JOINT BASE ELMENDORF-RICHARDSON
STANDARD CONSTRUCTION SPECIFICATIONS

DIVISION 40
ASPHALT SURFACING

2021

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JBER STANDARD CONSTRUCTION SPECIFICATIONS

DIVISION 40 – ASPHALT SURFACING

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CHANGE LOG

Item#	Reference(s)	Change
1	2021 release	No substantial changes

JBER STANDARD CONSTRUCTION SPECIFICATIONS

DIVISION 40 – ASPHALT SURFACING

SECTION 40.01 - GENERAL

Article 40.01.1 - Scope of Work

The Work covered by these Specifications consists of providing all labor, supervision, equipment, supplies, material, transportation, handling and storage, and performing all operations necessary for asphalt surfacing work as necessary to complete new construction, modification, repair, and/or surface restoration for water distribution and wastewater collection facilities operated by Doyon Utilities LLC on Joint Base Elmendorf Richardson, hereafter referred to as JBER.

All Division 40 work shall be in accordance with the Plans, Special Provisions, Standard Details, and all applicable JBER Specifications. In the event of differences between the requirements contained in these various documents and specifications, the most stringent requirements, as determined by Doyon Utilities' Authorized Representative, shall govern.

Much of the content of this JBER Division 40 is taken from the 2009 Municipality of Anchorage Standard Specifications (MASS), but this JBER Division 40 also includes requirements not found in the 2009 MASS.

Article 40.01.2 - Safety

The Contractor is solely responsible for all construction-related safety and safety compliance, including, but not limited to: worker and jobsite safety; safety of Doyon Utilities employees and agents; safety of other JBER personnel and property; safety of the general public; safety of military operations; safety of wildlife and the environment; and, safety of the water distribution system, the wastewater collection system, and other utility safety.

Article 40.01.3 - Applicable Standards

The latest revision of the following standards: American Association of State Highway and Transportation Officials (AASHTO), Alaska Department of Transportation and Public Facilities, Alaska Test Methods Manual (AKDOT&PF ATM), The Asphalt Institute (AI), and American Society for Testing and Materials (ASTM) are hereby made a part of these Specifications. Additionally, the Western Alliance for Quality Transportation Construction (WAQTC) Test Methods and Procedures are hereby incorporated into these Specifications. The test designations listed below are those that are currently specified for use in this Division.

AASHTO M29 ..... Fine Aggregate for Bituminous Paving Mix

AASHTO M43 ..... Standard Size of Coarse Aggregate for Highway Construction

AASHTO M156 ..... Requirements for Mixing Plants for Hot-Mixed, Hot-Laid Bituminous Paving Mixtures

AASHTO M208 ..... Specification for Cationic Emulsified Asphalt

AASHTO M226 ..... Viscosity Graded Asphalt Cement - Table 3

AASHTO M320 ..... Standard Specifications for Performance-Graded Asphalt Binder

AASHTO T27 ..... Bulk Specific Gravity of Compacted Bituminous Mixtures Using Paraffin-Coated Specimens

AASHTO T30 ..... Test for Mechanical Analysis of Extracted Aggregate

AASHTO T43 ..... Test for Specific Gravity of Bituminous Materials

AASHTO T53 ..... Standard Method of Test for Softening Point of Bitumen (Ring-and-Ball Apparatus)

AASHTO T85 ..... Specific Gravity and Absorption of Coarse Aggregate

AASHTO T90 ..... Standard Method of Test for Determining the Plastic Limit and Plasticity Index of Soils
AASHTO T102 ..... Spot Test of Asphaltic Materials
AASHTO T164 ..... Test for Quantitative Extraction of Bitumen*
AASHTO T166 ..... Bulk Specific Gravity of Compacted Bituminous Mixtures Using Saturated Surface Dry Specimens
AASHTO T168 ..... Sampling Bituminous Paving Mixtures
AASHTO T180D ..... Test for Moisture-Density Relations of Soils
AASHTO T195 ..... Test for Coated Particles for Bituminous Mixtures
AASHTO T209 ..... Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures
AASHTO T304 ..... Uncompacted Void Content of Fine Aggregate (Fine Aggregate Angularity)
AASHTO T308 ..... Determining the Asphalt Content of Hot Mix Asphalt (HMA) by Ignition Method
ADOT&PF ATM 312 .... Nordic Abrasion Value of Coarse Aggregate
ADOT&PF ATM 407 .... Moisture Content of Hot Mix Asphalt by Oven Drying
ADOT&PF ATM 414 ...Anti-Strip Requirements for Hot Mix Asphalt
AI MS2 ..... Mix Design Methods for Asphalt Concrete and Other Hot-Mix Types
AI SS1..... Model Construction Specifications For Asphalt Concrete and Other Plant-Mix Types
ASTM C29 ..... Test for Unit Weight of Aggregate
ASTM C88 ..... Test for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate
ASTM C117 ..... Test for Materials Finer than No. 200 Sieve in Mineral Aggregates
ASTM C127 ..... Test for Specific Gravity and Absorption of Coarse Aggregate
ASTM C128 ..... Test for Specific Gravity and Absorption of Fine Aggregate
ASTM C131 ..... Test for Resistance to Abrasion of Small Size Coarse Aggregate by Use of Los Angeles Abrasion Machine Test for Sieve or Screen Analysis of Fine and Coarse Aggregate
ASTM D75 ..... Sampling Stone, Slag, Gravel, Sand and Stone Block for Use as Highway Materials
ASTM D140 ..... Sampling Bituminous Materials
ASTM D242 ..... Specification for Mineral Filler for Bituminous Paving Mixtures
ASTM D2172 ..... Standard Test Methods for Quantitative Extraction of Bitumen From Bituminous Paving Mixtures
ASTM D4125 ..... Standard Test Method for Asphalt Content of Bituminous Mixtures by Nuclear Method
ASTM D4791 ..... Flat and Elongated Particles
ASTM D5801 ..... Standard Test Method for Toughness and Tenacity of Bituminous Materials
ASTM D5821 ..... Percent Fracture

Article 40.01.4 - Contaminated Material

Unless otherwise noted in the Contract Documents, neither JBER nor Doyon Utilities LLC is aware of any contaminated material within the project limits. If such material is encountered, the Contractor shall notify Doyon Utilities' Authorized Representative immediately for direction. Unless the contamination was caused by Contractor's operations, discovery of contaminated material will be treated as a changed condition.

Article 40.01.5 - JBER Access Privileges for Contractor Personnel

The Contractor shall provide Doyon Utilities LLC with a list of personnel, including Subcontractor personnel, requiring regular access to JBER, as well as required personnel identification documents as required by JBER military base security personnel, all at least 7 calendar days prior to the date that access is required. JBER access privileges for Contractor personnel are contingent on passing of background checks to the satisfaction of JBER military base security personnel.

JBER access privileges for Contractor and Subcontractor personnel are revocable at the discretion of JBER military base security personnel.

Denial or revocation of JBER access privileges by JBER military base security personnel for Contractor or Subcontractor personnel shall not be grounds for extra Contractor or Subcontractor compensation.

Article 40.01.6 - Inspection, Notices, and Official Communications

All work activities covered under this Division, including but not limited to traffic maintenance, roto-milling, placement of recycled asphalt pavement, seal coating, prime coating, tack coating, crack sealing, asphalt batching and paving, and punch list work, are subject to inspection and acceptance by Doyon Utilities LLC. Work completed without inspection by Doyon Utilities' Authorized Representative shall be subject to rejection.

The Contractor shall schedule construction work specifically requiring inspection, punch list work, and similar activities to occur on non-holiday weekdays during normal working hours of 7:30 AM to 4 PM to facilitate inspection by Doyon Utilities' Authorized Representative.

Written notice of traffic lane closures shall be provided to Doyon Utilities LLC, the JBER Fire Department, and the JBER Police Department by the Contractor at least 14 calendar days in advance.

Written notice of traffic maintenance (excluding lane closure work), roto-milling, placement of recycled asphalt pavement, seal coating, prime coating, tack coating, crack sealing, asphalt batching and paving, punch list work, and similar activities requiring inspection shall be provided to Doyon Utilities LLC by the Contractor at least 5 calendar days prior to beginning any of these operations.

The Contractor shall notify Doyon Utilities' Authorized Representative again in person or by e-mail one calendar day before starting any of the work listed above.

Failure by the Contractor to provide the required notice shall be grounds for issuance of a stop-work order and/or complete rejection of the work.

To be considered official and binding, all communication from and to Doyon Utilities LLC shall be in writing.

Article 40.01.7 - Utility Locations and Dig Clearance Permit Requirements

The Contractor shall place a telephone, fax, or on-line locate request with Alaska Digline Inc. (Anchorage telephone - 278-3121 or 811, statewide telephone - 1-800-478-3121, statewide fax – 1-907-278-0696, on-line – http://www.akonecall.com/). Documentation of the Alaska Digline request shall be provided to Doyon Utilities' Authorized Representative. The Contractor shall coordinate with utility companies' locator personnel to locate all existing utilities before digging.

