D projects. Information from those previous programs are relevant to this work, and are sufficient to support the basis of design decisions. Final recommendations will be incorporated prior to the preparation of construction bidding documents.

An exploration program in the fall of 2008 supported the preparation of a report titled Geotechnical Investigation Memo for Seward Highway: Dowling – Tudor Reconstruction #50816. The work for this report included borings advanced to depths of 25 feet below the existing ground surface in the vicinity of Dowling Road.

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.

Unsuitable materials, such as peat, are known to exist along the corridor and will require over excavation and backfill.

9.1 Dowling Road Undercrossing

The interchange was historically surrounded by a flat poorly drained peat swamp. During construction of the Dowling interchange, surficial peat deposits located in the vicinity of the interchange were excavated beneath the Seward Highway. The peat beneath the ramps was overlaid by granular embankment material. Native soil located beneath the current fill material consists of some organic gravelly silt overlying firm silt. (Source: Foundation Report Seward Highway High Tower Lighting, Central Region DOT&PF, July 1981)

According to the Geotechnical Investigation Memo of borings completed around the Dowling interchange for the Seward Highway, Dowling to Tudor Road Reconstruction, the general profile in the borings consisted of 3.5-4.5 feet of organic waste fill over 9.5-13.5 feet of peat.
9.2 Groundwater Conditions

The Anchorage area contains both shallow unconfined groundwater and deeper confined groundwater, some with artesian head. In general, groundwater is anticipated to be shallow throughout the project corridor. Special consideration for managing shallow groundwater will be required during construction. The Geotechnical Investigation Memo completed for the Dowling to Tudor Reconstruction states that the depth to groundwater in nearby borings was 8-10 feet deep below existing grade.

10.0 ACCESS CONTROL FEATURES

The Seward Highway, which is classified as an interstate, will be accessed via on- and off-ramps in the northbound and southbound directions. Existing approaches and driveways will be reconstructed. Direct access to the interstate and ramps will be prohibited, per the HPCM. No driveways have been identified for closure and no changes to the controlled access are proposed.

11.0 TRAFFIC ANALYSIS

Substantial delay and extensive queueing regularly occur during the weekday p.m. peak hour at the existing roundabout interchange with spillback impacting the safety and operations of the Old Seward Highway/Dowling Road intersection and the southbound Seward Highway. While the roundabouts have the highest number and rate of crashes of all Alaska roundabouts, only one severe injury crash was reported from 2010 to 2014.

The preferred alternative as proposed is forecast to operate at Level of Service C or better with reduced queues and improved weaving and ramp operations in 2040. Sensitivity testing indicates that to accommodate growth beyond what is projected for 2040 a third eastbound through lane and a free northbound right turn lane may be required.

The proposed roundabouts are expected to improve the safety of the interchange area due to:

- Eliminating queue spillback onto the southbound Seward Highway mainline and into the Old Seward Highway/Dowling Road intersection.
- Reducing peak hour queue conflicts at driveways and streets along Dowling Road
- Enhanced interchange movements through parallel ramps with longer merge and weave lengths compared to existing ramps and elimination of on-ramp weaving sections.
- Improving vehicle sight distance, operating speed, and speed consistency through refined roundabout design.
- Increasing driver yielding behavior to pedestrians and bicyclists, through use of active beacons at crossings.

A full traffic and safety analysis is provided in Appendix C.
12.0 SAFETY IMPROVEMENTS

Historic crash data from 2010-2014 was reviewed to identify crash patterns likely to respond to safety treatments and assess the safety performance of the study area. Additional screening was conducted for bicycle and pedestrian crashes and via field assessment. No fatal crashes were reported during this time period within the interchange.

