PART 4

STANDARD MODIFICATIONS

AND SPECIAL PROVISIONS

to the

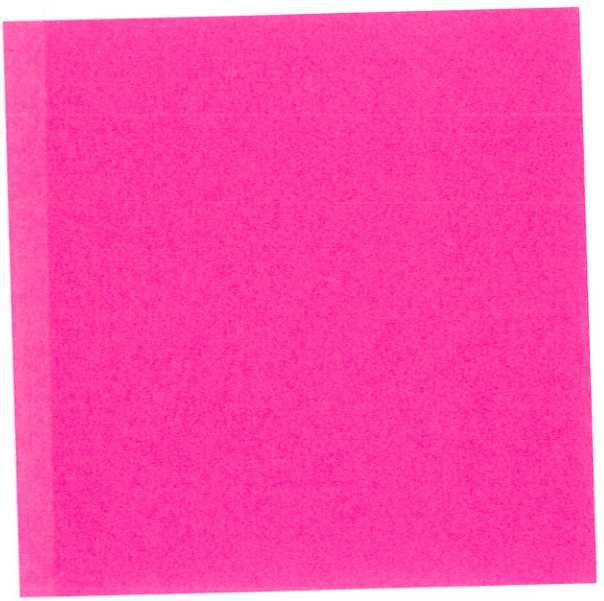
STATE OF ALASKA

SPECIFICATIONS

FOR

HIGHWAY CONSTRUCTION

2004



SECTION 101

DEFINITIONS AND TERMS

Standard Modifications

101-1.03 DEFINITIONS. *Replace the definitions of SUBGRADE with the following:*

SUBGRADE. The soil or embankment upon which the pavement structure is constructed.
E22(1/1/06)

SECTION 102

BIDDING REQUIREMENTS AND CONDITIONS

Standard Modifications

102-1.05 PREPARATION OF BID. *Modify the second sentence in the third paragraph, after:* "If a bidder is a corporation, the bid must be signed by a corporate officer," *add:* or agent.
E18(6/30/04)

SECTION 105

CONTROL OF WORK

Special Provisions

105-1.05 COOPERATION BY THE CONTRACTOR. *Add the following*: The City of Bethel will be constructing a new sewer line and removing the old sewer line at several locations within the project limits. **This work is expected to begin in July of 2006 and be completed in 2007.**

105-1.06 UTILITIES. *Add the following*: Request locates from all the utilities having facilities in the area. Use the Alaska Digline, Inc. Locate Call Center for the following utilities:

ALASKA DIGLINE, INC.
Locate Call Center Anchorage Area..... 278-3121 Statewide 800-478-3121 who will notify the following:
Bethel Utilities Corporation GCI Communications United Utilities, Inc.

Call the following utilities and agencies directly:

Contact the Central Region Maintenance & Operations Office at (907) 269-0760 to obtain the appropriate District Superintendent's phone number for this project.

There are various utility appurtenances located within the project limits. Utilities scheduled for relocation are addressed in the following utility specific sections.

Right of Way and/or Construction surveying is required before utility relocation.

Payment will be made as follows:

1. Subsidiary to Item 642(1) Construction Surveying, if the Contractor is required to provide the surveying as part of the contract and/or

2. Under Item 642(3) Three Person Survey Party, if the construction or Right of Way staking required by the utility is either in advance of the 2 week work plan, or not required by the contract.

The utility shall give the Contractor, through the Engineer, 15 calendar days advance written notice for required staking.
(09/01/04)R3

Specific coordination requirements for the specific utilities are included below:

Bethel Utilities Corporation, (BUC) has existing aerial facilities located within this project that will require adjustment. Notify BUC by calling 907-543-2949 to establish a point of contact and to

determine where to send the advance written notice. The following existing facilities have been identified as potential conflicts.

Location	Station	Type of Facility	Calendar Days Required
1. CEHH	11+45, 30ft +/- Lt.	BUC Pole # L3P88-1	5
2. CEHH	12+70, 40ft +/- Lt.	BUC Pole # L3P875	5
3. CEHH	141+56, Rt.	BUC Pole# L4P39-12	3
4. CEHH	150+82, 30ft.+/- Rt.	BUC Pole # L4P39-8-1	5
5. CEHH	**170+10, 35Ft+/-, Rt.**	**BUC Pole # L1P24-4**	**2**
6. RC	74+00+/-, Rt.	Anchor & Guys From BUC Pole# L2P140	4

Provide work items listed below before BUC commences with relocations.

Location No. 1, through **6.**: Provide required staking (right of way staking, special ditch etc.) and traffic control, flagging required to complete the relocation of the poles and load center service installation in these locations. Survey staking, traffic control, and flagging required for this location will be paid for under the 642 & 643 items

POLE SHORING LOCATIONS

Location	Station	Type of Facility	Calendar Days Required
1. CEHH	33+00+/-, Rt.	BUC Pole # L3P75	1
2. CEHH	70+60+/-, Rt.	BUC Pole # L3P47	1
3. CEHH	140+00 to 141+40 Rt.	BUC Pole # L1P23-1	1
4. RC	64+12, Rt.	BUC Pole #L1P38	1

Provide work items listed below before BUC commences with Pole Shoring.

Locations 1 **thru 4**: Provide staking and traffic control and flagging to enable the shoring in these locations. Provide adequate access and egress as required to enable the BUC crews to place and remove shoring equipment. Coordinate with BUC for the pole shoring that will need to be in place before beginning excavation operations in the vicinity of each of the pole location listed above. Pole shoring operations will only be done during the regular business hours between 0800 and 1600 Monday through Friday. No more than one pole will shored at any time and the Contractor will provide a minimum of 24-hour notice to move to the next pole requiring shoring. Once the shoring equipment is in place, the Contractor shall complete excavation and backfill operations adjacent to the poles before to the end of shift each day. Coordinate with BUC to enable the removal of the pole

shoring equipment each day. Pole shoring is required to enable the excavation and placement of culvert pipes and unclassified excavation operations. Provide the required surveying, staking, traffic control and flagging and access for these locations. Survey staking and traffic control for these locations will be paid for under the 642 & 643 items.

General Communications Inc. (GCI): has existing aerial and buried facilities location within this project that requires adjustment. Notify GCI by calling **907-229-9176 or local 543-4388** to establish a point of contact and to determine where to send the advance written notice. The following locations have been identified as potential conflicts.

Locations	Station	Type of Facility	Calendar Days
1. CEHH	45+70+/-, Lt.	Buried Cable	6
2. CEHH	84+10+/-, Lt. to 84+80+/-, Lt.	Buried Cable	6
3. CEHH	98+50+/-, Rt. to 99+20+/-, Rt.	Buried Cable	6
4. CEHH	**109+70+/-, Lt.**	**Buried Cable**	**6**
5. CEHH	171+30+/-, Lt. to 175+10+/-, Lt	Buried & Aerial Cables & TV-Pedestal, Pole	13

Provide work items listed below before GCI begins relocation.

Location 1 through 4: Provide the required staking (right of way staking, special ditch etc. culvert grading and alignment staking). When the special ditch and culvert grading information is completed and field locates of the existing buried GCI facilities have been performed a determination will be made how to proceed. Adjustment if required will be performed by GCI crews. Allow GCI crews the noted calendar days, provide required staking, traffic control and flagging for the adjustments and/or relocations. Surveying and traffic control required for these locations will be paid for under the 642 and 643 items.

United Utilities Inc., (UUI) has existing buried facilities located within this project that will require adjustment. Notify UUI by calling **907-543-2300** to establish a point of contact and to determine where to send the advance written notice. The following existing facilities have been identified as potential conflicts.

Location	Station	Type of Facility	Calendar Days Required
1. CEHH	10+40+/-, Lt to 15+00, Lt.	Buried T-Cables and T-Pedestal	8
2. CEHH	15+20+/-, Lt. to 21+70+/-, Lt.	Buried T-Cable	10
3. CEHH	27+15+/-, Rt. to 28+20+/-, Rt.	Buried Fiber Optic Cable	5
4. CEHH	44+30+/-, Lt to 44+60+/-, Lt.	Buried Copper Cable	5

Location	Station	Type of Facility	Calendar Days Required
5. CEHH	84+70+/-, Lt.	Buried Cables	5
6. CEHH	97+50+/-, Rt. to 98+50+/-, Rt.	Buried Cables	5
7. CEHH	110+25+/-, Lt to 111+40+/-, Lt.	Buried Fiber Optic Cable	5
8. CEHH	122+00, Lt to 123+20+/-, Lt.	Buried Cables	5
9. CEHH	127+50, Lt to 128+50, Lt	Buried Cable	5
10. CEHH	139+10+/-, Lt. to 142+90+/-, Lt.	Buried Fiber Optic Cable	10
11. CEHH	140+00+/-, Rt. to 141+20+/-, Rt.	Buried Cables and T-Pedestal	7
12. CEHH	159+15+/-, Rt. to 161+35+/- Rt.	Buried Cables	7
13. CEHH	165+00+/-, Rt. to 166+20+/-, Rt.	Buried Cables & T-Pedestal	5
14. CEHH	174+ 60+/-, Lt to 175+00+/-, Lt.	Buried Fiber Optic Cable	5
15. CEHH	175+60+/-, Lt. to180+85+/-, Lt.	Buried Cables	12
16. RC	54+30+/-, Lt. to 55+35+/-, Lt.	Buried Cable	10
17. RC	68+50+/-, Rt. to 70+10+/-, Rt.	Buried Cables & Fiber Optic Cable	20

Provide work items listed below before UUI commences with the relocations.

Locations 1,2,3,4,5,7,9,10,12,14,15,16. : Provide required staking for the special ditches, right of way if requested and traffic control, flagging required to complete the relocation in this location. When the special ditch grading information is completed and field locates of the existing buried UUI facilities have been performed a determination will be made how to proceed. Adjustment if required will be performed by UUI crews. Allow UUI crews the noted calendar days, provide required staking, traffic control and flagging for the adjustments and/or relocations. Surveying and traffic control required for these locations will be paid for under the 642 and 643 items.