In addition to obtaining utility locations through Alaska Digline Inc., the Contractor shall obtain a Dig Clearance Permit from JBER CES (673 ABW Form 3 – BCE Work Clearance Request) and provide a copy of the fully executed Dig Clearance Permit to Doyon Utilities' Authorized Representative. A minimum of 14 calendar days shall be allowed by the Contractor for complete processing of a Dig Clearance Permit. The Contractor shall comply with all requirements of the fully executed Dig Clearance Permit.

Article 40.01.8 - Hot Work Permit Requirements

For any activity producing open flames, or heat or sparks sufficient to cause combustion, the Contractor obtain a hot work permit signed by the JBER Fire Department, and provide a copy of the fully executed hot work permit to Doyon Utilities' Authorized Representative. A minimum of 14 calendar days shall be allowed by the Contractor for complete processing of a hot work permit. The Contractor shall comply with all requirements of the fully executed hot work permit.

Article 40.01.9 - Fire Hydrant Use Permit Requirements

Prior to use of any JBER fire hydrant for any reason other than emergency usage, the Contractor shall obtain a fire hydrant use permit from Doyon Utilities. Issuance of fire hydrant use permits is at the discretion of Doyon Utilities. A minimum of 3 working days shall be allowed by the Contractor for complete processing of a fire hydrant use permit. The Contractor shall comply with all requirements of the fully executed fire hydrant use permit.

Article 40.01.10 - Submittals

The Contractor shall provide paper submittals or electronic submittals, at the option of Doyon Utilities' Authorized Representative, for review and acceptance by Doyon Utilities. Duplicate paper submittals shall be supplied in the quantities requested by Doyon Utilities' Authorized Representative. Submittals shall clearly document compliance with Contract requirements, as well as any deviations from Contract requirements, all to the satisfaction of Doyon Utilities' Authorized Representative. Any materials ordered and/or work done in advance of written acceptance of submittals by Doyon Utilities' Authorized Representative is subject to rejection.

Submittals for Doyon Utilities review and acceptance are required for the following items.

1. Documentation of Alaska Digline utility locate requests.
2. Fully executed Dig Clearance Permit(s).
3. Fully executed hot work permit(s).
4. Submittals for all permanent materials.
5. Asphalt mixing plant and scale calibration documentation.
6. Paving Plans.
7. Work Site Traffic Supervisor certification and resume.
8. Traffic Control Plans.
9. Red-lined drawings.

Permanent material submittals shall be provided to Doyon Utilities' Authorized Representative at least 30 calendar days prior to ordering of materials. Other submittals listed above shall be provided to Doyon Utilities' Authorized Representative at least 14 calendar days prior to the activity covered by the submittal. Completed red-lined drawings shall be submitted to Doyon Utilities' Authorized Representative within 14 calendar days of substantial completion.

Doyon Utilities' Authorized Representative reserves the right to request additional submittals for other Contractor procedures and personnel qualifications.

Article 40.01.11 - Permanent Materials Furnished by Doyon Utilities and by Contractor

Doyon Utilities may furnish some permanent materials on some projects. When Doyon Utilities does furnish permanent materials, a list of these Doyon Utilities'-provided permanent materials, and locations where these Doyon Utilities'-provided materials shall be received by the Contractor, will be provided in the Contract Documents. The Contractor shall perform a complete take-off of all permanent materials required for the Project. The Contractor shall furnish any and all permanent materials not supplied by Doyon Utilities, in order to complete the Project in accordance with the Plans, Standard Details, Special Provisions, and these Specifications.

The Contractor shall be responsible for receiving, inspecting, and inventorying Doyon Utilities'-provided materials at locations specified in the Contract Documents, notifying Doyon Utilities Authorized Representative of damage, shortages, etc., loading as required, delivery to the jobsite, and unloading at the jobsite. Materials damaged during Contractor-provided loading, transportation to the jobsite, and/or unloading at the jobsite shall be replaced at Contractor expense.

Any surplus Doyon Utilities'-provided materials not used on a project shall remain the property of Doyon Utilities, and shall be delivered by the Contractor to the Doyon Utilities storage yard and carefully off-loaded and stored on Contractor-provided wooden pallets or other suitable dunnage.

Article 40.01.12 - Other Division Requirements

Except as specifically stated otherwise in the various Sections of this Division 40, the following other Divisions and Sections of these Standard Specifications are incorporated by reference into all Sections of Division 40:

A. Storm Water Pollution Prevention, Clearing and Grubbing, Concrete and Asphalt Demolition, and Earthwork

   The Contractor shall perform storm water pollution prevention, clearing and grubbing, concrete and asphalt demolition, earthwork, and related work in accordance with applicable sections of Division 20 - Earthwork.

B. Wastewater Collection Facility Construction

   The Contractor shall construct wastewater collection facilities, if required, in accordance with applicable sections of Division 50 - Wastewater Collection Systems.

C. Water Distribution Facility Construction

   The Contractor shall construct water distribution facilities, if required, in accordance with applicable sections of Division 60 - Water Distribution Systems.

D. Surface Restoration

Unless shown otherwise on the Plans and/or Standard Details, specified otherwise in the Special Provisions, or directed otherwise by Doyon Utilities' Authorized Representative, the Contractor shall provide the following materials as required for surface restoration:

1. For restoration of concrete pavement, sidewalks, curb and gutter, etc – Class AA-3 Portland cement concrete in accordance with Division 30 - Portland Cement Concrete, with concrete dimensions to match existing.

2. For restoration of asphalt pavement - Class E asphalt pavement, 2 inches minimum compacted thickness, in accordance with this Division 40, over a 2 inches minimum compacted base of leveling course in accordance with Division 20 - Earthwork.

3. For restoration of gravel-surfaced roads, road shoulders, parking lots, etc. Leveling course gravel surfacing, 2 inches minimum compacted thickness, in accordance with Division 20 - Earthwork.

4. For restoration of vegetated surfaces or bare dirt surfaces not scheduled for other surface restoration - 4 inches minimum rolled thickness of topsoil and hydro-seeding with Schedule A seeding mix (for mowed areas) or Schedule D seeding mix (for unmowed areas) in accordance with Division 75 - Seeding, Landscaping, and Revegetation.

E. Construction Surveying and Red-Lined Drawings

The Contractor shall provide construction surveying and maintain red-lined drawings in accordance with Division 65 - JBER Construction Surveys. The red-lined drawings shall be up-dated weekly by the Contractor to the satisfaction of Doyon Utilities' Authorized Representative. Completed red-lined drawings shall be submitted within 14 calendar days of substantial completion, for review and acceptance by Doyon Utilities' Authorized Representative.

F. Traffic Maintenance

The Contractor is solely responsible to provide all traffic maintenance for vehicular, non-motorized, and pedestrian traffic. All traffic maintenance shall be in accordance with the Division 70 – Miscellaneous Construction, and the Manual of Uniform Traffic Control Devices, latest edition adopted by State of Alaska. For any operations involving disruption of normal traffic flow, the Contractor shall provide Traffic Control Plans for review and acceptance by Doyon Utilities' Authorized Representative.

Article 40.01.13 - Site Housekeeping and Clean-Up

Littering is strictly prohibited.

The Contractor shall clean up all construction debris as soon as possible after it is generated and store it properly in suitable containers, all to the satisfaction of Doyon Utilities' Authorized Representative. Trash shall be disposed of weekly or more often if directed by Doyon Utilities' Authorized Representative.

The entire project site shall be cleaned up of all debris and litter at the end of the project and all debris and litter shall be properly disposed of, all to the satisfaction of Doyon Utilities' Authorized Representative.

SECTION 40.02 - ASPHALT PAVEMENT ROTO-MILLING

Article 40.02.1 - General

The work under this Section includes the removal and disposal or stockpiling of existing asphalt pavement to a required depth as shown on the Plans or Standard Details, or as directed by Doyon Utilities' Authorized Representative, using power-operated track-propelled planing or grinding profile machines designed for this specific purpose.

Refer to Section 40.01 – General for additional general requirements.

Article 40.02.2 - Construction

The planing or grinding profile machine for roto-milling shall have a maximum spacing of 5/8 inch between the cutting teeth on the mandrel. Existing asphalt pavement shall be milled to the width and required depth to an accuracy of plus or minus ⅜ inch. Pavement shall be removed to a final surface smooth enough for temporary traffic and for repaving. All roto-milling work shall be to the satisfaction of Doyon Utilities' Authorized Representative.

Any soft spots, pot holes, or other substantial defects in roto-milled pavement shall be cut out and repaired, including repair of the subgrade and base course as necessary, all to the satisfaction of Doyon Utilities' Authorized Representative. Cracks shall be sealed in accordance with Section 40.05 - Crack Sealant.

All areas to be roto-milled, including areas around manholes, catch basins, valve boxes, curb-and-gutter, and similar structures, and areas adjacent to existing pavement that is to remain shall be roto-milled to the full required depth. Exposed structures and existing pavement edges to remain shall be protected from damage, or repaired or replaced at Contractor expense, all to the satisfaction of Doyon Utilities' Authorized Representative.