Project specific safety improvements include:

- Updating the Seward Highway cross section and bridge width to current standards
- Removing barriers on the Seward Highway and providing a full width median that meets current clear zone requirements
- Providing full width shoulders on the Seward Highway
- Updating roundabout geometrics at the interchange terminals on Dowling Road to meet current standards
- Improving intersection sight distances
- Updating signing and striping
- Providing continuous lighting along the Seward Highway
- Providing Rectangular Rapid Flashing Beacons to assist pedestrians across Dowling Road

13.0 RIGHT-OF-WAY REQUIREMENTS

The project will require partial right-of-way (ROW) acquisition of three parcels in select quadrants of the Dowling Road interchange. The addition of separated pathways, attached sidewalks and roadside ditching on Brayton Drive and Homer Drive are not expected to require partial acquisitions as that ROW work was completed with the previous D2T and D2D projects. No full acquisitions are anticipated. Temporary construction easements and permits will also be required to construct the project.

14.0 PEDESTRIAN AND BICYCLE FACILITIES

Dowling Road provides a key pedestrian and bicycle route for connections to the Campbell Creek Trail and as a Seward Highway crossing. A sidepath is provided along the south side of Dowling Road and a sidewalk is along the north side. While marked crosswalks are provided through the roundabouts, driver yielding behavior has been observed to be poor, particularly on the exit lanes. The interchange was identified for crossing improvements in both the Anchorage Pedestrian Plan and the Anchorage Bicycle Plan.

The project will improve pedestrian and bicycle facilities within the project area. Proposed separated pathways will be used along portions of Dowling Road, ramps and frontage roads where constraints allow. Limited use of attached sidewalk and on street bikeways will be used along the corridor where ROW or other constraints make separated pathways impractical. After construction, active transportation will have improved connectivity.

Kittelson & Associates performed a pedestrian crossing analysis following Tables 4A-101 and 4A-102 in section 4A.100 of the ATM. Pedestrian counts were obtained in March 2018.
Although not representative of the pedestrians that use the facility in the summer, these pedestrian counts were available used for the analysis. The counts showed less than five pedestrian crossings per vehicle peak hours. ATM Table 4A The assessment resulted in electrical warning devices being warranted for westbound Dowling Road, west roundabout exit and eastbound Dowling Road, east roundabout exit assuming a crossing volume greater than 20 per hour, AADT greater than 15,000 and speeds above 30 mph. Gaps for pedestrians were less than 1 per 2 minute interval on average for these crossing locations as well.

Based on this work and considering that this is a major intersection, DOT&PF chose to install RRFB’s to assist pedestrians and increase motorist awareness at the multi-lane exists of the roundabouts. For uniformity, RRFB’s will be installed on the multi-lane entrances as well. This will be a research effort to improve yielding to pedestrians in both directions on Dowling Road.

15.0 UTILITY RELOCATION AND COORDINATION

Utility companies with facilities in the project limits include:

- Alaska Communications (AC)
- Anchorage Water and Wastewater Utility (AWWU)
- Chugach Electrical Association (CEA)
- ENSTAR Natural Gas Company (ENSTAR);
- General Communications Corp. (GCI)
- MOA Street Maintenance (storm sewer system)

Utilities will require relocation and agreements will need to be developed for those locations in conflict with the roadway improvements. The following sections describe existing utility facilities within the project corridor and identifies anticipated conflicts with the proposed work.

15.1 AC AND GCI Telecommunications Facilities

AC owns and operates communication lines along the south side of Dowling Road, with crossings occurring under the Seward Highway on/off ramps south of Dowling Road. Sections of these lines fall within the proposed roadway ditch improvements so depth of bury will need to be verified for adequate cover.

GCI owns and operates a large fiber optic and coaxial cable network within the project area. The fiber optic lines connects vaults along the south side of Dowling Road and the Seward Highway northbound off-ramp by Polaris k-12 School. The fiber optic and coaxial network cross under the Seward Highway on/off ramps south of Dowling Road.

Impacts for GCI facilities are anticipated at the Dowling Road interchange. There does not appear to be any other impacted telecommunications lines within the Seward Highway corridor.