Locations 8,11,12,13,17. : Provide a shoring plan to UUI for review and approval 5 calendar days, before beginning unclassified excavation or culvert installations operations in these locations. Once the staking of the unclassified excavation and field locates of the existing UUI facilities have been performed a determination will be made as how to proceed. Shoring may be required of the existing UUI facilities. The Contractor shall provide shoring. Shoring required for the UUI buried facilities will be considered subsidiary to the 203 items. UUI crews will perform adjustments and/or relocations if required. Allow UUI the noted calendar days and provide the required staking, traffic

control and flagging for the adjustments and/or relocations. Surveying and traffic control required for these locations will be paid for under the 642 and 643 items.

CULVERT PIPE LOCATIONS

Location	Station	Type of Facility	Calendar Days Required
1. CEHH	33+00+/-, Rt.	Buried Fiber Optic Cable	5
2. CEHH	45+70+/-, Rt. & Lt.	Buried Fiber Optic & Other Cables	5
3. CEHH	60+99+/-, Lt.	Buried Cable	5
4. CEHH	70+70+/-, Lt & Rt.	Buried Fiber Optic & Other Cables	5
5. CEHH	76+25+/-, Lt & Rt.	Buried Fiber Optic & Other Cables	5
6. CEHH	87+20+/-, Rt.	Buried Fiber Optic & Other Cables	5
7. CEHH	98+50+/-, Rt.	Buried Fiber Optic Cable	5
8.CEHH	100+70+/-, Rt.	Buried Fiber Optic Cable	5
9. CEHH	107+10+/-, Rt.	Buried Fiber Optic & Other Cables	5
10. CEHH	138+20+/-, Rt.	Buried Cable	5
11. CEHH	158+00+/-, Rt.	Buried Cables	5
12. CEHH	162+60+/-, Rt.	Buried Fiber Optic & Other Cables	4

Provide work items listed below before UUI commences with the relocations.

All Culvert Pipe Locations: Coordinate with UUI and provide the required pipe grading information and obtain field locates before beginning excavation in these locations. A determination will be made on how to proceed. If adjustment and/or relocation are required in these locations allow UUI the noted calendar days. Provide the required staking, traffic control and flagging to complete the adjustments and /or relocation in these locations. Staking, traffic control and flagging required for these locations will be paid for under the 642 and 643 items.

POTENTIAL SHORING LOCATIONS

Location	Station	Type of Facility
* **deleted row** * **1.** CEHH	48+**20**+/-, Rt. to 49+**50**+/-, Rt.	Buried Fiber Optic Cable
2. CEHH	8**2+90**+/-, Rt. to 84+05+/-, Rt.	Buried Fiber Optic Cable
3. CEHH	122+13+/-, Lt. to 123+19+/-, Lt.	Buried Cables

Location	Station	Type of Facility
4. CEHH	140+00+/-, Rt. to 141+20+/-, Rt.	Buried Cables
5. CEHH	159+15+/-, Rt.	Buried Cables
6. CEHH	165+00+/-, Rt. to 166+15+/-, Rt.	Buried Cables

Before beginning the unclassified excavation operations in the locations noted above provide a shoring plan to UUI for review and approval 5 calendar days in advance of excavation operations.

Locations 1 through **6**: Coordinate with UUI and provide shoring as required to maintain the depth of buried cables. Hand digging within two feet of the existing cables will be required. The Contractor shall provide shoring for the UUI facilities as required. Shoring will be considered subsidiary to the 203 items.

105-1.07 COOPERATION BETWEEN CONTRACTORS. *Add the following*: **The following projects will be under construction concurrently with this project:**

Owner	Project Name	Contractor
The Department SAS No.55694	**Bethel Airport Improvements Stage 1 and 1a**	**Knik Contractors**
The Department SAS No.56625	**Bethel Airport Improvements Stage 3**	**Knik Contractors**
The Department SAS No.55655	**Ptarmigan Street Paving**	**Knik Contractors**
The Department SAS No.54289	**Bethel Tundra Ridge Rehabilitation**	**Pending**
The Department	**Bethel Pavement Repair**	**Knik Contractors**
City of Bethel	**QFC No. 2 Lift Station and Forced Main Improvements**	**Pending**

Coordinate traffic control, construction, and material hauling operations with the prime contractor of the above project to minimize impact on the traveling public, and to minimize conflicts with the work being performed under the other contract.

Standard Modifications

105-1.16 FINAL ACCEPTANCE AND RECORD RETENTION. *Modify the first paragraph, Item 4., after*: "DOLWD" *add:* and State Department of Revenue.
(6/30/04)E19

Special Provisions

105-1.17 CLAIMS FOR ADJUSTMENT AND DISPUTES. *Add the following:* Appeals to the superior court under AS 36.30.685 must be filed in the third judicial district. (03/21/01)R93

SECTION 106

CONTROL OF MATERIAL

Special Provisions

106-1.01 SOURCE OF SUPPLY AND QUALITY REQUIREMENTS. *Add the following:*

Buy America Provision. Comply with the requirements of 23 CFR 635.410, Buy America Requirements, and shall submit a completed Material Origin Certificate, Form 25D-60, before award of the contract.

Steel and iron products which are incorporated into the work, shall be manufactured in the United States except that minor amounts of steel and iron products of foreign manufacture may be used, provided the aggregate cost of such does not exceed one tenth of one percent (0.001) of the total contract amount, or $2500, whichever is greater. For the purposes of this paragraph, the cost is the value of the products as they are delivered to the project including freight.

"Manufactured in the United States" means that all manufacturing processes starting with the initial mixing and melting through the final shaping, welding, and coating processes must be undertaken in the United States. The definition of "manufacturing process" is smelting or any subsequent process that alters the material's physical form, shape or chemical composition. These processes include rolling, extruding, machining, bending, grinding, drilling, etc. The application of coatings, such as epoxy coating, galvanizing, painting or any other coating that protects or enhances the value of steel or iron materials shall also be considered a manufacturing process subject to the "Buy America Requirements."

Buy America does not apply to raw materials (iron ore), scrap, pig iron, and processed, pelletized and reduced iron ore. It also does not apply to temporary steel items (e.g., temporary sheet piling, temporary bridges, steel scaffolding, and falsework). Further, it does not apply to materials that remain in place at the Contractor's convenience (e.g., sheet pilings, and forms).

The North American Free Trade Agreement (NAFTA) does not apply to the Buy America requirement. There is a specific exemption within NAFTA (article 1001) for grant programs such as the Federal-aid highway program.

When steel and iron products manufactured in the United States are shipped to a foreign country where non-steel or iron products are installed on or in them (e.g., electronic components in a steel cabinet), the steel and iron is considered to meet the requirements of this subsection.

Take whatever steps are necessary to ensure that manufacturing processes for each covered product comply with this provision. Non-conforming products shall be replaced at no expense to the State. Failure to comply may also subject the Contractor to default and/or debarment. False statements may result in criminal penalties prescribed under Title 18 US Code Section 1001 and 1020. (02/07/05)R13

Standard Modifications

106-1.02 MATERIAL SOURCES.

1. a. General. *Within Item a. delete text and replace with:* Utilize Useable Excavation according to subsection 104-1.04 before using material sources listed in subsection 106-1.02.4. When there is insufficient useable excavation furnish additional required materials from sources of the Contractor's choice, except that the Contractor shall use a mandatory source when identified in the Contract.

4. Type of Sources. *Replace the first paragraph with the following*: The Contractor shall utilize Useable Excavation according to subsection 104-1.04 before using material sources listed in this subsection. When there is insufficient Useable Excavation, the Contractor shall furnish additional required materials from sources of the Contractor's choice, except that the Contractor shall use a mandatory source when identified in the Contract.

When there is insufficient Useable Excavation, the Contractor shall supply additional required material from the following sources:

4. d. Available Sources. *Replace the second paragraph with the following*: When the Department furnishes copies of existing boring logs, test results, or other data in its possession concerning Available Sources, the Contractor is responsible for determining the accuracy and completeness of this data, for assumptions the Contractor makes based on this data, and for exploring Available Sources to the Contractor's satisfaction.

4. e. Excluded Material Sources. *Replace the paragraph with the following*: Some material sources may not be considered acceptable regardless of location or ownership. The bid documents may identify some material sources excluded from use. The Department reserves the right to exclude a material sources or any portion of a material source, at any time after Contract award, that is determined by material testing to be unsuitable for use on the project.

(1/1/06)E24

SECTION 107

LEGAL RELATIONS AND RESPONSIBILITY TO PUBLIC

Special Provisions

107-1.02 PERMITS, LICENSES AND TAXES. *Add the following:* Obtain a written statement from the State Historic Preservation Officer stating that material disposal, extraction, stockpiling or staging, on any off project site, is not expected to impact any cultural resources. The State Historic Preservation Officer is with the Department of Natural Resources in Anchorage, and may be contacted at (907) 269-8715. If you discover cultural resources during construction activities, stop work at that site and notify the Engineer.

Provide a wetland specialist able to conduct wetlands determinations and delineations in accordance with the Corps of Engineers 1987 Wetland Delineation Manual. The wetland specialist shall conduct the determination and delineations of any site outside the project limits or not previously permitted, impacted by your operations. These delineations will be subject to Corps of Engineers approval.

Provide the Engineer a copy of all permits or clearances received prior to using any site outside the project limits. Additionally, provide the Engineer a written statement that all necessary permits or clearances have been obtained. Also provide a written statement to the Engineer listing agencies or offices contacted which responded that no additional action is required.

Obtain permits or make arrangements with owners of existing permitted sites for water draw (non-potable) to be used for dust control, compaction, and water for seeding. Owners of existing permitted water draw sites and their locations are as follows:

Owner	Water Body Location
City of Bethel	Western tributary to Brown's Slough, draw site located near Dario's Hill on Ptarmigan Street.
City of Bethel	Kuskokwim River, draw site located off East Ave approximately 150 yards downstream of City Dock
Bethel Utilities, Corp.	Existing well, draw site located near the Chief Eddie Hoffman Highway

The Department has received the following permits on your behalf and are attached in Appendix A:

1. Corps of Engineers Nationwide Permit No. 23, Categorical Exclusions, Permit reference POA-2006-367-D. Permit covers placement of dredged and/or fill materials into waters of the U.S. and prohibits roadside clearing operations between June 1 and July 15.