Just prior to tack coating and new asphalt over-laying, roto-milled surfaces shall be cleaned of dust, dirt, and other debris by power sweeping and blowing, water flushing, and/or other acceptable methods, and the existing pavement surface shall be allowed to dry sufficiently, all to the satisfaction of Doyon Utilities' Authorized Representative. Surface cleaning and drying shall be repeated at Contractor expense if necessary to provide a suitable clean and dry surface for tack coating and new asphalt over-laying.

Tack coating of roto-milled surfaces shall be completed in accordance with Section 40.04 - Seal Coat, Prime Coat, and Tack Coat.

The Contractor shall load, haul, and place, stockpile, or dispose of the roto-milled asphalt pavement at a location designated by Doyon Utilities' Authorized Representative.

SECTION 40.03 - RECYCLED ASPHALT PAVEMENT (RAP)

Article 40.03.1 - General

Work under this Section includes providing compacted recycled asphalt pavement (RAP) to the required depth and to the required elevations and grades on prepared subgrade to provide either a smooth stabilized pavement base or a finished surface.

Refer to Section 40.01 – General for additional general requirements.

Article 40.03.2 - Material

RAP shall be produced from durable and sound recovered asphalt pavement, free from objectionable matter to the satisfaction of Doyon Utilities' Authorized Representative, with 100% passing the 1-inch sieve.

RAP shall be delivered to the jobsite at ambient temperature. Delivery of heated RAP to the jobsite shall be rejected unless previously approved by Doyon Utilities' Authorized Representative.

A. Coarse Aggregate

Coarse aggregate shall be material retained on Number 4 and larger sieves. When tested in accordance with ASTM C131, coarse aggregate wear shall not exceed 50% after 500 revolutions. Coarse aggregate shall consist of angular fragments, reasonably uniform in density and quality, and reasonably free from thin elongated pieces, dirt, and other objectionable material to the satisfaction of Doyon Utilities' Authorized Representative. At least 50% of the coarse aggregate particles shall have at least two mechanically fractured faces. Asphalt extraction and sieve analysis shall be performed in accordance with ASTM D2172, A or B, AASHTO T164, A or B, and AASHTO T30.

B. Fine Aggregate

The fine aggregate shall consist of material free of organic or other objectionable matter to the satisfaction of Doyon Utilities' Authorized Representative. The fine aggregate, either naturally combined with the coarse aggregate, or separately obtained and mixed with coarse aggregate, shall be of a gradation such that the overall gradation of the RAP mixture meets requirements specified below.

C. Gradation, Asphalt Content, and Moisture Content

The composite mixture of coarse aggregate and fine aggregate shall conform to the following gradation limits:

Recycled Asphalt Pavement	
U.S. Std. Sieve	Cumulative % Passing by Weight
1"	100
3/4"	70 - 100
3/8"	50 - 85
#4	35 - 65
#10	25 - 50
#40	10 - 30
#80	5 - 20
#200	2 - 10

Asphalt content of RAP shall be 2.7% to 4.7%. The asphalt content of RAP delivered to the project shall be determined on the individual extraction test results and not an average of extractions conducted.

Moisture content of RAP shall be 4% maximum.

Article 40.03.3 - Construction

The entire existing subgrade onto which RAP is to be placed shall be firm, unyielding, thawed material that is compacted to 95% minimum density per Division 20 - Earthwork, and cleaned of loose material, all to the satisfaction of Doyon Utilities' Authorized Representative.

If specific and detailed structural sections for subgrade for asphalt pavements are shown on the Plans, those requirements shall take priority over the subgrade requirements specified below.

Where RAP is placed as base for asphalt pavement, the upper 2 feet minimum of the subgrade, extending at least 2 feet horizontal beyond the edges of asphalt pavement, shall consist of clean granular material (5% or less passing the No. 200 sieve). Prior to placing RAP, all unsuitable subgrade shall be excavated and replaced with suitable compacted backfill material in accordance with Division 20 – Earthwork, Section 20.01 – General, and Section 20.07 - Excavation, Fill, and Backfill for Roads, Trails, and Structures, and all to the satisfaction of Doyon Utilities' Authorized Representative.

RAP shall be placed to the required loose lift thickness, such that when compacted to a 95% minimum density in accordance with Division 20 - Earthwork, the compacted material meets the required finished thickness. RAP that becomes segregated during placement shall be remixed to the required gradation and re-compacted. Adequate water shall be used to facilitate compaction of RAP to the satisfaction of Doyon Utilities' Authorized Representative. If at any time RAP becomes excessively saturated, it shall be moisture conditioned at Contractor expense and to the satisfaction of Doyon Utilities' Authorized Representative until the moisture content is satisfactory.

RAP shall be placed to the elevations, centerline grades, and/or transverse slopes as shown or indicated on the Plans, the Standard Details, and/or as directed by Doyon Utilities' Authorized Representative. The surface of the RAP for pavement base, when finished, shall be within 3/8 inch of straight when tested with a 10 foot straightedge applied parallel with, and at right angles to, the centerline of the area to be paved. Any deviation in excess of this amount shall be corrected by adding or removing material, and re-compacting to satisfy the above requirement.

RAP for pavement base shall extend one foot beyond the edge of pavement wherever possible.

RAP for pavement base shall be subject to acceptance by Doyon Utilities' Authorized Representative prior to paving.

SECTION 40.04 - SEAL COAT, PRIME COAT, AND TACK COAT

Article 40.04.1 - General

The work under this Section consists of application of a seal coat, prime coat, and/or tack coat as required by the Plans, Standard Details, Special Provisions, and/or as directed by Doyon Utilities' Authorized Representative.

A seal coat consists of asphalt and cover aggregate applied to a prepared recycled asphalt pavement or gravel base course to provide a permanent or temporary driving surface.

A prime coat consists of asphalt and, if needed, blotter aggregate, applied to a prepared base course of recycled asphalt pavement (RAP) or leveling course that is to receive new asphalt pavement, to stabilize the base course, to decrease the permeability of the base course, and to improve adhesion between the base course and new asphalt pavement.

A tack coat consists of asphalt applied to an existing asphalt pavement surface that is to be over-laid by new asphalt pavement, to improve adhesion between the existing and new asphalt pavement.

Refer to Section 40.01 – General for additional general requirements.

Article 40.04.2 - Material

A. General

The Contractor shall submit a certified analysis of the proposed seal coat, prime coat, and/or tack coat asphalt, prepared by an acceptable asphalt testing laboratory, to Doyon Utilities' Authorized Representative for review and acceptance. A copy of the certified analysis shall accompany each shipment of asphalt to the Project. Doyon Utilities' Authorized Representative shall reserve the right to test asphalt received on the project site. Asphalt that is not in accordance with the certified analysis shall be rejected and replaced at Contractor expense.

B. Seal Coating Asphalt and Non-Stripping Additive

Asphalt for seal coating shall be Asphalt Institute Type CRS-2 or Doyon Utilities' Authorized Representative accepted equal.

A "non-stripping" additive shall be added to seal coating asphalt in the amount of 0.5% by weight of the asphalt. Such additive material shall be of quality and grade acceptable to Doyon Utilities' Authorized Representative.

At least 70% of the aggregate shall remain coated with asphalt when tested in accordance with AKDOT&PF ATM 414.

C. Seal Coating Cover Aggregate

Cover aggregate shall consist of sound durable crushed gravel and shall be free of organics, silt, clay, or any other objectionable matter to the satisfaction of Doyon Utilities' Authorized Representative. Wear shall not exceed 40% after 500 revolutions as determined by ASTM C131. Coarse aggregate shall include material retained on the #4 and larger sieves. 90% of coarse aggregate shall have at least two fractured faces in accordance with ASTM D5821. The cover aggregate shall have the following gradation:

Seal Coat Cover Aggregate

U.S. Std. Sieve	Cumulative % Passing by Weight
1/2"	100
3/8"	90 - 100
#4	10 - 30
#8	0 - 8
#20	0 - 1

D. Prime Coating Asphalt

Asphalt for prime coat shall be Asphalt Institute MC-30 or Doyon Utilities' Authorized Representative accepted equal.

E. Prime Coating Blotter Aggregate

The aggregate for blotter material shall conform to the gradation requirements of AASHTO M43, Size No. 10. The aggregate shall be free of organics, silt, clay, or any other objectionable matter to the satisfaction of Doyon Utilities' Authorized Representative.

F. Tack Coating Asphalt

Asphalt for tack coat shall be Asphalt Institute STE-1, "Snap-Tack" or Doyon Utilities' Authorized Representative accepted equal.

Article 40.04.3 - Construction

A. Base Preparation for Seal Coating and Prime Coating

The entire existing base and subgrade onto which seal coat or prime coat is to be applied shall be firm, unyielding, thawed material that is graded to the required line and grade, compacted to 95% minimum density per Division 20 - Earthwork, and cleaned of loose material, all to the satisfaction of Doyon Utilities' Authorized Representative.

Prior to the start of seal coating and prime coating operations, all unsuitable base and subgrade shall be removed and replaced with suitable compacted base and subgrade material in accordance with Division 20 – Earthwork or Section 40.03 Recycled Asphalt Pavement (RAP).