There are telecommunication line conflicts occurring on the north side of Dowling Road, near the west roundabout approach as a result of a full-depth structural reconstruction. The line lies between two telephone pedestals and does not have the required 3-4 feet of cover. They are located in the northwest quadrant of the interchange and both the telecommunication lines and the telephone pedestals will need to be relocated.
In the southwest quadrant on ramp DO3, there is a telephone pedestal that will need to be relocated as a result of the sidewalk reconstruction.

15.2 AWWU Facilities

AWWU Water

AWWU owns and operates existing water facilities that include water mains ranging in size from 8-inch to 16-inch diameter pipes, valves, valve vaults, fire hydrants, and service lines within the project area. A 16-inch-diameter ductile iron water transmission main approaches the project from the east along Dowling Road and crosses the Seward Highway and continues west along Dowling Road. The 16-inch water main crosses the under existing Seward Highway bridge abutments on the south side of Dowling Road, between the existing roundabouts. The water line is approximately 10 feet deep and serves the businesses and residential subdivisions along Dowling Road.

Anticipated impacts to this water main will be at the Dowling Road interchange and may include the relocation or adjustment of a valves and key boxes. No water line pipe impacts are anticipated as they are assumed to be approximately 10 feet or deeper.

Along Dowling Road, there are approximately 24 valves that require relocations or adjustments and 6 fire hydrants that require relocation as a result of roadway, sidewalk reconstruction, or pavement planing.

AWWU Sewer

AWWU owns and operates existing sewer facilities that includes sewer lines ranging in size from 8-inch to 12-inch diameter pipes, manholes, and services within the project area. There is one 12-inch sewer line that crosses under the existing Seward Highway bridge abutments on the south side of Dowling Road, between the existing roundabouts. The sewer line is approximately 8 feet deep and serves the businesses and residential subdivisions along Dowling Road.

Anticipated conflicts with this sewer line are around the Dowling Road interchange and may require the relocation or adjustment of sewer manholes. Sewer line pipe conflicts are anticipated where there are full-depth structural reconstructions.

There are approximately 14 sewer manholes along Dowling Road that require relocations as a result of roadway reconstruction and pavement planing. In addition, there is a sewer manhole on ramp DO2 and DO3 that will require relocation as a result of roadway reconstruction.

15.3 CEA

CEA owns and operates both aerial and underground electrical facilities within the project area. CEA has a large underground electric network with a major above ground transmission line running parallel with Dowling Road. Throughout project development, improvements to the Dowling Road interchange were designed to maintain and avoid impacts to the 34.5 kV overhead transmission line along the south side of Dowling Road. The project will include a “shoo-fly” temporary relocation of 2 poles that support the overhead transmission in order to facilitate bridge construction.

Impacts to underground electrical facilities and above ground structures are anticipated on Dowling Road. Impacts to above ground structures are anticipated on the Seward Highway.
Underground electrical facilities located near the west Dowling Road roundabout approach will need to be relocated as a result of the median being significantly higher grade than the existing grade. Also located near this section are transformers, junction boxes, and luminaire that will need to be relocated as a result of the roadway reconstruction.

Along Seward Highway from the south to north project limits, there are junction boxes and luminaire structures that will need to be relocated as a result of roadway reconstruction.

In the southeast quadrant on ramp DO2, there are junction boxes that will need to be relocated as a result of roadway reconstruction.

15.4 ENSTAR

ENSTAR owns and operates gas facilities within the project area. Gas lines run mainly along the north side of Dowling Road on both the west and east sections of Dowling Road. On the west section, gas line crossings from the north to south side of Dowling Road occur on Juneau Street and on Rosewood Street. On the east section, gas line crossings from the north to south side of Dowling Road occur on the parking lot leading to Best Storage and on Meadow Street. There are 90° gas line bends on the north side of Dowling Road that run into approaches. There are also gas lines that cross the mainline from the northwest quadrant to the northeast quadrant and from Greenwood Street to East 64th Avenue.

Anticipated conflicts with this gas line are where the structural section is being fully reconstructed or the grade change along Dowling Road are significant. As a result, the gas line may require relocation or depth adjustments.