2. Alaska Department of Environmental Conservation (DEC), Storm Water Review, letter of Non-Objection, Storm Water Project No. 06-WW-118-035, dated May 10, 2006. Provide

all necessary information to comply with the US Environmental Protection Agency National Pollutant Discharge Elimination System (NPDES) General Permit for Alaska to discharge storm water from the construction site. Refer to Section 641, Erosion, Sediment, and Pollution Control for requirements for this permit.

(05/29/02)R7M98(05/15/06)R&M

107-1.11 PROTECTION AND RESTORATION OF PROPERTY AND LANDSCAPE. *Add the following:* If you require water for any construction purpose from a non-municipal water source, obtain a Temporary Water Use Permit from the Water Resource Manager, and provide a copy to the Engineer. The Water Resource Manager is with the Department of Natural Resources in Anchorage and may be contacted at (907) 269-8624.
(05/29/02)R7M98

Add the following Subsection:

107-1.21 FEDERAL AFFIRMATIVE ACTION. The Federal Equal Employment Opportunity, Disadvantaged Business Enterprise, and On-the-Job Training affirmative action program requirements that are applicable to this Contract are contained in the project Special Provisions and Contract Forms, and may include:

Disadvantaged Business Enterprise (DBE) Program	Section 120
Training Program	Section 645
Federal EEO Bid Conditions	Form 25A-301
EEO-1 Certification	Form 25A-304
DBE Subcontractable Items	Form 25A-324
ADOT&PF Training Program Request	Form 25A-310
Training Utilization Report	Form 25A-311
Contact Report	Form 25A-321A
DBE Utilization Report	Form 25A-325C
Summary of Good Faith Effort Documentation	Form 25A-332A
Required Contract Provisions, Federal-Aid Contracts	Form 25D-55

In addition to the sanctions provided in the above references, non-compliance with these requirements is grounds for withholding of progress payments.
(01/22/02)S80

SECTION 108

PROSECUTION AND PROGRESS

Special Provisions

108-1.03 PROSECUTION AND PROGRESS. *Delete the last sentence of the first paragraph and substitute the following:* Submit the following at the Preconstruction Conference:

Delete item 1. A progress schedule. *and substitute the following:*

1. A Critical Path Method (CPM) Schedule is required, in a format acceptable to the Engineer, showing the order the work will be carried out and the contemplated dates the Contractor and subcontractors will start and finish each of the salient features of the work, including scheduled periods of shutdown. Indicate anticipated periods of multiple-shift work in the CPM Schedule. Revise to the proposed CPM Schedule promptly. Promptly submit a revised CPM Schedule if there are substantial changes to the schedule, or upon request of the Engineer.

(12/13/02)R261M98

SECTION 109

MEASUREMENT AND PAYMENT

Special Provisions

109-1.02 MEASUREMENT OF QUANTITIES. *Under subtitle* Electronic Computerized Weighing System *item (1) add the following to the end of the first sentence*: ", CD, or a USB device."

109-1.05 COMPENSATION FOR EXTRA WORK.
Under item 3. Equipment., *item a. add the following to the second paragraph*: The rental rate area adjustment factors for this project shall be as specified on the adjustment maps for the Alaska - South Region.
(4/31/05)R14

Standard Modifications

109-1.08 FINAL PAYMENT. *Add the following sentence to the first paragraph:*
The Department will not process the final estimate until the Contractor completes Items 1 through 4 in the first paragraph of subsection 105-1.16.
(6/30/04)E11

Add the following Section:

SECTION 120

DISADVANTAGED BUSINESS ENTERPRISE (DBE) PROGRAM

Special Provisions

120-1.01 DESCRIPTION. The work consists of providing Disadvantaged Business Enterprises (DBEs), as defined in Title 49, CFR (Code of Federal Regulations), Part 26, with the opportunity to participate on an equitable basis with other Contractors in the performance of Contracts financed in whole, or in part, with Federal funds. The Contractor or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this Contract. The Contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of USDOT assisted Contracts.

120-1.02 INTERPRETATION. It is the intent of this Section to implement the requirements of 49 CFR, Part 26, and the Department's Federally approved DBE Program.

120-1.03 ESSENTIAL CONTRACT PROVISION. Failure to comply with the provisions of this Section will be considered a material breach of Contract, which may result in the termination of this Contract or such other remedy, as DOT&PF deems appropriate. The Department also considers failure to comply with this Section to be so serious as to justify debarment action as provided in AS 36.30.640(4).

120-1.04 DEFINITIONS AND TERMS. The following definitions will apply.

1. Broker. A DBE certified by the Department that arranges for the delivery or provision of creditable materials, supplies, equipment, transportation/hauling, insurance, bonding, etc., within its certified category, that is necessary for the completion of the project. A broker of materials certified in a supply category must be responsible for scheduling the delivery of materials and fully responsible for ensuring that the materials meet Specifications before credit will be given.

2. Commercially Useful Function (CUF). The execution of the work of the Contract by a DBE carrying out its responsibilities by actually performing, managing, and supervising the work involved using its own employees and equipment. The DBE shall be responsible, with respect to materials and supplies used on the Contract, for negotiating price, determining quality and quantity, ordering the material, and installing (where applicable) and paying for the material itself. To determine whether a DBE is performing a commercially useful function, an evaluation of the amount of work subcontracted, industry practices, whether the amount the firm is to be paid under the Contract is commensurate with the work it is actually performing and the DBE credit claimed for its performance of the work. Other relevant factors will be considered. The Engineer makes the determination of CUF after evaluating the way in which the work was performed during the execution of the Contract.

3. Disadvantaged Business Enterprise (DBE). An enterprise which is a for-profit small business concern

   a. That is at least 51 percent owned by one or more individuals who are both socially and economically disadvantaged or, in the case of a corporation, in which 51 percent of the stock is owned by one or more such individuals;

   b. Whose management and daily business operations are controlled by one or more of the socially and economically disadvantaged individuals who own it; and

   c. Has been certified by the Department in accordance with 49 CFR, Part 26.

4. DBE Key Employee. Permanent employees identified by the DBE owner in its certification file in the Department Civil Rights Office.

5. DBE Utilization Goal. The percent of work to be performed by certified DBEs that is established by the Department and specified in the Contract.

6. Good Faith Efforts. Efforts by the bidder or Contractor to achieve a DBE goal or other requirement of 49 CFR Part 26, by their scope, intensity, and appropriateness to the objective, that can reasonably be expected to fulfill the program requirement.

7. Manufacturer. A DBE certified by the Department in a supply category that changes the shape, form, or composition of original material in some way and then provides that altered material to the project and to the general public or the construction industry at large on a regular basis.

8. Notification. For purposes of soliciting DBE participation on a project and to count toward a Contractor's Good Faith Efforts, notification shall be by letter or fax transmission, with a return receipt requested or successful transmission report. Telephonic contact with a DBE may be allowed, however it shall be based on the ability of Civil Rights staff to independently verify this contact.

9. Regular Dealer. A DBE certified by the Department in a supply category that

   a. Maintains an in-house inventory on a regular basis of the particular product provided to this project; and

   b. Keeps an inventory in an amount appropriate for the type of work using that product; and

   c. Offers that inventory for sale to the general public or construction industry at large (private and public sectors), not just supplied as needed on a project by project basis during the construction season, except where the product requires special or heavy equipment for delivery and the DBE possesses and operates this equipment

on a regular basis throughout the construction season in order to deliver the product to the general public or construction industry at large. If the distribution equipment is rented or leased, it must be on a repetitive, seasonal basis; and may additionally

d. Fabricate (assembles large components) for use on a construction project, consistent with standard industry practice, for delivery to the project.

120-2.01 UTILIZATION GOAL. The DBE Utilization Goal for this Contract is shown on Form 25A324 (DBE Subcontractable Items) as a percentage of the total basic bid amount. A DBE may be considered creditable towards meeting the DBE Utilization Goal at time of Contract award, if the DBE is certified by the Department in a category covering the CUF to be performed at the time of listing on Form 25A325C (DBE Utilization Report).

A bidder shall demonstrate the ability to meet the DBE Utilization Goal or perform and document all of the required Good Faith Efforts under Subsection 120-3.02 in order to be eligible for award of this Contract.

If the quantity of work of a bid item involving a DBE firm is reduced by the Department, the DBE Utilization Goal on Form 25A325C will be reduced proportionately.

120-3.01 DETERMINATION OF COMPLIANCE

1. Phase I - Bid. Each bidder must register with the Civil Rights Office annually in accordance with §§26.11 & 26.53(b)(2)(iv) of 49 CFR, Part 26. No Contract may be awarded to a bidder that is not registered.

2. Phase II - Award. The apparent low bidder will provide the following within 15 days of receipt of Notice of Intent to Award:

   a. **Written DBE Commitment.** Written commitments from DBEs to be used on the project. The written commitment shall contain the following information:

      (1) A description of the work that each DBE will perform;

      (2) The dollar amount of participation by the DBE firm;

      (3) Written documentation of the bidder/offeror's commitment to use a DBE subcontractor whose participation it submits to meet a Contract goal; and

      (4) Written confirmation from the DBE that it is participating in the Contract as provided in the prime Contractor's commitment.

   b. DBE Utilization Report. Form 25A325C listing the certified DBEs to be used to meet the DBE Utilization Goal.

c. **Good Faith Effort Documentation.** Summary of Good Faith Effort Documentation (Form 25A332A and attachments) and DBE Contact Reports (Form 25A321A) if the Contractor submits less DBE utilization on Form 25A325C than is required to meet the DBE Utilization Goal. If accepted by the Department, this lower DBE utilization becomes the new DBE Utilization Goal. If the bidder cannot demonstrate the ability to meet the DBE Utilization Goal, and can not document the minimum required Good Faith Efforts (as outlined in Subsection 120-3.02 below), the Contracting Officer will determine the bidder to be not responsible.

3. Phase III - Construction.

a. **Designation of DBE/EEO Officer.** At the preconstruction conference, the Contractor shall submit, in writing, the designation of a DBE/EEO officer.

b. **DBE Creditable Work.** The CUF work items and creditable dollar amounts shown for a DBE on the DBE Utilization Report (Form 25A325C) shall be included in any subcontract, purchase order or service agreement with that DBE.

c. **DBE Replacement.** If the Engineer approves a DBE replacement, the Contractor shall replace the DBE with another DBE for the same work in order to fulfill its commitment under the DBE Utilization Goal. In the event that the Contractor cannot obtain replacement DBE participation, the Engineer may adjust the DBE Utilization Goal if, in the opinion of the Engineer and the Civil Rights Office, both of the following criteria have been met:

(1) The Contractor has not committed any discriminatory practice in its exercise of good business judgment to replace a DBE.