B. Existing Pavement Preparation for Tack Coating

Any soft spots, pot holes, or other substantial defects in existing pavement to be tack coated shall be cut out and repaired, including repair of the subgrade and base course as necessary, all to the satisfaction of Doyon Utilities' Authorized Representative. Cracks shall be sealed in accordance with Section 40.05 - Crack Sealant.

Just prior to the start of tack coating operations, the existing pavement surface shall be cleaned of dust, dirt, and other debris by power sweeping and blowing, water flushing, and/or other acceptable methods, and the existing pavement surface shall be allowed to dry sufficiently, all to the satisfaction of Doyon Utilities' Authorized Representative, prior to tack coating. Surface cleaning and drying shall be repeated at Contractor expense if necessary to provide a suitable clean and dry surface for tack coating.

C. General Seal, Prime, and Tack Coating Equipment Requirements

All seal, prime, and tack coating equipment shall be of sufficient size and adequate mechanical condition to meet the requirements and to produce seal coating, prime coating, and/or tack coating of the specified quality.

D. Asphalt Pressure Distributors

Asphalt distributors for seal, prime, and/or tack coating shall be pneumatic-tired, self-propelled, and shall have heated tanks with a capacities of not less than 800 gallons, equipped to agitate and circulate the asphalt during the heating process. Asphalt distributors shall be equipped with independently-operated asphalt pumps with tachometers calibrated in revolutions per minute, pressure gauges, volume metering devices, thermometers for reading the tank temperatures, and hose attachments suitable for applying asphalt to spots unavoidably missed by distributors. Full circulation spray bars shall be adjustable laterally and vertically, with extensions available for distributing widths from 8 to 15 feet by one foot increments, and shall provide for uniform distribution of asphalt. Valving shall be provided for quick and positive shut-off of asphalt without dripping. Distributors shall be designed, equipped, and maintained to distribute asphalt uniformly at consistent surface speeds and at uniform temperatures for various surface widths, at known and controlled rates of 0.05 to 2.0 gallons per square yard within a tolerance of 5%, and through pressure ranges from 25 to 75 pounds per square inch.

E. Aggregate Hauling Equipment

Cover or blotter aggregate shall be transported from the plant to the site in trucks having tight, clean, and smooth beds.

F. Cover and/or Blotter Aggregate Spreaders

Spreaders shall be self-propelled and capable of spreading the cover material uniformly for widths of 8 to 15 feet in one foot increments, and adjustable to spread uniform layers of 10 to 30 pounds per square yard. Revolving plate type chip spreaders shall not be approved.

G. Rollers

Rollers shall be self-propelled, pneumatic-tired, weighing not less than 5 tons and not more than 8 tons, distributed to provide 200 to 350 pounds of ground weight per inch of rolling width. Rolling shall follow closely behind spreading of seal coat cover aggregate.

H. Test Strips

The Contractor shall be required to lay test strips of not less than 15 feet in length each to demonstrate that the asphalt pressure distributor and its operator are capable of applying seal coating, prime coating, and/or tack coating asphalt at the required rates. Location of the test strips will be on-site as approved by Doyon Utilities' Authorized Representative. Notification of testing will be made to Doyon Utilities' Authorized Representative not less than two working days and 48 hours prior to making of the test strips. Doyon Utilities' Authorized Representative shall require as many tests as needed to verify that equipment meets the requirements of these Specifications and that the Contractor has sufficiently qualified personnel to complete this Work.

I. Weather Limitations

Asphalt for seal coating, prime coating, and/or tack coating shall not be placed during

rainy or threatening weather, and/or when the moisture, snow, or ice on the surface to be treated would prevent satisfactory bond, and/or when the air temperature is less than 40° Fahrenheit, and/or when the surface temperature is at or below 32° Fahrenheit.

J. Traffic Control

Traffic shall be controlled to avoid travel on fresh seal coat, prime coat, and/or tack coat asphalt, until the asphalt has set up so that it will not be damaged by vehicle traffic, as determined by Doyon Utilities' Authorized Representative.

K. Heating and Application of Asphalt

Asphalt shall be heated in such a manner as to insure even heating of the entire mass with an efficient and positive control at all times. The table below lists storage and application temperatures for various types of asphalt.

Seal, Prime, and Tack Coating Asphalt Products, Storage Temperatures, and Application Temperatures			
Type of Coating	Asphalt Product	Storage Temperature (^oF)	Application Temperature (^oF)
Seal Coating	CRS-2	100^o to 175^o	125^o to 175^o
Prime Coating	MC-30	140^o Maximum	85^o to 140^o
Tack Coating	STE-1	50^o to 125^o	70^o to 140^o

If specific asphalt product manufacturers' recommendations for asphalt storage and/or application temperatures differ from the values listed in the table above, manufacturers' recommendations shall take priority.

Asphalt shall be uniformly applied by the asphalt pressure distributor at rates as shown in the table below. The quantity of material as measured by the volume measuring device of the distributor shall not vary from the true quantity, as herein specified, by more than 5%.

Asphalt Application Rates	
Type of Coating	Application Rate (Gallons/Square Yard)
Seal Coating	0.40 to 0.55, 0.45 Average
Prime Coating	0.05 to 2.00 **
Tack Coating	0.05 to 0.10 **
** Exact rate to be specified by Plans or by Doyon Utilities' Authorized Representative.	

To avoid excessive application of asphalt, application shall not begin until the asphalt pressure distributor is moving forward at the required speed.

Seal coat asphalt shall not be applied in excess of the amount that can be covered with aggregate in the same working day and within daylight hours.

Prime coat asphalt shall not be applied in excess of the amount that can sufficiently penetrate the base course, or be covered with blotter aggregate if needed, all in the

same working day and within daylight hours.

Tack coat shall not be applied in excess of the amount that can be covered with new asphalt pavement in the same working day and within daylight hours.

Seal coat, prime coat, and/or tack coat asphalt, applied where the above criteria cannot be complied with, is subject to rejection by Doyon Utilities' Authorized Representative, and removal and replacement at Contractor expense.

Building paper, plastic sheathing, and/or other suitable covering shall be used at the beginning and/or end of the spread to provide a positive cut-off at the desired limits, and to mask any surfaces that are not to receive seal, prime, or tack coat. Building paper and other protective materials shall be properly disposed of after use.

All deficiencies in application of seal coat, prime coat, and/or tack coat asphalt shall be corrected to the satisfaction of Doyon Utilities' Authorized Representative.

L. Application, Maintenance, and Clean-Up of Seal Coat Cover Aggregate

Cover aggregate shall be sufficiently dry when it comes in contact with asphalt such that a satisfactory bond or coating is obtained. The moisture content of cover aggregate shall not exceed 2% by weight.

Immediately following the application of the asphalt, the aggregate cover material shall be uniformly spread over the surface with an approved mechanical spreader at a rate of 22 to 30 pounds per square yard. All seal coating asphalt shall be covered with aggregate in the same working day that the seal coat asphalt is applied to the base course. The cover material shall be applied continuously and without delay until the asphalt is covered.

Whenever possible, a successive strip of cover aggregate shall be applied before the previous strip has cooled. Cover material shall not be spread on the 6 inches adjacent to an unprotected edge until the next strip of bituminous material has been applied.

Rolling shall immediately follow the application of the cover material. At least three complete roller passes shall be made over the entire seal coat area. Rolling shall continue only long enough to "set" the cover material in the asphalt, but shall not cause crushing of cover material.

If the cover material is distributed or thrown off the surface by traffic, it shall be moved back into place. Areas with a deficiency or excess of cover material shall be corrected to the satisfaction of Doyon Utilities' Authorized Representative.

After application of the cover material, the surface shall be maintained by the Contractor for 5 calendar days. During this period the Contractor shall, at least once daily, redistribute the cover material that has become displaced by traffic back onto the seal coat area to the satisfaction of Doyon Utilities' Authorized Representative, of if contaminated, shall be disposed of and replaced with new cover material at Contractor expense.

When all possible cover material has been embedded in asphalt to the satisfaction of Doyon Utilities' Authorized Representative, the Contractor shall sweep the pavement surface of all excess cover material, and load, haul, and stockpile or dispose of excess cover material at a location designated by Doyon Utilities' Authorized Representative.

M. Application and Clean-Up of Prime Coating Blotter Aggregate

If, after the application of the prime coat, the asphalt material fails to penetrate to the satisfaction of Doyon Utilities' Authorized Representative, blotter aggregate shall be uniformly spread in an amount required to absorb any excess asphalt. Blotter aggregate shall be used only if acceptable to Doyon Utilities' Authorized Representative. Blotter aggregate, if required, shall be applied in the same working day as the prime coat asphalt was applied to the base course.

When blotter aggregate has suitably absorbed excess prime coat asphalt to the satisfaction of Doyon Utilities' Authorized Representative, the Contractor shall remove all excess blotter aggregate, and load, haul, and stockpile or dispose of excess blotter aggregate at a location designated by Doyon Utilities' Authorized Representative.

SECTION 40.05 - CRACK SEALANT

Article 40.05.1 - General

The work under this Section includes preparation and application of crack sealant consisting of hot asphalt and 1/4 inch minus aggregate. For asphalt pavement to be roto-milled, this work shall be performed after the asphalt has been roto-milled.