A gas line conflict occurs on the Latouche Street approach due to a structural section reconstruction. The conflict runs approximately 50 feet along the approach and lacks the required 3-4 feet of cover.

There are gas line conflicts near the east roundabout approach that will require gas line relocation as a result of a significant Dowling Road grade change. The conflict runs approximately 300 feet with an approximate elevation of 135 feet.

15.5 MOA Storm Sewer

The storm drain system within the project limit is owned and maintained by DOT&PF. Anticipated impacts to the storm drain system will occur at the Dowling Road interchange.

The existing storm drain system within the project limits will be heavily impacted as a result of a new storm drain system in order to provide adequate drainage for the new interchange. The existing storm drain structures and pipes will either be removed, reused, or abandoned.
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 traffic management plan (TMP). This project meets the definition of “Significant” and therefore requires a TMP. Components of the TMP that are required include a traffic control plan, public information plan (PIP), and transportation operations plan.

16.1 Traffic Control Plan (TCP)

Maintenance of Traffic (MOT) during construction is one of the more complex challenges on the project. The Seward Highway currently carries an AADT of approximately 60,000 vehicles. The Current AADT of Dowling Road is approaching 26,000 vehicles. Replacing the Seward Highway bridge over Dowling Road will have impacts to the traveling public on both facilities.

Temporary traffic control plans have been developed to show major construction and traffic maintenance sequencing. The proposed sequencing involves crossover ramps and temporary roads that detour the Seward Highway around the new bridge site, carrying traffic across Dowling Road at grade. Construction impacts to the traveling public will be minimized by maintaining three lanes in each direction on the Seward Highway. Dowling Road will remain open during construction and will include temporary signalization at points where the Seward Highway mainline is detoured and intersects Dowling Road. Intermittent lane closures are expected along the corridor during construction. Access to parcels on Brayton Drive, Homer Drive, and the cross streets will be maintained during construction.

The contractor will develop a traffic control plan during construction, to safely guide and protect the traveling public in work zones, in accordance with the Alaska Traffic Manual (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 the following:

- Contractor’s worksite traffic supervisor
- DOT&PF Construction section through their 511 system
- DOT&PF Navigator website
- Television, radio, and/or newspaper
- Other location-specific communication tools

The traveling public should not be caught unawares by any closures, detours, delays, night work, or any potentially disruptive activity.
16.3 Transportation Operations Plan (TOP)

DOT&PF will coordinate with relevant public agencies and event organizers, and incorporate means and methods for minimizing traffic impacts with the contractor not covered by the traffic control plan or the PIP within the project plans.

17.0 STRUCTURAL SECTION AND PAVEMENT DESIGN

Pavement recommendations are under development but are expected to closely mimic the pavement recommendations of the recently constructed, adjacent D2T and D2D projects. These are shown in the Typical Sections contained in Appendix B. The Seward Highway, frontage roads, and ramps use structural sections based on the recommendations for highway, frontage road and ramps sections constructed with the D2D project. The Dowling Road cross streets use a structural section based on the frontage road structural section from the D2D project.

When complete, pavement recommendations will be incorporated into the design and provided in Appendix D

Material sources for this project will be contractor-supplied.

18.0 COST ESTIMATE

The project cost estimate is as follows:

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<th>Cost</th>
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</thead>
<tbody>
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<td>Design Engineering</td>
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<tr>
<td>Right-of-Way</td>
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<td><strong>Total</strong></td>
<td><strong>$39,400,000</strong></td>
</tr>
</tbody>
</table>

A Value Engineering (VE) Study was conducted in April of 2019. Recommendations from the VE team are being evaluated by DOT&PF and will be incorporated with final design documents. The VE study is provided in Appendix E.
19.0 ENVIRONMENTAL COMMITMENTS AND CONSIDERATIONS

DOT&PF is preparing a Categorical Exclusion (CE) for the project which will be incorporated into this Design Study Report once approved.