(2) If the Contractor is unable to find replacement DBE participation and has adequately performed and documented the Good Faith Effort expended in accordance with Subsection 120-3.02.

d. **DBE Utilization Goal.** The DBE Utilization Goal will be adjusted to reflect only that amount of the DBE's work that can not be replaced.

120-3.02 GOOD FAITH EFFORT

1. **Good Faith Effort Criteria.** The Contracting Officer will use the following criteria to judge if the bidder, who has not met the DBE Utilization Goal, has demonstrated sufficient Good Faith Effort to be eligible for award of the Contract.

Failure by the bidder to perform and document all of the following actions constitutes insufficient Good Faith Effort.

a. Consideration of all subcontractable items. The bidder shall, at a minimum, seek DBE participation for each of the subcontractable items upon which the DBE goal was established as identified by the Department (on Form 25A324) prior to bid opening. It is the bidder's responsibility to make the work listed on the subcontractable items list available to DBE firms, to facilitate DBE participation.

b. If the bidder can not achieve the DBE Utilization Goal using the list of available DBE firms based on the subcontractable items list, then the bidder may consider other items that could be subcontracted to DBEs.

c. Notification to all active DBEs listed for a given region in the Department's most current DBE Directory at least seven calendar days prior to bid opening. The bidder must give the DBEs no less than five days to respond. The bidder may reject DBE quotes received after the deadline. Such a deadline for bid submission by DBEs will be consistently applied. DBEs certified to perform work items identified on Form 25A324 must be contacted to solicit their interest in participating in the execution of work with the Contractor. Each contact with a DBE firm will be logged on a Contact Report (Form 25A321A).

d. The bidder may reject non-competitive DBE quotes. Allegations of non-competitive DBE quotes must be documented and verifiable. A DBE quote that is more than 10.0 percent higher than the accepted non-DBE quote will be deemed non-competitive, provided the DBE and non-DBE subcontractor quotes are for the exact same work or service. Bidders must have a non-DBE subcontractor quote for comparison purposes. Such evidence shall be provided in support of the bidder's allegation. Where the bidder rejects a DBE quote as being non-competitive under this condition, the work must be performed by the non-DBE subcontractor and payments received by the non-DBE subcontractor during the execution of the Contract shall be consistent with the non-DBE's accepted quote. This does not preclude increases as a result of Change documents issued by the Department.

e. Provision of assistance to DBEs who need help in obtaining information about bonding or insurance required by the bidder.

f. Provision of assistance to DBEs who need help in obtaining information about securing equipment, supplies, materials, or related assistance or services.

g. Providing prospective DBEs with adequate information about the requirements of the Contract regarding the specific item of work or service sought from the DBE.

h. Follow-up of initial notifications by contacting DBEs to determine whether or not they will be bidding. Failure to submit a bid by the project bid opening or deadline by the bidder is de facto evidence of the DBE's lack of interest in bidding. Documentation of follow-up contacts shall be logged on the Contact Report (Form 25A321A).

i. Items c through h will be utilized to evaluate any request from the Contractor for a reduction in the DBE Utilization Goal due to the default or decertification of a DBE and the Contractor's subsequent inability to obtain additional DBE participation.

2. **Administrative Reconsideration.** Under the provisions of 49 CFR. Part 26.53(d), if it is determined that the apparent successful bidder has failed to meet the requirements of this Subsection, the bidder must indicate whether they would like an opportunity for administrative reconsideration. The bidder must exercise such an opportunity within 3 calendar days of notification it has failed to meet the requirements of this Subsection. As part of this reconsideration, the bidder must provide written documentation or argument concerning the issue of whether it met the goal or made adequate good faith efforts to do so.

   a. The DBE Liaison Officer will make the decision on reconsideration.

   b. The bidder will have the opportunity to meet in person with the DBE Liaison Officer to discuss the issue of whether it met the goal or made adequate good faith efforts to do so. If a meeting is desired, the bidder must be ready, willing and able to meet with the DBE Liaison Officer within four days of notification that it has failed to meet the requirements of this Subsection.

   c. The DBE Liaison Officer will render a written decision on reconsideration and provide notification to the bidder. The written decision will explain the basis for finding that the bidder did or did not meet the goal or make adequate good faith efforts to do so.

   d. The result of the reconsideration process is not administratively appealable to US DOT.

120-3.03 COMMERCIALLY USEFUL FUNCTION (CUF).

1. **Creditable Work.** Measurement of attainment of the DBE Utilization Goal will be based upon the actual amount of money received by the DBEs for creditable CUF work on this project as determined by the Engineer in accordance with this Section. CUF is limited to that of a:

   a. Regular dealer,

   b. Manufacturer;

   c. Broker,
   d. Subcontractor,

e. Joint-venture, or

f. Prime Contractor.

2. **Termination of Commercially Useful Function.** In order for the CUF work of the DBE to be credited toward the goal, the Contractor will ensure that all of the following requirements are met:

a. The CUF performed by a DBE certified in a supply category will be evaluated by the Engineer to determine whether the DBE performed as either a broker, regular dealer, or manufacturer of the product provided to this project.

b. A DBE trucking firm certified and performing work in a transportation/hauling category is restricted to credit for work performed with its own trucks and personnel certified with the CRO prior to submitting a bid to a Contractor for DBE trucking. The DBE trucking firm must demonstrate that it owns all trucks (proof of title and/or registration) to be credited for work and that all operators are employed by the DBE trucking firm. A DBE trucking firm that does not certify its trucks and personnel that it employs on a job will be considered a broker of trucking services and limited to credit for a broker. (This does not effect the CUF of that same firm, when performance includes the hauling of materials for that work.)

c. The DBE is certified in the appropriate category at the time of

(1) The Engineer's approval of the DBE subcontract, consistent with the written DBE commitment; and

(2) The issuance of a purchase order or service agreement by the Contractor to a DBE performing as either a manufacturer, regular dealer, or broker (with a copy to the Engineer).

d. The Contractor will receive credit for the CUF performed by DBEs as provided in this Section. Contractors are encouraged to contact the Engineer in advance of the execution of the DBE's work or provision of goods or services regarding CUF and potential DBE credit.

e. The DBE may perform work in categories for which it is not certified, but only work performed in the DBE's certified category meeting the CUF criteria may be credited toward the DBE Utilization Goal.

f. The work of the DBE firm must meet the following criteria when determining when CUF is being performed by the DBE:

(1) The work performed will be necessary and useful work required for the execution of the Contract.

(2) The scope-of-work will be distinct and identifiable with specific Contract items of work, bonding, or insurance requirements.

(3) The work will be performed, controlled, managed, and supervised by employees normally employed by and under the control of the certified DBE. The work will be performed with the DBE's own equipment. Either the DBE owner or DBE key employee will be at the work site and responsible for the work.

(4) The manner in which the work is sublet or performed will conform to standard, statewide industry practice within Alaska, as determined by the Department. The work or provision of goods or services will have a market outside of the DBE program (must also be performed by non-DBE firms within the Alaskan construction industry). Otherwise, the work or service will be deemed an unnecessary step in the contracting or purchasing process and no DBE credit will be allowed.

There will be no DBE credit for lower-tier non-DBE subcontract work.

(5) The cost of the goods and services will be reasonable and competitive with the cost of the goods and services outside the DBE program within Alaska. Materials or supplies needed as a regular course of the Contractor's operations such as fuel, maintenance, office facilities, and portable bathrooms are not creditable.

The cost of materials actually incorporated into the project by a DBE subcontractor is creditable toward the DBE goal only if the DBE is responsible for ordering and scheduling the delivery of creditable materials and fully responsible for ensuring that the materials meet Specifications.

(6) Unless the Engineer gives prior written approval all subcontract work, with the exception of truck hauling, will be sublet by the same unit of measure as is contained in the Bid.

(7) The DBE will control all business administration, accounting, billing, and payment transactions. The prime Contractor will not perform the business, accounting, billing, and similar functions of the DBE. The Engineer may, in accordance with AS 36.30.420(b), inspect the offices of the DBE and audit the records of the DBE to assure compliance.

g. On a monthly basis, the Contractor shall report on Form 25A336 (Monthly Summary of DBE Participation) to the Department Civil Rights Office the payments made (canceled checks or bank statements that identify payor, payee, and amount of transfer) for the qualifying work, goods and services provided by DBEs.

3. **Decertification of a DBE.** Should a DBE performing a CUF become decertified during the term of the subcontract, purchase order, or service agreement for reasons beyond the control of and without the fault or negligence of the Contractor, the work remaining under the subcontract, purchase order, or service agreement may be credited toward the DBE Utilization Goal.

   Should the DBE be decertified between the time of Contract award and the time of the Engineer's subcontract approval or issuance of a purchase order or service agreement, the work of the decertified firm will not be credited toward the DBE Utilization Goal. The Contractor must still meet the DBE Utilization Goal by either

   a. Withdrawing the subcontract, purchase order or service agreement from the decertified DBE and expending Good Faith Effort (Subsection 120-3.02, Items c through h) to replace it with one from a currently certified DBE for that same work or service through subcontractor substitution (Subsection 103-1.01); or

   b. Continuing with the subcontract, purchase order or service agreement with the decertified firm and expending Good Faith Effort to find other work not already subcontracted out to DBEs in an amount to meet the DBE Utilization Goal through either

      (1) Increasing the participation of other DBEs on the project;

      (2) Documenting Good Faith Efforts (Subsection 120-3.02, Items c through h); or

      (3) By a combination of the above.

4. **DBE Rebuttal of a Finding of no CUF.** Consistent with the provisions of 49 CFR, Part 26.55(c)(4)&(5), before the Engineer makes a final finding that no CUF has been performed by a DBE firm the Engineer will coordinate notification of the presumptive finding through the Civil Rights Office to the Contractor, who will notify the DBE firm.