Refer to Section 40.01 – General for additional general requirements.

Article 40.05.2 - Material

A. Crack Sealing Asphalt

The Contractor shall submit a certified analysis of the proposed crack sealing asphalt, prepared by an acceptable asphalt testing laboratory, to Doyon Utilities' Authorized Representative for review and acceptance. A copy of the certified analysis shall accompany each shipment of asphalt to the Project. Doyon Utilities' Authorized Representative shall reserve the right to test asphalt received on the project site. Asphalt that is not in accordance with the certified analysis shall be rejected and replaced at Contractor expense.

Asphalt for crack sealing shall be Asphalt Institute STE-1, "Snap-Tack" or Doyon Utilities' Authorized Representative accepted equal.

B. Crack Sealing Aggregate

The aggregate shall consist of sound 1/4 inch minus material, free of organics, silt, clay, or any other objectionable matter to the satisfaction of Doyon Utilities' Authorized Representative. The aggregate shall have the following gradation:

U.S. Std. Sieve	Cumulative % Passing by Weight
1/4"	100
#4	85 - 1200
#8	0 - 25
#200	0 - 2

Article 40.05.3 - Construction

A. General

All crack sealing equipment shall be of sufficient size and adequate mechanical condition to meet the requirements and to produce crack sealing of the specified quality.

B. Asphalt Distributors

Asphalt distributors for crack sealing shall have heated tanks equipped to agitate and circulate the asphalt during the heating process. Asphalt distributors shall be equipped with independently-operated asphalt pumps, thermometers for reading the tank temperatures, and hose attachments suitable for applying asphalt in cracks. Valving shall be provided for quick and positive shut-off of asphalt without dripping. Hand held nozzles with nozzle pressures ranging from 20 to 50 pounds per square inch shall be provided for placing hot asphalt in cracks.

C. Crack Cleaning, Drying, and Deepening

Cracks shall be cleaned and all loose material shall be blown out to the full depth of the crack. The interiors of cracks shall be completely dried and existing asphalt surfaces shall be exposed to enable bonding of the sealant. All cracks shall have a minimum depth of 1 inch. If the crack does not have a minimum depth of 1 inch, the crack shall be deepened to a minimum of 1 inch by methods acceptable to Doyon Utilities' Authorized Representative.

D. Weather and Temperature Limitations

Crack sealing shall not be done during rainy or threatening weather, and/or when the moisture on the surface or in cracks would prevent satisfactory bond, and/or when the air and/or pavement temperature is less than 40º Fahrenheit.

E. Crack Sealing

Asphalt for crack sealing shall be stored at 50º to 125º Fahrenheit and applied at 70º to 140º Fahrenheit. If the specific asphalt product manufacturer's recommendations for asphalt storage and/or application temperatures differ from these values, the manufacturer's recommendations shall take priority.

Cracks less than 1/2 inch in width shall be filled hot asphalt only. Cracks more than 1/2 inch in width shall be filled hot asphalt and 1/4 inch minus aggregate. Cracks shall be entirely filled with sealant to the pavement surface to the satisfaction of Doyon Utilities' Authorized Representative.

Aggregate placement shall immediately follow hot asphalt application. All loose aggregate shall be removed after the crack sealant has cooled and set.

For wide cracks, potholes, or other breaks in existing asphalt surface which, in the opinion of Doyon Utilities' Authorized Representative, are too large for crack sealing, Doyon Utilities' Authorized Representative shall direct the Contractor to remove existing pavement, repair the subgrade and base, and patch with asphalt concrete in accordance with Section 40.06 - Asphalt Pavement.

SECTION 40.06 - ASPHALT PAVEMENT

Article 40.06.1 - General

The work under this Section includes construction of asphalt pavement on a prepared base.

Refer to Section 40.01 – General for additional general requirements.

Article 40.06.2 - Material

A. Asphalt Cement

The Contractor shall submit a certified analysis of asphalt cement, prepared by an acceptable asphalt testing laboratory, to Doyon Utilities' Authorized Representative for review and acceptance. A copy of the certified analysis shall accompany each shipment of asphalt cement to the asphalt mixing plant. Doyon Utilities' Authorized Representative may perform acceptance tests of the asphalt cement, and asphalt cement not in accordance with the accepted certified analysis shall be rejected.

1. For Class A asphalt paving mix, the asphalt cement shall conform to AASHTO M320 and to the following requirements:

   Performance Grade of Asphalt Binder.....PG 64-28
   Softening Point, minimum (AASHTO T53) ..... 125˚ F
   Toughness, minimum (ASTM D5801) .....110 In-Lbs
   Tenacity, minimum (ASTM D5801).....75 In-Lbs

2. For other classes of asphalt paving mix, the asphalt cement shall conform to the requirements of AASHTO M320 and Performance Grade Asphalt Binder PG 52-28.

B. Aggregate

1. Aggregate for Class A Asphalt Paving Mix

Coarse aggregate shall be sound, tough, durable rock of uniform quality, produced entirely from a crushing operation. All natural fines, organic matter, and/or other deleterious material shall be removed before crushing. Coarse aggregate shall be screened again after crushing to remove any oversize material and any material passing the No. 4 sieve. All completely processed coarse aggregate shall be free from coatings or lumps of clay, silt, or other objectionable matter to the satisfaction of Doyon Utilities' Authorized Representative. Coarse aggregate shall meet the following requirements:

Coarse Aggregate for Class A Asphalt Paving Mix		
Property	Test Method	Requirement
%Sodium Sulfate Loss (5 cycles)	ASTM C88	9% Maximum
% Fracture (Two Surfaces)	ASTM D5821	90% Minimum
Flat & Elongated Particles: 3 to 1 5 to 1	ASTM D4791	 15% Maximum 5% Maximum
Nordic Abrasion	ADOT&PF AMT 312	12% Maximum
Absorption	AASHTO T85	2% Maximum

Fine aggregate shall be sound, tough, durable crushed rock of uniform quality, and not coated with silt or clay. All material retained on the No. 4 sieve, organic matter, and/or other deleterious material shall be removed before crushing. Fine aggregate shall consist entirely of aggregate produced from a crushing operation, and shall be non-plastic as determined in accordance with AASHTO T90. Fine aggregate shall also meet AASHTO M29 (including S1.1 - Sulfate Soundness), and the following requirements:

Fine Aggregate for Class A Asphalt Paving Mix		
Property	Test Method	Requirement
Uncompacted Void Content of Fine Aggregate (Fine Aggregate Angularity)	AASHTO T304	45% Minimum

2. Aggregate for Class D and E Asphalt Paving Mix

Coarse aggregate shall be sound, tough, durable crushed rock of uniform quality, produced entirely from a crushing operation. All natural fines, organic matter, and/or other deleterious material shall be removed before crushing. Coarse aggregate shall be screened again after crushing to remove any oversize material and any material passing the No. 4 sieve. All finished coarse aggregate shall contain at least 80% by weight of particles having a minimum of two mechanically fractured surfaces and shall be free from coatings or lumps of clay, silt, or other objectionable matter to the satisfaction of Doyon Utilities' Authorized Representative.

Coarse aggregate shall be tested for soundness in accordance with the requirements of ASTM C88, or shall have a satisfactory soundness record.

When coarse aggregate grading is such that the material will tend to segregate in stockpile or handling, it shall be supplied in two or more sizes. Each size of aggregate required to produce the combined graduation specified shall be placed in an individual stockpile at the plant site and separated by bulkheads or other means. When necessary to blend two or more aggregate sizes, the blending shall be done through separate bins at the cold elevator feeders, and not in the stockpiles.

Fine aggregate shall be clean, tough, durable, moderately sharp naturally occurring sand and/or crushed material passing the No. 4 sieve, free of organic matter, and/or other deleterious material to the satisfaction of Doyon Utilities' Authorized Representative. Fine aggregate shall be tested for soundness in accordance with ASTM C88, specifically using 5 cycles of sodium sulphate solution with a maximum weight loss of 9%, or shall have a record of soundness acceptable to Doyon Utilities' Authorized Representative.

Fine aggregate shall be maintained in individual stockpiles, suitably separated to prevent intermingling with other products.

C. Mineral Filler

Mineral Filler shall conform to the requirements of ASTM D242.

D. Additive Materials

A "non-stripping" additive shall be added to the asphalt in the amount determined by AKDOT&PF ATM 414, or 0.25% by weight of the asphalt cement, if approved by Doyon Utilities' Authorized Representative. Such additive material shall be of quality and grade acceptable to Doyon Utilities' Authorized Representative. At least 70% of the aggregate shall remain coated when tested in accordance with AKDOT&PF ATM 414.