19.1 Water Quality

Permanent water quality best management practice (BMP) facilities are proposed to meet the MOA and DOT&PF’s stormwater discharge permit (MS4) as described in Section 8 of this DSR. Additional impervious surface area that will result from proposed Dowling Road improvements will increase the amount of precipitation that runs off the surface rather than infiltrating through the vegetation and soil. The proposed measures for mitigating water quality impacts are listed in detail as a part of Section 8.3 of this DSR as well as the H&H Report.

Through use of grassed ditches, drainage swales, detention/sedimentation ponds and oil and grease separators, the project meets APDES EPA MS4 water quality requirements by managing and treating 100 percent of the water quality storm prior to discharge to adjacent surface waters.

19.2 Wetlands

In May 2019, a re-evaluation of aquatic resources in the Seward Highway (NSH), Dowling Road intersection corridor was completed. The re-evaluation was conducted to update the presence and extent of aquatic resources identified in the 2014 Anchorage Wetlands Management Plan (AWMP). The 2019 field investigation identified the following within the NSH, Dowling Road intersection proposed footprint:

- 0.51 acre of palustrine scrub shrub (PSS) (Wetland 46, 0.35 acre)

Wetlands boundaries identified in the AWMP were adjusted based on the new delineation. A new Waters of the U.S. (WOUS) was identified and designated Ditch 1. Ditch 1 connects to a drainageway to Campbell Creek and Turnagain Arm. One previously (2014) identified wetland feature was adjusted (Wetland 46). The wetland indicators observed at these locations suggest that wetland boundaries have changed from those identified in the AWMP.

Impact calculation to the wetlands based on a project design have been estimated. Once a footprint is determined impact calculations will be updated.

Avoidance

Although the preliminary design of the proposed project avoids impacts to some wetlands, the opportunity to avoid wetlands is very limited within the corridor, because the corridor is constrained by existing development on all sides. Because wetlands occur on both sides of the NSH and immediately adjacent to the on- and off-ramps, slight shifts toward either side of the proposed road alignments to avoid wetlands are not possible in all locations.

The design of the proposed project avoids impacts to wetlands to the extent practicable, with special design considerations near the most valuable wetlands in the area. Wetland 46 in the project area has been classified as a “C” type wetland. “C” wetlands are the lowest value wetlands that have moderate values for one or more wetland function and are suitable for development with only minor alteration. The development of “C” wetlands should have insignificant cumulative impacts on the overall functions and values of Anchorage wetlands.
Minimization

Field-truthing of wetland boundaries identified a reduced extent of wetland acreage in comparison to the AWMP. To minimize the extent of impact, steep embankment slopes (2:1) are used where wetlands are affected. The use of vertical walls or slopes steeper than 2:1 to minimize impact to roadside wetlands was also considered, but determined to be impractical for most areas given:

- the limited functions of the wetlands that would be affected
- the lesser safety of vertical walls
- the added need for guardrails
- the added cost of construction

The southbound exit ramp onto Dowling Road minimizes impacts by utilizing a mix of uplands and wetlands.

Protection and Restoration

To protect wetlands that will be temporarily disturbed during construction of the proposed project, two methods will be employed:

1. Covering the wetland with a geotextile and aggregate, allowing construction vehicles to pass over them without disturbing the underlying wetland soil
2. Recontouring the soil and revegetating with native plant species after construction activities are complete.
3. Flagging clearing boundaries prior to clearing and installation of semi-permanent barrier fence (orange snow fencing) along clearing boundaries prior to ground disturbance to ensure that no incidental disturbance occurs outside the permitted boundaries.

Compensation

In areas where wetlands will be filled, and functions lost to the extent that wetland functions will be adversely affected, the proposed project compensates for the loss by one of (or a combination of) the following actions, in accordance with the EPA and USACE regulations for compensating wetland losses:

- Purchase of mitigation credits from an approved wetland mitigation bank
- Payment of in-lieu fees
- Preservation, restoration, enhancement, or creation of wetland functions elsewhere in the watershed

19.3 Floodplains

No flood hazard permitting will be required for this project phase.