   The Engineer, in cooperation with the Civil Rights Office, may determine that the firm is performing a CUF if the rebuttal information convincingly demonstrates the type of work involved and normal industry practices establishes a CUF was performed by the DBE. Under no circumstances shall the Contractor take any action against the DBE firm until the Engineer has made a final determination. The Engineer's decisions on CUF matters are not administratively appealable to US DOT.

120-3.04 DEFAULT OF DBE. In the event that a DBE firm under Contract or to whom a purchase order or similar agreement has been issued defaults on their work for whatever reason, the Contractor shall immediately notify the Engineer of the default and the circumstances surrounding the default.

The Contractor shall take immediate steps, without any order or direction from the Engineer, to retain the services of other DBEs to perform the defaulted work. In the event that the Contractor cannot obtain replacement DBE participation, the Engineer may adjust the DBE Utilization Goal if, in the opinion of the Engineer, the following criteria have been met:

1. The Contractor was not at fault or negligent in the default and that the circumstances surrounding the default were beyond the control of the Contractor; and

2. The Contractor is unable to find replacement DBE participation at the same level of DBE commitment and has adequately performed and documented the Good Faith Effort expended in accordance with Items c through h of Subsection 120-3.02 for the defaulted work; or

3. It is too late in the project to provide any real subcontracting opportunities remaining for DBEs.

The DBE Utilization Goal will be adjusted to reflect only that amount of the defaulted DBE's work that can not be replaced.

120-4.01 METHOD OF MEASUREMENT. The Contractor will be entitled to count toward the DBE Utilization Goal those monies actually paid to certified DBEs for CUF work performed by the DBE as determined by the Engineer. The Contractor will receive credit for the utilization of the DBEs, as follows:

1. Credit for the CUF of a DBE prime Contractor is 100 percent of the monies actually paid to the DBE under the Contract for creditable work and materials in accordance with 49 CFR 26.55.

2. Credit for the CUF of a subcontractor is 100 percent of the monies actually paid to the DBE under the subcontract for creditable work and materials. This shall include DBE trucking firms certified as a subcontractor and not a broker. Trucks leased from another DBE firm shall also qualify for credit and conforms to the provisions of 49 CFR 26.55(d).

3. Credit for the CUF of a manufacturer is 100 percent of the monies paid to the DBE for the creditable materials manufactured.

4. Credit for the CUF of a regular dealer of a creditable material, product, or supply is 60 percent of its value. The value will be the actual cost paid to the DBE but will not exceed the bid price for the item.

5. Credit for the CUF of a broker performed by a DBE certified in a supply category for providing a creditable material, product or supply is limited to a reasonable brokerage fee. The brokerage fee will not exceed five percent of the cost of the procurement Contract for the creditable item.

6. Credit for the CUF of a broker performed by a DBE certified in the transportation/hauling category for arranging for the delivery of a creditable material, product or supply is limited to a reasonable brokerage fee. The brokerage fee will not exceed five percent of the cost of the hauling subcontract.

7. Credit for the CUF of a broker performed by a DBE certified in a bonding or insurance category for arranging for the provision of insurance or bonding is limited to a reasonable brokerage fee. The brokerage fee will not exceed five percent of the premium cost.

8. Credit for the CUF of a joint venture (JV) (either as the prime Contractor or as a subcontractor) may not exceed the percent of the DBE's participation in the joint venture agreement, as certified for this project by the Department. The DBE joint venture partner will be responsible for performing all of the work as delineated in the certified JV agreement.

120-5.01 BASIS OF PAYMENT. Work under this item is subsidiary to other Contract items and no payment will be made for meeting or exceeding the DBE Utilization Goal.

If the Contractor fails to utilize the DBEs listed on Form 25A325C as scheduled or fails to submit required documentation to verify proof of payment or documentation requested by the Department to help in the determination of CUF, the Department will consider this to be unsatisfactory work. If the Contractor fails to utilize Good Faith Efforts to replace a DBE, regardless of fault (except for Subsection 120-3.04 Item 3), the Department will also consider this unsatisfactory work. Unsatisfactory work may result in disqualification of the Contractor from future bidding under Subsection 102-1.13 and withholding of progress payments consistent with Subsection 109-1.06. (11/17/00)S33

SECTION 202

REMOVAL OF STRUCTURES AND OBSTRUCTIONS

Special Provisions

202-1.01 DESCRIPTION. *Add the following*: This work will also include the removal of thermosyphons, curb and gutter, light poles and fixture, and existing interlocking concrete slope protection blocks that are in conflict with the construction of structural steel sheet piles. This work will also include reconnecting the through cable to the remaining existing interlocking concrete slope protection blocks that are to remain and installing new anchors as shown on Plans.

202-3.01 GENERAL. *Add the following*: Thermosyphons are pressurized. Take special handling measures when discharging thermosyphons prior to removal. Cut and remove the riser pipe and condenser to one-foot below finish ground and abandon the remaining underground pipe. Once the pipelines are abandoned, remove abandoned pipe within the right-of-way that are in conflict with the work. Dispose pipe and condenser off the project limits.

202-3.03 REMOVAL OF BRIDGES, CULVERTS AND OTHER DRAINAGE STRUCTURES. *Add the following*: This work includes removing and disposing of the following elements of the existing multiple span, timber plank deck, and timber piling boardwalk structure located on the easterly side of Ridgecrest Drive as shown on the Plans:

1. wood plank deck,
2. timber bridge rail and supports,
3. timber piling and cross members,
4. timber girders, and
5. miscellaneous hardware.

Deck sections and piling shall be removed in such a manner that damage is not done to the adjacent above ground sanitary sewer. Repair, at the Contractor's own expense, damage to all adjacent appurtenances due to the Contractor's removal operations.

The use of explosives to remove portions of the existing bridge is prohibited.

Remove timber piles to 1' below existing ground and backfill cavity as required.

202-3.05 REMOVAL OF PAVEMENT, SIDEWALKS, AND CURBS. *Delete the first paragraph and substitute the following:* All pavements from the existing highway, streets, approaches being removed or reconstructed, and in areas of obliteration within the project limits shall be crushed or processed and may be reused as Item 308(1), Crushed Asphalt Base Course.

(6/20/05)R&M

202-4.01 METHOD OF MEASUREMENT. *Add the following:*

Removal of temporary pavement will not be measured.
(6/20/05)R&M

SECTION 203

EXCAVATION AND EMBANKMENT

Special Provisions

203-1.01 DESCRIPTION. *Add the following*: This work will also include ditch linear grading consisting of the final shaping of ditches and slopes for drainage, as directed by the Engineer, by grading with a small dozer, motor grader, or other suitable means approved by the Engineer. This work will also include supporting/shoring of utilities during excavation; and inspecting, cleaning, and grading to provide positive drainage through existing culvert pipes to conform to the improvements shown on the Plans. **Coordinate with and obtain locates of the existing buried GCI and UUI facilities within the linear grading locations. Once the ditch linear grading locations have been staked and field locates of the existing buried facilities have been performed, a determination will be made on how to proceed if a conflict is noted. Should adjustment and /or relocation be required, allow GCI and/or UUI 6 calendar days for each location and provided all the required, right of way staking, traffic control and flagging to enable the adjustment of the buried facilities. Notify GCI by calling 907-229-9176 or local 543-4388 to establish a point of contact. Notify UUI by calling 907-543-2300 to establish a point of contact.**
(2/26/03)R20USC02(06/21/05)R&M

203-3.04 COMPACTION WITH MOISTURE AND DENSITY CONTROL. *Add the following:* Compact embankment within 20 feet of a bridge abutment full width to not less than 100 percent of the maximum density. Material used within this zone shall be graded to pass the 3-inch sieve.
(11/05/02)R113USC02

203-4.01 METHOD OF MEASUREMENT. *Add the following:* Ditch linear grading, whether flat bottom or "V" ditch, will be measured by the station in accordance with Section 109.

203-5.01 BASIS OF PAYMENT. *Add the following:*

Inspecting, cleaning, and grading to provide positive drainage through existing culvert pipes to conform to the improvements shown on the Plans will not be paid for separately but will be subsidiary to 203(27) Ditch Linear Grading.

Delete Item 203(6) Borrow and add the following pay items:

Pay Item	Pay Unit
203(6B) Borrow, Type B	Ton
203(27) Ditch Linear Grading	Station

(2/26/03)R20USC02 (6/22/05)R&M

SECTION 205

EXCAVATION, BACKFILL, AND FOUNDATION FILL FOR MAJOR STRUCTURES

Special Provisions

205-2.01 MATERIALS. *Delete the requirements for Backfill and Foundation Fill and substitute the following:*

Backfill and Foundation Fill	Subsection 703-2.03, Aggregate Base Course, Grading D-1

205-3.02 FOUNDATION FILL. *Delete this subsection and replace with the following*: Remove material that is unsuitable for foundations, to a depth of 3 feet below the bottom of footing or as ordered by the Engineer. Replace the unsuitable material with foundation fill in 6-inch layers, compacted to meet Subsection 301-3.03.
(6/08/06)R&M

SECTION 301

AGGREGATE BASE AND SURFACE COURSE

Special Provisions

301-2.01 MATERIALS. *Add the following after the first sentence*: Recycled asphalt material (RAM) may be substituted for aggregate base course, inch for inch, if the following conditions are met:

1. RAM shall be crushed or processed to 100 percent by weight passing the 1.5-inch sieve and 95-100 percent by weight passing the 1-inch sieve.

2. The gradation of the extracted aggregate shall meet the following:

Sieve	Percent Passing by Weight
1 inch	100
3/4 inch	70-100
3/8 inch	42-90
No. 4	28-78
No. 16	11-54
No. 50	5-34
No. 100	3-22
No. 200	2-12

3. The asphalt content shall be 2.5 - 5.0 percent by weight of the RAM.
(11/05/02)R176USC02

301-3.01 PLACING. *Add the following:* Base course material used for the sidewalk and pathway foundation shall be placed with a "Layton box" or similar equipment capable of providing a specified depth with a uniform surface.
(09/01/89)R26

Add the following: If recycled asphalt material is substituted for aggregate base course, the following conditions shall be met:

1. Density acceptance will be based upon a roller pattern. The roller pattern shall be determined by a test strip using a vibratory compactor with a minimum dynamic force of 40,000 pounds. The optimum density will be determined by the Engineer using a nuclear densometer gauge to

monitor the test strip in accordance with ATM 412. Adequate water shall be added to aid compaction.