E. Asphalt Paving Mixes

Asphalt paving mixes prepared under these Specifications shall be composed of aggregate and asphalt cement within the limits set forth in the following table:

Asphalt Paving Mix Aggregate % by Weights Passing Sieves and Asphalt Cement Content			
Sieve Size	Class A	Class D	Class E
1"	-----	-----	-----
3/4"	100	-----	100
1/2"	68 - 82	100	78 - 96
3/8"	52 - 64	75 - 92	66 - 86
#4	36 - 46	50 - 68	46 - 66
#8	26 - 36	32 - 50	34 - 52
#16	16 - 28	20 - 38	24 - 42
#30	10 - 20	14 - 30	16 - 32
#50	6 - 16	10 - 24	10 - 24
#100	4 - 12	7 - 16	7 - 16
#200	3 - 8	3 - 9	3 - 9
Asphalt Cement (% by weight of total mix.)	5.0 – 7.0	5.0 – 7.0	5.0 – 7.0

The Contractor shall submit a Job Mix Design for acceptance by Doyon Utilities' Authorized Representative. The Job Mix Design shall comply with the limits specified above for each class of mix designated on the Plans or in the Special Provisions, or directed by Doyon Utilities' Authorized Representative. Within each mix design the Contractor shall provide correction factor ignition points generated in accordance with AASHTO T308. The aggregate gradation of the job-mix formula, when plotted upon an aggregate grading chart, shall closely approximate the shape of average gradations for the limits specified. For that portion of the aggregate passing No. 4 sieve, gradations which range from at or near the maximum of one sieve to at or near the minimum of the next sieve will not be permitted. Doyon Utilities' Authorized Representative may require increased asphalt cement content up to 0.5% above that indicated by Marshall Design Criteria at Contractor expense. Upon requiring increased asphalt content, the lower limit of percent voids and the upper limit of percent voids filled shall be waived.

The use and proportions of anti-strip agents shall be determined by AKDOT&PF ATM 414 and be included in Job Mix Design.

For the Marshall Mix Design, 50 blows of the compaction hammer shall be used per side of specimen.

Tolerances to the approved Job Mix Design shall not exceed the permissible variations presented in the following table. The Job Mix Design band shall mean the approved Job Mix Design plus-or-minus the numeric values for the maximum permissible variations.

Asphalt Paving Mix Maximum Permissible Variation (Percentages by Weight of Total Aggregate)		
Sieve Size	Class A	Class D & E
3/8" and Larger	± 6.0	± 5.0
#4	± 5.0	± 5.0
#8	± 5.0	± 4.0
#16, #30 & #50	± 4.0	± 4.0
#100	± 3.0	± 3.0
#200	± 2.0	± 2.0
Asphalt	± 0.4	± 0.4

When these permissible variations are applied to the Class A Job Mix Design, the broad band limits may be exceeded only as follows:

1. The 3/4 inch and No. 200 sieves shall not exceed the broad band limits in the "Asphalt Paving Mix Aggregate Percentages by Weights Passing Sieves and Asphalt Cement Content" table above.
2. All other sieves may exceed the broad band limits in the "Asphalt Paving Mix Aggregate Percentages by Weights Passing Sieves and Asphalt Cement Content" table above for the respective sieve sizes in the "Asphalt Paving Mix Maximum Permissible Variation" table above, provided that the Job Mix Design band is not exceeded.

When these permissible variations are applied to the Class D or Class E asphalt concrete Job Mix Designs, the individual sieve shall not exceed the Broad Band limits in the "Asphalt Paving Mix Aggregate Percentages by Weights Passing Sieves and Asphalt Cement Content" table above.

The Job Mix Design shall be determined according to the Marshall Method, as set forth in The Asphalt Institute Manual Series No. 2 (M5-2), Fourth Edition.

Compacted Job Mix Design specimens shall conform to the aforementioned specifications within the following limits:

Compacted Job Mix Design Limits		
Parameter	Class A	Class D & E
Stability (Marshall) Pounds Minimum	1200	1200
Flow (Marshall) Maximum	8 to 16	8 to 16
Percent Voids	2.5 to 4.5	3 to 5
Percent Voids Filled with Asphalt	70 to 80	75 to 85

Article 40.06.3 - Construction

A. Paving Plan

The Contractor shall submit a Paving Plan a minimum of 14 calendar days prior to paving operations for review by Doyon Utilities' Authorized Representative. The plan shall consist of at least the following items:

1. Paving schedule to include sequence of operations.
2. Plant operating capacity, target production rate, process control, testing methods, and frequency of testing for aggregate gradation and moisture content and asphalt cement content.
3. Number and capacity of trucks, cycle time, and delivery rate.
4. The manufacturer and model of the paver, and pick-up machine if used, to include information on grade followers, sensors, operating speed, and production rate of the pavers.
5. Number, type(s), and weight(s) of rollers.
6. Location and method of constructing longitudinal and transverse joints.
7. Construction plans for paving of roads, intersections, and driveways.

B. General Equipment Requirements

All equipment furnished by the Contractor shall be maintained in a sound mechanical condition. Equipment shall be serviced and lubricated away from the paving site. Equipment that drips fuel, oil, and/or grease shall be removed from the project until such leakage is corrected to the satisfaction of Doyon Utilities' Authorized Representative.

C. Asphalt Mixing Plants

The plant used by the Contractor shall be designed and operated to produce a mix uniformly within the Job Mix Design tolerances as listed herein and in accordance with AASHTO M156. The plant may be either a weight batch type or a volumetric proportioning, continuous/drum mixing type, provided the equipment has demonstrated that it is suitable for producing asphalt concrete complying with the required Job Mix Design to the satisfaction of Doyon Utilities' Authorized Representative. The plant shall have a current Air Quality Permit issued by the State of Alaska.

The Contractor shall calibrate the plant not more than 30 days in advance of production and furnish copies of the calibration data to Doyon Utilities' Authorized Representative at least 14 calendar days prior to asphalt concrete production. Plant metering systems and scales shall be calibrated to the accuracy specified in AASHTO M156. Proportioning (batch) scales shall not be used for weighing material for payment.

The plant shall be equipped with the necessary equipment for storing, handling, drying, heating, and mixing the aggregate, mineral filler if used, and asphalt cement. Satisfactory means shall be provided for quality control of aggregate, mineral filler if used, and asphalt cement as to quantity and temperature. Aggregate, mineral filler, and asphalt cement sampling locations shall be provided and shall comply with OSHA safety requirements. Adequate safety measures shall be provided on stairs, gears, pulley, chains, sprockets, and all other potentially dangerous moving parts.

Asphalt cement shall be heated at the mixing plant to a temperature at which it can be

properly handled through the pumping system and to provide a material sufficiently fluid to produce a uniform coating on every particle of aggregate within the specified mixing time., but at no time shall the temperature of the asphalt cement exceed that recommended by the asphalt cement manufacturer, or be greater than 325º Fahrenheit or less than 250º Fahrenheit.

Aggregate and mineral filler, if used, shall be heated and dried to a temperature compatible with the mix requirements specified. The burner on the dryer shall be properly adjusted to avoid damage to the aggregate and mineral filler, if used, and to avoid the presence of unburned fuel on the aggregate and mineral filler. Any asphalt concrete mixture in which soot or fuel is present shall be wasted at Contractor expense.

Drying operations shall reduce the aggregate and mineral filler moisture content so that the resulting moisture content of the asphalt paving mix, sampled at the point of acceptance for asphalt cement content, shall be no more than 0.5% by total weight of mix as determined by AKDOT&PF ATM 407.

Aggregate shall be stored at the plant in such a manner that the separate sizes will not become intermixed. Cold aggregate shall be carefully fed to the plant in such proportions that surplus or shortages in the hot bins will not cause breaks in the continuous operations.

Stockpiles and bins shall be sampled and tested for gradation analysis, dust coating, and for other purposes, at the option of Doyon Utilities' Authorized Representative.

Aggregates shall be screened into sizes that may be recombined into a gradation meeting the requirements of the Job Mix Formula. Screens shall have normal capacities in excess of the rated production capacity of the mixer and dryer.

Dust collected during the drying operation may be fed uniformly back into the hot aggregate prior to screening, provided a position mechanical feed is used which will control the feed-back to the quantity specified by Doyon Utilities' Authorized Representative.

Hot aggregate shall be stored in such a manner as to minimize segregation and loss of temperature.

When the mix is produced in a batch type plant, the aggregate shall be accurately weighed in the proper proportions to provide the batch weight.

The plant shall be equipped with a positive means to govern the time of mixing. Mixing time shall not be altered unless requested by Doyon Utilities' Authorized Representative.

A dry aggregate mixing period of not less than 10 seconds shall precede the addition of the asphalt cement to the mix.

The temperature of the aggregate, mineral filler, if used, and asphalt cement immediately prior to mixing shall be approximately that of the completed batch. In no case shall the temperature of the aggregate, mineral filler, if used, and asphalt cement vary more than 25º Fahrenheit from one another when placed in the mixing chamber.

Wet mixing shall continue as long as is necessary to obtain a thoroughly blended mix. Excess wet mixing shall be avoided. The minimum percent of coated particles used to establish the mixing time interval shall be 95% as determined by AASHTO T195.

D. Hot-Mix Haul Trucks

Trucks used for the transportation of asphalt paving mix from the plant to the project shall have tight metal bottoms and shall be free from dust, screenings, petroleum oils, volatiles, and other mineral spirits which may affect the asphalt paving mix being hauled. The truck beds shall be cleaned and then elevated and thoroughly drained at least once a day, all to the satisfaction of Doyon Utilities' Authorized Representative.