19.4 Fish and Essential Fish Habitat

No anadromous fish streams are present in this section and therefore no Essential Fish Habitat (EFH) consultation is required.
19.5 Wildlife

The project will replace disturbed habitat with roads, bridges, pathways, and other infrastructure. Because the habitat that will be lost currently is degraded by its location next to Seward Highway, the habitat supports mainly disturbance-tolerant animals. Most wildlife species in the project area are highly mobile and, consequently, are unlikely to be affected on an individual basis by the proposed actions.

While incidental take is allowed under the Migratory Bird Treaty Act, no vegetation clearing will occur between May 1 and July 15 to avoid incidental take of birds or bird nests.

19.6 Invasive Species

The proposed project will involve soil disturbance and vegetation clearing. Following construction and slope stabilization, areas of exposed soil will be seeded with a seed mix that meets DOT&PF specifications (DOT&PF Standard Specifications for Highway Construction, Sec. 724).

19.7 Air Quality

Air quality analysis modeling results for the no-build scenario indicated that 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 2040. Because the project conforms to Clean Air Act requirements, no environmental commitments are included. However, mitigation will be conducted during construction to minimize fugitive dust emissions.

19.8 Noise

DOT&PF determined that a noise analysis was not required for this project. Land use in the surrounding area is primarily industrial.
20.0 BRIDGES

There is one existing bridge within the project limits, as detailed in the following sections.

20.1 Existing Dowling Road Undercrossing

Bridge Number 1324, Dowling Road Undercrossing, was constructed in 1974. The single-span bridge is 110 feet, 0 inches long and 100 feet, 11 inches wide, with 40 feet of drive surface northbound and southbound. The substructure consists of spread footing abutments. Concrete slope paving at 1.5H:1V exists in front of the abutments.

The superstructure consists of pre-stressed concrete bulb-tee girders with a cast-in-place concrete deck with a total superstructure depth of about 5 feet, 6 inches, overlaid with waterproofing membrane and asphalt.

Across the bridge deck, the existing freeway consists of three lanes northbound and southbound. Dowling Road consists of two through lanes with a roundabout on either side of the Seward Highway, with pathways on both sides.

The existing clearance, per the latest bridge inspection report (June 2017), is approx. 16 feet, 10 inches.

The bridge has an inventory load rating (excluding the deck) of HS-15 and an operating rating of HS-44. These values are less than the design load of HS-20 but do not result in load posting of the bridge.

20.2 Proposed Dowling Road Undercrossing

The project will replace the existing bridge to account for the shift in the horizontal alignment of Dowling Road. The vertical clearance will be maintained at a minimum of 17 feet, 0 inches.

The most cost effective structure features a single span bridge on deck bulb tees with a bridge length of 145’ and vertical abutment walls. This bridge is the maximum length for this type of single span bridge. The structure design life is for 75 years and the project design horizon is only 20 years. This configuration provides forward compatibility and maximum flexibility in the future.

This bridge type is common to local contractors, very durable and fast to construct. Their heavy girders require large cranes to construct, which need to be balanced by the constructability issues associated with the CEA overhead transmission line.

21.0 EXCEPTIONS TO DESIGN STANDARDS

There are no exceptions to design standards for this project.
22.0 MAINTENANCE CONSIDERATIONS

Maintenance of the Seward Highway and Dowling Road will remain the responsibility of the State of Alaska and the local DOT&PF Maintenance and Operations station located at Tudor Road.

The project will increase maintenance efforts by constructing a new bridge over Dowling Road, adding roadside lighting and signage, adding traffic barriers, adding new drainage pipes and structures, and adding active transportation facilities including RRFB's.