2. After the appropriate coverage with the vibratory compactor, a minimum of 6 passes with a pneumatic tire roller shall be completed. Tires shall be inflated to 80 psi (± 5 psi), and the roller shall have a minimum operating weight per tire of 3,000 pounds.

301-3.03 SHAPING AND COMPACTION. *Delete the the second paragraph and replace with the following*: Spread and shape the material to the required grade and section. Water or aerate as necessary to provide the approximate optimum moisture content for compaction. Compact each layer to a density of not less than 95% of the maximum density. Acceptance densities will be determined by WAQTC FOPs for AASHTO T 310 and T224. Acceptance densities will not be taken in the aggregate base course materials placed in the area designated as "Special Fill" on the Plans.

301-5.01 BASIS OF PAYMENT. *Add the following*: If recycled asphalt material is substituted for aggregate base course, it will be paid for as Item 301(1), Aggregate Base Course at the unit price shown on the bid schedule for that item.
(11/05/02)R176USC02 (6/07/06)R&M

SECTION 308

CRUSHED ASPHALT BASE COURSE

Special Provisions

308-1.01 DESCRIPTION. *Delete the first paragraph and replace with the following:*
Recondition the surface and shoulders of an existing roadbed by constructing a base course, using pulverized asphalt pavement to the lines shown on the Plans.

Delete Subsection 308-3.01 in its entirety and replace with the following:

308-3.01 PULVERIZING AND MIXING. Crush or process the existing asphalt pavement so that 100% by weight passes the 2-inch sieve and 95-100% by weight passes the 1½-inch sieve. Spread the pulverized or processed material to the lines shown on the Plans and grades approved by the Engineer, and compact uniformly. Add aggregate base course to the base course mixture as needed.

Use self-propelled pulverizing and mixing equipment capable of processing to full depth in a single pass.

308-3.04 COMPACTION AND COMPACTION EQUIPMENT. *Delete the third sentence of the first paragraph and replace with the following:* Compact the remainder of the project to not less than 95% of the density standard, in accordance with ATM 412.

Insert the following Section:

SECTION 318

HOT MIX ASPHALT AND SURFACE TREATMENTS

Special Provisions

318-1.01 DESCRIPTION. The work consists of constructing a mixed-in-place foamed asphalt stabilized base course by pulverizing the base course while simultaneously injecting and thoroughly mixing metered amounts of foamed asphalt, Portland cement, and water into the pulverized material. Spread, shape, and compact the mixed material in accordance with these specifications and in conformity to the dimensions shown on the plans.

Provide an experienced foamed asphalt technician on site to supervise the foamed asphalt process and to supervise the related process control testing.

Prior to starting this process, provide a demonstration project at another location to demonstrate this process with the same model and brand of equipment proposed for this project.

At the Preconstruction Meeting, provide information on the equipment proposed for use, the name and resume of the foamed asphalt technician, and the location of the demonstration site.

MATERIALS

318-2.01 COMPOSITION OF MIXTURE – JOB MIX DESIGN. Prior to foamed asphalt stabilized base course production, laboratory tests of materials submitted by the Contractor shall be made to determine the quantity of asphalt cement and Portland cement required in the mix. At least 15 days prior to the production of foamed asphalt stabilized base course, the contractor shall furnish the following:

1. 500-pound representative sample of in-place aggregate
2. 200- pound representative sample of in-place asphalt concrete pavement
3. 10-gallons of asphalt cement
4. One sack of Portland cement

The Engineer will determine the Job Mix Design using procedures contained in the Wirtgen Manual Foamed Bitumen Mix Design Procedure Using the Wirtgen WLB 10 to generate foamed asphalt. The Job Mix Design will provide the following:

1. The percent by weight of foamed asphalt cement to be added to the mix.
2. The optimum percent by weight of water to be added to the asphalt cement to foam it.
3. The minimum Foamed Asphalt Expansion Characteristics required
4. The temperature of asphalt cement at the time of injection.
5. The percent by weight of Portland cement to be added to the mix.
6. The gradation of the in-place aggregate.
7. The optimum moisture content for compaction

8. Design dry and wet indirect splitting tensile strength
9. The maximum dry density

318-2.02 ASPHALT CEMENT. Conform to Subsection 702-2.01 Asphalt Cement PG 52-28.

Each batch of asphalt cement shall be tested for conformance to specifications before shipping. Storage tanks used for the batch shall be noted on the test report.

Provide the following shipping documents:

1. Manufacturer's certification of compliance.
2. Conformance test results of the batch
3. Manufacturer shall also document:
   a) date and time of loading
   b) batch number and storage tank
   c) type, grade, and quantity of materials loaded

The vendor's certified test report for the asphalt cement can be used for acceptance or tested independently by the Engineer.

All excess asphalt cement shall remain the property of the Contractor. Removal of excess asphalt cement from the project area shall be incidental to the contract and no separate payment will be made.

318-2.03 PORTLAND CEMENT. Conform to Subsection 701-2.01, Type I or II meeting low alkali requirements.

318-2.04 WATER. Water shall be clean and free from sewage, oil, acid, strong alkalies, or vegetable matter. Water of questionable quality shall be tested in accordance with the requirements of AASHTO T 26.

318-2.05 CONTRACTOR'S FOAMED ASPHALT TECHNICIAN. The Contractor shall provide an onsite technician to supervise the foamed asphalt process and the related process control of the product on the test strip and for 10 days of production. This technician shall have successfully supervised at least five (5) successful projects using foamed asphalt cement with similar base material and equipment. The technician must also be qualified to develop a foamed asphalt stabilized base course mix design and supervise the process control.
Provide a submittal that includes the following information for each project supervised:

1. Resume of Technician
2. Successful project listing, owners- contact, address, and telephone number; location of projects
3. Description of foamed asphalt cement equipment used on the project.

318-2.06 CONTRACTOR PROCESS CONTROL AND ACCEPTANCE SAMPLING AND TESTING. The quantity of foam asphalt stabilized base produced will be divided into lots and the lots evaluated individually.

A lot will normally be 12,000 square yards. The lot will be divided into sublots of 4,000 square yards. The contractor shall randomly sample and test for density and Indirect Tensile Strength for each sublot. The Engineer will validate this test data for each lot through independent random testing before accepting it.

The contractor shall provide the following:

1. Daily production records for each sublot, including the quantity of asphalt cement, Portland cement, and in-place compaction moisture content.
2. Measure and report expansion ratio and half-life of foamed asphalt cement for every 4 hours of production.
3. Monitor and report in-place field density of the foamed asphalt stabilized base for each sublot.
4. Sample and perform Indirect Tensile Strength testing for each sublot in accordance with Wirtgen Foamed bitumen mix design procedure manual, using calibrated equipment and a qualified technician. Make a minimum of 3 specimens to average for each sublot Indirect Tensile Strength test. Provide a laboratory and test equipment for ITS testing on the jobsite.
5. Report process control and acceptance sampling and testing data to the Engineer within 24 hours.

318-2.07 PREPROCESS MEETING. A minimum of 5 days before initiating operations, hold a meeting on the jobsite where the Contractor's technician outlines a processing plan. This plan must address the sequence of operations, equipment to be used, and process control. Outline steps to assure product consistency, conformity to strength requirements, and proposed quality control testing frequency.

CONSTRUCTION METHODS

318-3.01 WEATHER LIMITATIONS. Foamed asphalt stabilized base course shall not be mixed while the air or surface temperature is below 40°F or when conditions indicate that the temperature may fall below 40°F within 24 hours, or when the aggregate is above the optimum compaction moisture content, or when the aggregate or subgrade is frozen. The Contractor's technical representative shall approve the weather conditions.

318-3.02 TEST SECTION. Prior to full production, the Contractor shall use the equipment specified for the foamed asphalt stabilized base course operation and construct a test section at a location approved by the Engineer. Process material in the test section two passes wide, 150 feet long and to the depth shown on the plans. The Contractor's technical representative shall supervise the test section construction and calibration of the cement distributor and reclaimer.

318-3.03 RECLAIMER / ASPHALT FOAMER. The reclaimer shall have the following features and capabilities:

1. A minimum power capability of 600 horsepower.
2. The capability to pulverize to the size specified, mix and recycle material to the depth shown on the plans.
3. Ability to increase the effective volume of the mixing chamber in relation to depth of cut.
4. Two microprocessor controlled systems, complete with two independent pumping systems and spray bars, to regulate the application of foamed asphalt cement, separate from water that is used to increase the moisture content of the mixed material. Both systems shall perform in relation to the forward speed of the reclaimer and the mass of the material being processed.
5. Two spray bars, one for foamed asphalt cement and one for compaction moisture, shall each be fitted with self cleaning nozzles at a maximum spacing of one nozzle for each 6 inch width of the mixing chamber. Provide a way to monitor the flow rate at each nozzle to verify that all nozzles are producing foamed asphalt at the same rate.
6. The foamed asphalt cement shall be produced at the spray bar in individual expansion chambers into which hot asphalt cement, water, and air are injected under pressure through individual and small orifices that promote atomization. The rate of addition of water into the hot asphalt cement shall be kept at a constant percentage by mass of asphalt cement by the same microprocessor.
7. A system within the operator cabin to verify the foamed asphalt cement is being evenly distributed across the full width of the spray bar at the rate specified. The system shall be demonstrated to the Engineer to verify even spraying.
8. An inspection or test nozzle shall be fitted at one end of the spray bar that produces a representative sample of foamed asphalt cement.
9. An electrical heating system capable of maintaining the temperature of asphalt cement flow components above 300 degrees F.
10. A single asphalt cement feed pipe installed between the recycler and the supply tanker. Do not use circulating systems that incorporate a return pipe to the supply tanker.
11. The ability to print out asphalt cement quantities used during production.
12. The teeth on the mandrel mixing head form a Chevron pattern

The reclaimer model proposed for use shall have successfully been used by the contractor/subcontractor on other projects. Provide a submittal of the reclaimer specifications at the Preconstruction conference.

318-3.04 PORTLAND CEMENT DISTRIBUTOR. Use a cement distributor designed to spread a uniform coverage of Portland cement at a specified rate. The spread rate shall be integrated with the speed of travel to maintain a uniform coverage.