When requested by Doyon Utilities' Authorized Representative, trucks shall be equipped with covers of canvas or other suitable material, and insulated boxes, to protect asphalt paving mix from adverse weather conditions and to maintain the required mix temperatures.

E. Truck Scales

Asphalt paving mix shall be weighed on platform scales furnished by the Contractor or on public scales at the Contractor's expense. All scales shall be satisfactory to Doyon Utilities' Authorized Representative and shall be certified and sealed by the State of Alaska as often as Doyon Utilities' Authorized Representative may deem necessary to ensure scale accuracy.

F. Pavers

Asphalt pavers shall be self-propelled units provided with heated vibratory screeds. The term "screed" includes any adjustable mechanical device which is effective to strike off asphalt paving mix within the required temperature range without tearing, gouging, or segregating the mix, and which produces a finished surface of an even and uniform texture and of the required thickness.

Pavers shall be equipped with receiving hoppers having sufficient capacity for uniform spreading operations. Hoppers shall be equipped with auger systems to spread asphalt paving mix uniformly in front of screeds without segregation. Auger extensions shall be within 18 inches of the screed extensions on both sides.

Pavers shall be equipped with means of preventing the segregation of the coarse aggregate from the remainder of the asphalt concrete mixture, such as chain curtains, deflector plates, other devices, or any combination of these devices. Mechanisms proposed by Contractor for preventing segregation of coarse aggregate in pavers shall be satisfactory to Doyon Utilities' Authorized Representative.

The following specific requirements apply to the following identified pavers:

1. Blaw-Knox asphalt pavers shall be equipped with the Blaw-Knox Materials Management Kit (MMK).
2. Cedarapids asphalt paver must have been manufactured in 1989 or later.
3. Caterpillar asphalt pavers shall be equipped with deflector plate Models 6630, 6631, or 6640.

Grade and cross slope shall be controlled through the use of automatic grade and slope control devices. The paver screed control system shall be automatically actuated by the use of an erected string-line or a mobile string-line (ski) at least 30 feet in length on the high side of the paver. Grade control shall be provided on both the high and low sides, or grade control shall be provided on the high side and slope control shall be provided on the low side. The Contractor may request a waiver for the screed control system

(string-line or ski) at extreme horizontal or vertical curves or unusual cul-de-sac and/or street configurations.

For trails, pavers shall be capable of placing the required thickness in one lift with a minimum paving width of 5 feet. Truck-towed spreader-type equipment will be permitted, providing that pavement width and depth requirements can be met.

Pavers shall be capable of placing courses in thicknesses of 1/2 inch to at least 3 inches and shall be adjustable in increments of 6 inches in width.

G. Rollers

Rollers shall be self-propelled, reversible, and equipped to maintain clean and straight contact surfaces. Heat shall be maintained on pneumatic tires by skirting or other approved devices.

The number, weight, and type of rollers furnished shall be sufficient to obtain the required density and surface requirements while the paving mix is in a workable condition. At least one pneumatic-tired roller and one vibratory drum roller shall be furnished and operated in a workmanlike manner by the Contractor to the satisfaction of Doyon Utilities' Authorized Representative. One qualified operator shall be provided for each roller.

All rollers shall be equipped with power units of not less than four cylinders. Rollers shall be in good working condition and be free from backlash, faulty steering mechanism, or worn parts.

Vibratory drum rollers shall be equipped with adjustable scrapers to keep the drums clean and with efficient means of keeping the drums and/or wheels wet to prevent asphalt paving mix from sticking to the drums and/or wheels. Drums shall be free of flat areas, openings, or projections which will mar the surface of the pavement.

Pneumatic tired rollers shall ride on not less than seven uniformly sized and uniformly inflated smooth tires mounted on wheel rims of 20 inch minimum diameter. The rear group of tires shall align behind and cover the spaces between the forward group of tires. Tires shall be inflated, and the roller ballasted, to provide a uniform ground contact weight of 70 pounds per square inch plus or minus 5 pounds per square inch, unless a lower weight is requested by Doyon Utilities' Authorized Representative. If pneumatic rollers experience pick-up problems, the Contractor shall be add an effective release agent to tire watering tanks.

H. Hand Tools

Lutes or asphalt rakes shall be used during the spreading operation and when finishing by hand. Tamping irons shall weigh not less than 25 pounds and shall have a bearing area not exceeding 48 square inches. Mechanical compaction equipment, satisfactory to Doyon Utilities' Authorized Representative, may be used instead of tamping irons.

I. Straightedges

The Contractor shall provide 10 feet and 16 feet straightedges to test the finished surface. The 16 feet straightedges shall be used on straight sections and the 10 feet straightedges shall be used on vertical curves or crown.

J. Preparation of Granular Base for New Pavement

The entire existing base to be paved shall be firm, unyielding, thawed leveling course

per Division 20 – Earthwork, or recycled asphalt pavement per Section 40.03 - Recycled Asphalt Pavement (RAP), that is at least 2 inches thick or more as shown on the Plans, called out in the Special Provisions, or directed by Doyon Utilities' Authorized Representative, graded to the required lines and grades, compacted to 95% minimum density per Division 20 - Earthwork, and cleaned of loose material, all to the satisfaction of Doyon Utilities' Authorized Representative. The pavement base shall extend at least one foot beyond new pavement wherever physically possible.

Prior to the start of paving operations, all unsuitable base shall be removed and replaced with suitable compacted base material in accordance with Division 20 - Earthwork, or Section 40.03 Recycled Asphalt Pavement (RAP).

If required, the base shall be prime coated in accordance with Section 40.04 - Seal Coat, Prime Coat, and Tack Coat.

K. Preparation of Existing Pavement for New Pavement Overlay

Roto-milling of existing pavement, if required, shall be in accordance with Section 40.02 – Asphalt Pavement Roto-Milling.

Any soft spots, pot holes, or other substantial defects in existing pavement shall be cut out and repaired, including repair of the subgrade and/or base course as necessary, all to the satisfaction of Doyon Utilities' Authorized Representative.

Cracks in existing pavement shall be filled in accordance with Section 40.05 - Crack Sealant.

Existing pavement shall be cleaned and tack coated in accordance with Section 40.04 - Seal Coat, Prime Coat, and Tack Coat.

L. Prior Acceptance of Areas to be Paved

The Contractor shall request inspection of areas to be paved from Doyon Utilities' Authorized Representative at least one full working day prior to paving. Doyon Utilities' Authorized Representative shall inspect the grade by use of string lines, straightedges, levels, compaction testing equipment, and/or any other means determined to be necessary by Doyon Utilities' Authorized Representative. Upon determining the base that has been proposed for paving is in conformance with the Plans and Specifications, or after correction of any defects to the satisfaction of Doyon Utilities' Authorized Representative, written authorization will be provided for the Contractor to proceed with the paving. The Contractor shall not initiate paving prior to receiving written authorization to proceed.

The finished surface of the granular base, existing pavement to be overlain, or roto-milled pavement shall not deviate in excess of 3/8 inch in 10 feet parallel with, and at right angles to, the centerline, or more than 5/8 inch total from centerline to face of curb of the area to be paved. Any deviation in excess of these amounts shall be corrected to the satisfaction of Doyon Utilities' Authorized Representative so that the finished surface meets required tolerances.

When multiple new pavement lifts are specified on the Plans or directed by Doyon Utilities' Authorized Representative, subsequent lifts shall not be placed until all lower lifts have been completely placed and accepted by Doyon Utilities' Authorized Representative.

M. Joints

All joints shall be constructed to ensure a continuous bond between existing and new sections of the asphalt pavement. All joints shall present the same texture and smoothness as other sections of the asphalt pavement.

Paving operations shall be planned and conducted to minimize the number of longitudinal joints. Longitudinal joints in subsequent layers shall offset from the longitudinal joints in layers immediately below by at least 6 inches. Longitudinal joints of the top layer of pavement shall be aligned to either the centerline of the road or to lane lines.

Transverse joints shall not be perpendicular to centerline, but shall be skewed between 15º and 25º.

All cold joints, where new asphalt pavement is to be placed against existing ambient temperature asphalt pavement, shall be formed by saw cutting back on the existing asphalt pavement to expose a vertical full depth edge on the existing pavement, and removing and disposing of existing loose cut-off pavement debris, all to the satisfaction of Doyon Utilities' Authorized Representative. Exposed cut edges of existing pavement shall be protected from damage prior to new paving, and cut pavement edges that are damaged prior to new paving shall be re-sawed and corrected, all to the satisfaction of Doyon Utilities' Authorized Representative and at Contractor expense.

Just prior to placing fresh asphalt paving mix at a cold joint, a tack coat of asphalt cement or asphalt emulsion shall be carefully applied on all vertical faces of existing pavement. Tack coat shall be similarly applied to Portland cement concrete curb and gutter, sidewalks, foundations, or similar structures and to utility cast iron manhole and catch basin frames, valve boxes, or similar components when placing new asphalt pavement against these structures or components. All tack coating shall be to the satisfaction of Doyon Utilities' Authorized Representative.