Maintenance considerations incorporated in the design include the following:

- Adding a 2-foot strip of concrete behind curbs to facilitate snow plowing
- Maintaining the mainline median for snow storage
- Providing sufficient ditch depth for drainage and snow storage
- Minimizing culverts, drainage pipes, and structures where possible
- Installing low maintenance infiltration basins
- Easily accessible oil and grit separator
- Providing limited, low-maintenance landscaping
- Providing larger roundabout terminals at the Dowling Road interchange, which do not require traffic signals
- Using inlaid striping on all roadways

23.0 ITS FEATURES

Intelligent Transportation System (ITS) projects improve transportation safety and efficiency, and enhance productivity through the integration of advanced communication technologies into the transportation infrastructure and in vehicles.

Three ITS elements are proposed or under consideration for this project. These include:

1. Rectangular Rapid Flashing Beacons (RRFB’s)
2. Radar Detection
3. PTZ or Miovision camera

RRFB’s are proposed to aid in pedestrian crossings at the Dowling Road roundabouts as discussed in section 14. The FHWA has found that RRFB’s can enhance safety by reducing crashes between vehicles and pedestrians at unsignalized intersections and mid-block pedestrian crossings by increasing driver awareness of potential pedestrian conflicts. RRFB’s increase driver yielding behavior at crosswalks significantly when supplementing standard pedestrian crossing warning signs and markings. (FHWA-SA-09-009).

The DOT&PF is also considering two ITS elements that can be incorporated into the RRFB’s. The use of Radar Detection incorporated into the RRFB’s is a common treatment used to extend the flashing time for slower pedestrians.

Cameras are also being considered for incorporation into the RRFB units. These are useful for traffic gap analysis and research.
24.0 ILLUMINATION

24.1 Existing Illumination

The existing lighting system along the New Seward Highway is provided by a mix of high-mast lights and 400W HPS offset lights. The offset lights were installed as part of the 2011 Seward Highway Dowling Rd to Tudor Rd and the 2016 Seward Highway Dimond to Dowling projects. High-mast lights were installed as part of the 2002 High Tower Illumination Mast Replacement project. There are two high-mast lights on the northwest side of the interchange providing illumination to the highway and ramps. Additional offset lighting supplements the high-mast lights. Highway and ramp lighting on the south portion of the interchange is powered by load center LC “B” located at 68th Ave and Homer Dr with the north part of the interchange illumination system powered by LC “A” located at International Airport Rd and Homer Dr.

The Dowling Road illumination system was installed during the 2002 Dowling Road Old Seward Highway to Lake Otis Parkway project. 400W HPS cobra head luminaires were installed on mast arm poles at mounting heights of 45’. The underpass has six HPS luminaires mounted to the bridge abutments. Street lighting is powered by load center LC “B” located at the west Dowling Rd roundabout.

24.2 Proposed Illumination

The proposed illumination system will be designed to meet the AASHTO Roadway Lighting Design Guide 2005. New Seward Highway will be modeled as an interstate with residential conflict and Dowling will be modeled as a minor arterial with intermediate conflict. The roundabout illumination systems will meet the IES RP-8-18 Recommended Practice For Design And Maintenance Of Roadway And Parking Facility Lighting. The roundabouts will be classified as major/major intersections with medium pedestrian conflict.

Much of the existing illumination system within the project boundary will be salvaged due to conflicts with the proposed improvements. The New Seward Highway salvaged poles will be reused where possible, however, the high-mast lighting and Dowling Road poles will be disposed.

The highway and ramp illumination systems will consist of offset poles with 400W HPS luminaires at a 45° mounting height. Dowling Rd and the roundabouts will utilize mast arm poles with LED luminaires, also at a 45° mounting height. Underpass lighting will be accomplished using abutment-mounted LED luminaires. The pedestrian facilities and frontage road will not have dedicated illumination, except for frontage road diverging and merging areas at the ramps.

The exiting load center LC “B” at the west roundabout will be salvaged due to conflicts with improvements. A new 240/480V single-phase Type 1 load center will be installed to provide power to Dowling Rd and the Roundabouts. The existing load centers LC “A” and LC “B” at 68th Ave will be utilized to power the north and south sides of the highway and interchange. The design will keep all system voltage drops at 5% maximum and will seek to maintain voltage drops at 3% or less for overall system efficiency.