318-3.05 ROLLER. Provide the following rollers:

1. Self-propelled vibratory pad foot roller having a minimum dynamic force of 60,000 lb for initial compaction.

2. Pneumatic tired roller having a minimum operating weight of 50,000 lb for secondary compaction and finishing.
3. Vibratory steel drum roller for secondary compaction and finishing.

318-3.06 GRADER. Grader must have calibrated automatic cross slope blade controls.

318-3.07 PREPARATION. The area to be stabilized with foamed asphalt cement may require pulverization, graded, and shaped to conform to the grades and typical cross section shown on the Plans before being stabilized with foamed asphalt. If additional material is required to attain the levels shown in the plans, then aggregate shall be provided and paid for under a separate bid item. Any soft or yielding spots shall be removed and replaced with acceptable aggregate before being stabilized.

318-3.08 PULVERIZATION. Pulverize base materials so that at the completion of moist-mixing, 100% passes a 2-inch sieve. Multiple passes may be required to size the insitu material and to adjust the moisture content before applying Portland cement and injecting foamed asphalt.

318-3.09 FOAMED ASPHALT CEMENT AND PORTLAND CEMENT APPLICATION, MIXING, AND SPREADING. Mix insitu material with foamed asphalt cement, Portland cement, and water in-place with a reclaimer.

Measure the moisture content of insitu material before processing and adjust if necessary. The percentage of moisture in the aggregate, at the time of Portland cement application, shall not exceed the quantity that will permit a uniform mixture during mixing operations, and it shall not exceed the specified optimum moisture content for the foamed asphalt stabilized base course mixture.

Spread the required quantity of Portland cement uniformly on the surface to be stabilized. Pulverize to the depth required while simultaneously injecting foamed asphalt cement and compaction water. Mixing shall continue until the foamed asphalt cement, Portland cement and compaction water has been sufficiently blended with the existing material.

318-3.10 COMPACTION. Immediately upon completion of the mixing operations, the mixture shall be thoroughly compacted with the initial compaction done with the vibratory pad foot roller. The intermediate compaction shall be done with the pneumatic tired roller and the finish compaction shall be done with the vibratory steel drum roller.

Acceptable field dry density of the compacted mixture shall not be less than 98 percent of the Job Mix Design dry density. Determined the in-place field density by direct transmission in accordance with WAQTC FOP for AASHTO 310, Method A. The moisture content of the mixture at the start of compaction shall not be below nor more than 2 percentage points above the optimum moisture content as determined by the foamed asphalt mix design.

318-3.11 FINISHING. The completed foamed asphalt stabilized base course shall conform to the required lines, grades, and cross section. If necessary, the surface shall be lightly scarified to eliminate any deep imprints made by the compacting or shaping equipment. The surface shall then be recompacted to the required density. Seal the surface with water and a pneumatic roller

318-3.12 CONSTRUCTION LIMITATIONS. When any of the operations after the application of cement are interrupted for more than 30 minutes or when the uncompacted mixture is wetted by rain so that the optimum moisture content is exceeded by 2 percentage points, the decision to reconstruct the portion affected shall rest with the Engineer. In the event the uncompacted, rain-wetted mixture exceeds the specified moisture content tolerance, the Contractor shall reconstruct at his/her expense the portion affected. All material along the longitudinal or transverse construction joints not properly compacted shall be reconstructed, at the Contractor's expense, with properly moistened and mixed foamed asphalt stabilized base compacted to specified density.

318-3.13 SURFACE TESTS. The finished surface shall not vary more than 3/8 inch when tested with a 10-foot straightedge applied parallel with, or at right angles to, the longitudinal axis of the pavement. Any variations in excess of this tolerance shall be corrected by the Contractor, at his/her own expense, and in a manner satisfactory to the Engineer.

318-3.14 MAINTENANCE. The Contractor shall be required to maintain, at his/her own expense, the entire base course within the limits of contract in a condition satisfactory to the Engineer from the time he starts work until all the work has been completed. Maintenance shall include immediate repairs of any defects that may occur either before or after the foamed asphalt stabilized base course has been constructed. The work shall be done by the Contractor at his/her own expense and repeated as often as necessary to keep the area intact at all times. Repairs shall be made in a manner that will insure restoration of a uniform surface and the durability of the part repaired. Faulty work must be reconstructed for the full depth of treatment. Any low areas shall be remedied by reconstructing the material for the full depth of treatment rather than by adding a thin layer of foamed asphalt stabilized base course to the completed work.

318-4.01 METHOD OF MEASUREMENT. Section 109 and the following:

1. Foamed Asphalt Stabilized Mix. By area of finished top surface meeting specifications.
2. Asphalt Cement. By the weight recorded on delivery tickets minus waste, diversion, and remnant.
3. Portland Cement. By the weight recorded on delivery tickets minus waste, diversion, and remnant.

318-4.02. EVALUATION OF MATERIALS FOR ACCEPTANCE

The Engineer will average the Indirect Tensile Strength results from the Contractor's process control and acceptance sampling and testing for each lot. Payment shall be made at the contract unit price per square meter for foamed asphalt stabilized base course whose lot average dry Indirect Tensile Strength is greater than 85% of the mix design. This price shall be full

compensation for furnishing all materials, except asphalt cement or Portland cement, and for all preparation, delivering, placing, and mixing of these materials; and for all labor, equipment, tools and incidentals necessary to complete the item.

If the lot average dry Indirect Tensile Strength value is less than 85% of the Job Mix Design dry Indirect Tensile Strength value, the foamed asphalt stabilized base is deemed to not meet specification. The Contractor shall increase the thickness of the hot asphalt pavement and adjust the surface grade at his expense to compensate for reduced dry Indirect Tensile Strength

T =5.5 - 6.25*(lot average dry ITS / Job Mix Design dry ITS)

T = increase in hot asphalt pavement thickness in inches
ITS = Indirect Tensile Strength

318-5.01 BASIS OF PAYMENT. Payment will be made under:

Pay Item	**Pay Unit**
318(1) Foamed Asphalt Stabilized Base Course	Square Yard
318(2) Asphalt Cement, Grade PG 52-28	Ton
318(3) Portland Cement, Type I or II	Ton

(6/08/06)R&M

Replace Section 401 with the following:

SECTION 401

HOT MIX ASPHALT AND SURFACE TREATMENTS

Special Provisions

401-1.01 DESCRIPTION. Construct one or more layers of plant-mixed hot asphalt concrete pavement on an approved surface, to the lines, grades, and depths shown on the Plans.

MATERIALS

401-2.01 COMPOSITION OF MIXTURE - JOB MIX DESIGN. Meet the requirements of Table 401-1 for the Job Mix Design performed according to ATM 417.

TABLE 401-1

DESIGN PARAMETERS	CLASS "A"	CLASS "B"
Stability, pounds	1800 min.	1200 min.
Flow, 0.01 inch	8-14	8-16
Voids in Total Mix, %	3-5	3-5
Compaction, number of blows each side of test specimen	75	50
Percent Voids Filled with Asphalt (VFA)	65-75	65-78
Asphalt Content, min. %	5.0	5.0
Dust-asphalt ratio*	0.6-1.4	0.6-1.4
Voids in the Mineral Aggregate (VMA), %, min.		
Type I	12.0	11.0
Type II	13.0	12.0
Type III, IV	14.0	13.0

*Dust-asphalt ratio is the percent of material passing the No. 200 sieve divided by the percent of effective asphalt (calculated by weight of mix).

The approved Job Mix Design will specify the target values for gradation, the target value for asphalt cement content, the Maximum Specific Gravity (MSG) of the hot mix asphalt, the additives, and the allowable mixing temperature range.

Target values for gradation in the Job Mix Design must be within the broad band limits shown in Table 703-3, for the type of hot mix asphalt specified. For acceptance testing, hot mix asphalt concrete mixture will have the full tolerances in Table 401-2 applied. Except the tolerances for the No. 200 sieve, the tolerance limits will apply even if they fall outside the broad band limits shown in Table 703-3. The tolerance limits for the No. 200 sieve will be confined by the broad band shown in Table 703-3. Tolerance limits will not be applied to the largest sieve specified.

Do not produce hot mix asphalt for payment until the Engineer approves the Job Mix Design. Do not mix asphalt produced from different plants.

Use Hot Mix Asphalt Type II, Class B, minimum, for temporary pavement.

Submit the following to the Engineer at least 15 days before the production of hot mix asphalt:

1. A letter stating the location, size, and type of mixing plant, the proposed gradation for the Job Mix Design, gradations for individual stockpiles with supporting process quality control information, and the blend ratio of each aggregate stockpile. The proposed gradation must meet the requirements of Table 703-3 for each type of hot mix asphalt specified in the Contract.

2. Representative samples of each aggregate (coarse and/or intermediate, fine, and al blend material and/or mineral filler, if any) in the proportions required for the proposed mix design. Furnish a total of 500 pounds of material.

3. Five separate 1-gallon samples of the asphalt cement proposed for use in the hot mix asphalt. Include name of product, manufacturer, test results of the applicable quality requirements of subsection 702-2.01, manufacturer's certificate of compliance according to subsection 106-1.05, a temperature viscosity curve for the asphalt cement or manufacturer's recommended mixing and compaction temperatures, and current Material Safety Data Sheet.

4. One sample, of at least 1/2 pint, of the anti-strip additive proposed, including name of product, manufacturer, and manufacturer's data sheet, and current Material Safety Data Sheet.

The Engineer will then evaluate the material and the proposed gradation using ATM 417 and the requirements of Table 401-1 for the appropriate type and class of hot mix asphalt specified and establish the approved Job Mix Design that will become a part of the Contract.

No payment for hot mix asphalt for which a new Job Mix Design is required, will be made until the new Job Mix Design is approved. Approved changes apply only to hot mix asphalt produced after the submittal of the changes.

Changes. Failure to achieve results conforming to Table 401-1 or changes in the source of asphalt cement, source of aggregates, aggregate quality, aggregate gradation, or blend ratio, will require a new Job Mix Design. Submit changes and new samples in the same manner as the original submittal.

401-2.02 AGGREGATES. Conform to subsection 703-2.04.