Rolling of joints after the asphalt paving mix has cooled below 170º Fahrenheit shall not be allowed.

The Contractor shall not pave against newly placed concrete curbing until said curbing has cured for a minimum 7 days.

Improperly formed joints resulting in surface irregularities shall be saw cut in neat lines, removed full depth, and replaced with fresh asphalt paving mix to the satisfaction of Doyon Utilities' Authorized Representative and at Contractor expense.

N. Weather, Temperature, and Subgrade Limitations

Asphalt paving mix shall not be placed when the following conditions are present:

1. During rainfall or when rain is imminent in the opinion of by Doyon Utilities' Authorized Representative.
2. When the ambient air temperature is colder than 40º Fahrenheit.
3. When the temperature is falling and is likely to fall below 40º Fahrenheit, in the opinion of Doyon Utilities' Authorized Representative, prior to completion of paving operations for the day.
4. On subgrades colder than 40º Fahrenheit.

5. On saturated, unstable, and/or soft subgrade.

Air temperature shall be measured in the shade away from heat sources at the paving site.

O. Delivery of Mix

The dispatching of the hauling trucks shall be scheduled so that all delivered asphalt paving mix shall be placed and rolled in daylight. Asphalt delivery shall be managed to provide for continuous and efficient paving operations to the satisfaction of Doyon Utilities' Authorized Representative.

When backing trucks up to the paver, care shall be taken not to jar the paver.

P. Spreading

The asphalt paving mix shall be placed on the subgrade surface at a temperature not less than 250º Fahrenheit or greater than 300º Fahrenheit. Additionally, the maximum temperature to which the asphalt paving mix is heated shall not exceed the asphalt manufacturer's recommendations. The asphalt paving mix temperature shall be measured directly behind the paver screed at the time of placement. Asphalt paving mix that is outside of the specified temperature limits, as determined by Doyon Utilities' Authorized Representative, shall be subject to rejection.

The asphalt paving mix shall be spread, struck-off, and compacted to the elevations, thickness, centerline grades, and transverse slopes specified on the Plans or as directed by Doyon Utilities' Authorized Representative.

The texture of the unrolled surface shall be checked to determine its uniformity. Paver adjustments shall be checked frequently to assure uniform spreading of the mix. Segregation of the material shall not be permitted. If segregation occurs, the spreading operation shall be immediately suspended until the cause is determined and corrected.

Any irregularities left by the paver shall be corrected by trimming directly behind the paver to the satisfaction of Doyon Utilities' Authorized Representative. Improperly corrected irregularities shall be removed and replaced at Contractor expense.

Longitudinal edges, against which additional pavement is to be placed, shall be vertically formed in straight lines.

At longitudinal joints, the paver shall be positioned so that when spreading, the just-place asphalt paving mix overlaps the edge of the lane previously placed by 1 to 2 inches and is sufficiently thick to allow for compaction. The coarse aggregate in the material overlapping the joint shall all be raked out into the cold lane immediately behind the paver, broomed up, and wasted. Scattered coarse aggregate shall not be rolled into the surface of either lane.

Where unavoidable obstacles make the use of mechanical spreading and finishing equipment impracticable, the asphalt paving mix shall be spread, raked, and luted by hand tools. For such areas, the asphalt paving mix shall be placed and compacted to the required elevations, thickness, centerline grades, and transverse slopes.

Asphalt paving mix which is contaminated or segregated, as determined by Doyon Utilities' Authorized Representative, shall be rejected and replaced at Contractor expense.

Q. Compaction

Immediately after asphalt paving mix has been spread and struck off, and surface irregularities have been corrected to the satisfaction of Doyon Utilities' Authorized Representative, asphalt paving mix shall be thoroughly and uniformly compacted by rolling.

The surface shall be rolled when the mixture is in the proper condition and when the rolling does not cause undue displacement, cracking, or shoving.

Initial rolling shall be done with a steel-drum roller with the drive roll operating toward the paver, and/or a suitable pneumatic tired roller. Initial rolling shall be completed while the bituminous mat temperature is above 225º Fahrenheit.

Following the initial rolling, at least three complete passes over the entire pavement surface shall be completed with a pneumatic tired roller, while the mat temperature is above 175º Fahrenheit.

Final rolling shall be completed with a steel–drum roller and shall continue until roller marks and further compression are not evident in the pavement and the minimum density has been achieved.

Unless otherwise directed, rolling shall begin at the sides and proceed longitudinally parallel to the road center line, each trip overlapping one-half the roller width, gradually progressing to the crown of the road. When paving adjacent to a previously placed lane, the longitudinal joint should be rolled first followed by the regular rolling procedure. On super-elevated curves, the rolling shall begin at the low side and progress to the high side by overlapping of longitudinal trips parallel to the centerline.

Care shall be exercised during rolling not to displace the line and grade of the edges of the pavement, and not to cause pavement irregularities by reversing of rolling direction.

To prevent adhesion of the asphalt paving mix to the rollers, the wheels shall be kept properly moistened with water or water mixed with very small quantities of detergent or other approved material. Excess liquid shall not be permitted.

Rollers and other vehicles shall not be parked or left standing on pavement that has not cooled sufficiently to prevent indentation by wheels.

Any pavement irregularities occurring from rolling operations shall be corrected to the satisfaction of Doyon Utilities' Authorized Representative. Improperly corrected irregularities shall be removed and replaced at Contractor expense.

Along curbs, walls, and other places not accessible to the rollers, asphalt paving mix shall be thoroughly compacted with hot hand tampers or with vibratory plate compactors.

R. Asphalt Pavement Density, Thickness, and Surface Requirements

All asphalt roadway pavement shall have a density equal to or greater than 96% of maximum density (Marshall Method), and all trail asphalt pavement shall have a density equal to or greater than 90%.

The thickness of finished pavement shall be in accordance with the Plans, Special Provisions, or as directed by Doyon Utilities' Authorized Representative, with tolerances of plus ¼ inch and minus zero.

The final pavement surface shall be of a uniform texture and shall conform to lines,

elevations, centerline grades, transverse slopes, and cross sections as shown on the Plans, and to the satisfaction of Doyon Utilities' Authorized Representative. Lines shall not deviate horizontally from design alignments as shown on the Plans by more than 3 inches in 100 feet. Elevations shall not deviate from design elevations as shown or indicated on the Plans by more than 0.02 feet. Ponding areas in the finished paved surface shall not be permitted.

Where pavement is being placed adjacent to curb and gutter, the compacted pavement surface shall be flush with to 1/4 inch above the top front edge of curb. The specified grade of the pavement surface shall be achieved through proper grading of the subgrade, in order not to exceed the design thickness of the pavement.

When requested, the Contractor shall provide Doyon Utilities' Authorized Representative with test samples of asphalt concrete cored from the finished pavement. All cores shall be at least 4 inches in diameter. All core holes shall be patched immediately by the Contractor to the satisfaction of Doyon Utilities' Authorized Representative.

If asphalt paving density, mat thickness, alignment, elevation, centerline grade, transverse slope, and/or cross section are found to be outside of the specification limits, all out-of-tolerance paving is subject to rejection by Doyon Utilities' Authorized Representative, and removal and replacement at Contractor expense.

S. Testing of the Delivered Asphalt Paving Mix

At the option of Doyon Utilities' Authorized Representative, delivered asphalt paving mix shall be sampled and laboratory tested for asphalt content, aggregate gradation, and other specified requirements, to confirm that the delivered mix is within specification limits and the tolerances of the Job Mix Design. If delivered asphalt paving mix is found to be outside of the specification limits and/or outside of the Job Mix Design tolerances, all paving completed with the out-of-tolerance mix is subject to rejection by Doyon Utilities' Authorized Representative, and removal and replacement at Contractor expense.

T. Vehicular Traffic

Contractor shall not allow vehicular traffic on the asphalt pavement surface until the surface has cooled to below 120º Fahrenheit. Any portion of the pavement that becomes loose, broken, rutted, or damaged in any way due to vehicular traffic on the asphalt mat surface prior to cooling to below 120º Fahrenheit, shall be removed and replaced with new asphalt paving mix to the satisfaction of Doyon Utilities' Authorized Representative at Contractor expense.

U. Repair and Replacement

Any area determined to have deficiency or unacceptable excess of asphalt pavement thickness, any asphalt paving mix that becomes contaminated with foreign material, and/or any asphalt pavement or paving mix that is in any other way defective as determined by Doyon Utilities' Authorized Representative shall be removed and replaced at Contractor expense and to the satisfaction of Doyon Utilities' Authorized Representative. Skin patching shall not be permitted. Defective pavement shall be removed for the full thickness of the course. The pavement shall be cut so that all edges are vertical, the sides are parallel to the direction of traffic, and the ends are skewed between 15º and 25º from perpendicular with centerline. Edges shall be coated with a thin tack coat of material. Fresh asphalt paving mix shall be placed in sufficient quantity so that the finished surface will conform to grade and smoothness requirements. The asphalt paving mix shall be compacted to the density specified.