Use a minimum of three stockpiles for crushed hot mix asphalt aggregate (coarse, intermediate, and fine). Place blend material or mineral filler, if any, in a separate pile.

401-2.03 ASPHALT CEMENT. Provide the grade of asphalt cement specified in the Contract meeting the applicable requirements of Section 702. If not specified, use PG 52-28.

Provide test reports for each batch of asphalt cement showing conformance to the specifications in Section 702 before delivery to the project. Require that the storage tanks used for each batch be noted on the test report, the anti-strip additives required by the mix design be added during load out for delivery to the project, and a printed weight ticket for anti-strip is included with the asphalt cement weight ticket. The location where anti-strip is added may be changed with the written approval of the Engineer.

Furnish the following documents at delivery:

1. Manufacturer's certificate of compliance (106-1.05).
2. Conformance test reports for the batch (Section 702).
3. Batch number and storage tanks used.
4. Date and time of load out for delivery.
5. Type, grade, temperature, and quantity of asphalt cement loaded.
6. Type and percent of anti-strip added.

401-2.04 ANTI-STRIP ADDITIVES. Use anti-strip agents in the proportions determined by ATM 414 and included in the approved Job Mix Design. At least 70% of the aggregate must remain coated when tested according to ATM 414.

401-2.05 PROCESS QUALITY CONTROL. Sample and test materials for quality control of the hot mix asphalt according to subsection 106-1.03. Provide copies of these test results to the Engineer within 24 hours.

Failure to perform quality control forfeits the Contractor's right to a retest under subsection 401-4.02.

Submit a paving and plant control plan at the pre-paving meeting to be held a minimum of 5 working days before initiating paving operations. Address the sequence of operations and joint construction. Outline steps to assure product consistency, to minimize segregation, and to prevent premature cooling of the hot mix asphalt. Include a proposed quality control testing frequency for gradation, asphalt cement content, and compaction.

CONSTRUCTION REQUIREMENTS

401-3.01 WEATHER LIMITATIONS. Do not place the hot mix asphalt on a wet surface, on an unstable/yielding roadbed, when the base material is frozen, or when weather conditions prevent proper handling or finishing of the mix. Do not place hot mix asphalt unless the roadway surface temperature is 40 °F or warmer.

401-3.02 EQUIPMENT, GENERAL. Use equipment in good working order and free of hot mix asphalt buildup. Make equipment available for inspection and demonstration of operation a minimum of 24 hours before placement of hot mix asphalt.

401-3.03 ASPHALT MIXING PLANT. Meet AASHTO M 156. Use an asphalt plant designed to dry aggregates, maintain accurate temperature control, and accurately proportion asphalt cement and aggregates. Calibrate the asphalt plant and furnish copies of the calibration data to the Engineer at least 4 hours before hot mix asphalt production.

Provide a scalping screen at the asphalt plant to prevent oversize material or debris from being incorporated into the hot mix asphalt.

Provide a tap on the asphalt cement supply line just before it enters the plant (after the 3-way valve) for sampling asphalt cement.

Provide aggregate and asphalt cement sampling conditions meeting OSHA safety requirements.

401-3.04 HAULING EQUIPMENT. Haul hot mix asphalt in trucks with tight, clean, smooth metal beds, thinly coated with a minimum amount of paraffin oil, lime water solution, or an approved manufactured asphalt release agent. Do not use petroleum fuel as an asphalt release agent.

Cover the hot mix asphalt in the hauling vehicle, when directed.

401-3.05 ASPHALT PAVERS. Use self-propelled pavers equipped with a heated vibratory screed. Control grade and cross slope with automatic grade and slope control devices. Use an erected string line, a 30-foot minimum mobile stringline (ski), or other approved grade follower, to automatically actuate the paver screed control system. Use grade control on either (a) both the high and low sides or (b) grade control on the high side and slope control on the low side.

Equip the paver with a receiving hopper having sufficient capacity for a uniform spreading operation. Equip the hopper with a distribution system to place the hot mix asphalt uniformly in front of the screed.

Use a screed assembly that produces a finished surface of the required smoothness, thickness and texture without tearing, shoving or displacing the hot mix asphalt. Heat and vibrate screed extensions. Place auger extensions within 20 inches of the screed extensions or per written manufacturer's recommendations.

Equip the paver with a means of preventing the segregation of the coarse aggregate particles from the remainder of the bituminous plant mix when that mix is carried from the paver hopper back to the paver augers. The means and methods used shall be approved by the paver manufacturer and may consist of chain curtains, deflector plates, or other such devices and any combination of these.

The following specific requirements apply to the identified bituminous pavers:

(1) Blaw-Knox bituminous pavers shall be equipped with the Blaw-Knox Materials Management Kit (MMK).
(2) Cedarapids bituminous pavers must have been manufactured in 1989 or later.
(3) Caterpillar bituminous pavers shall be equipped with deflector plates.

The use of a "Layton Box" or equivalent towed paver is allowed on bike paths, sidewalks, and driveways.

401-3.06 ROLLERS. Use both steel-wheel (static or vibratory) and pneumatic-tire rollers. Operate rollers according to manufacturer's instructions. Avoid crushing or fracturing of aggregate. Use rollers designed to compact hot mix asphalt and reverse without backlash.

Use fully skirted pneumatic-tire rollers with a minimum operating weight of 3000 pounds per tire.

401-3.07 PREPARATION OF EXISTING SURFACE. Prepare existing surfaces conforming to the Plans and Specifications. Before applying tack coat to the existing surface, clean out loose material from cracks in existing pavement wider than 1 inch in width full depth then fill using asphalt concrete tamped in place. Clean, wash, and sweep existing paved surfaces of loose material.

Preparation of a milled surface,

- Prelevel remaining ruts, pavement delaminations, or depressions having a depth greater than ½-inch with Asphalt Concrete, Type IV. No density testing is required for the leveling course material. The Engineer will inspect and accept this material.

- If planing breaks through existing pavement remove 2 inches of existing base and fill with Asphalt Concrete, Type II. Notify the Engineer of pavement areas that might be considered thin or unstable during pavement removal.

Existing surface must be approved by the Engineer before applying tack coat. Clean existing pave surfaces of loose material.

Before placing the hot asphalt mix, uniformly coat contact surfaces of curbing, gutters, sawcut pavement, cold joints, manholes, and other structures with tack coat material meeting Section 402.

Allow prime coat to cure and emulsion tack coat to break before placement of hot mix asphalt on these surfaces.

401-3.08 PREPARATION OF ASPHALT. Provide a continuous supply of asphalt cement to the asphalt mixing plant at a uniform temperature, within the allowable mixing temperature range.

401-3.09 PREPARATION OF AGGREGATES. Dry the aggregate so the moisture content of the hot mix asphalt, sampled at the point of acceptance for asphalt cement content, does not exceed 0.5% (by total weight of mix), as determined by WAQTC FOPT for AASHTO T 329.

Heat the aggregate for the hot mix asphalt to a temperature compatible with the mix requirements specified.

Adjust the burner on the dryer to avoid damage to the aggregate and to prevent the presence of unburned fuel on the aggregate. Hot mix asphalt concrete containing soot or fuel is considered unacceptable according to subsection 105-1.11.

401-3.10 MIXING. Combine the aggregate, asphalt cement and additives in the mixer in the amounts required by the Job Mix Design. Mix to obtain 98% coated particles when tested according to AASHTO T 195.

For batch plants, put the dry aggregate in motion before addition of asphalt cement.

Mix the hot mix asphalt within the temperature range determined by the Job Mix Design.

401-3.11 TEMPORARY STORAGE. Silo type storage bins may be used, provided that the characteristics of the hot mix asphalt are not altered. Signs of visible segregation, heat loss, changes from the Job Mix Design, change in the characteristics of asphalt cement, lumpiness, or stiffness of the hot mix asphalt are causes for rejection.

401-3.12 PLACING AND SPREADING. Place the hot mix asphalt upon the approved surface, spread, strike off, and adjust surface irregularities. Use asphalt pavers to distribute hot mix asphalt, including leveling courses. Use asphalt pavers to distribute hot mix asphalt, including leveling courses. The maximum compacted lift thickness allowed is 3 inches.

During placement, the Engineer may evaluate the hot mix asphalt immediately behind the paver for temperature uniformity. Areas with temperature differences more than 25°F lower than the surrounding hot mix asphalt are likely to produce areas of low density. Any thermal images and/or thermal profile data will become part of the project record and shared with the Contractor. The Contractor shall immediately adjust his laydown procedures to correct the problem.

Use hand tools to spread, rake, and lute the hot mix asphalt in areas where irregularities or unavoidable obstacles make the use of mechanical spreading and finishing equipment impracticable.

When the section of roadway being paved is open to traffic, pave adjacent traffic lanes to the same elevation within 24 hours. Place approved material against the outside pavement edge when the drop off exceeds 2 inches.

When multiple lifts are specified in the Contract, do not place the final lift until all lower lifts throughout that section, as defined by the Paving Plan, are placed and accepted.

Do not pave against new Portland concrete curbing until it has cured for at least 72 hours.

Place hot mix asphalt over bridge deck membranes according to Section 508 and the manufacturer's specifications.

401-3.13 COMPACTION. Thoroughly and uniformly compact the hot mix asphalt by rolling. In areas not accessible to large rollers, compact with mechanical tampers or trench rollers.

The target value for density is 94% of the maximum specific gravity (MSG), as determined by WAQTC FOP for AASHTO T 209. For the first lot of each type of hot mix asphalt, the Job Mix Design will determine the MSG. For additional lots, the MSG will be determined by the sample from the first sublot of each lot.

Acceptance testing for density will be performed in accordance with WAQTC FOP for AASHTO T 166/T 275 using a 6-inch diameter core. (Acceptance testing for density of leveling course or temporary pavement is not required.)

Do not leave rollers or other equipment standing on hot mix asphalt that has not cooled sufficiently to prevent indentation.

401-3.14 JOINTS. Minimize the number of joints. Place and compact the hot mix asphalt to ensure a continuous bond, texture, and smoothness between adjacent sections of the hot mix asphalt.

Remove to full depth improperly formed joints resulting in surface irregularities, replace with new hot mix asphalt, and thoroughly compact.

Precut pavement removal to a neat line with a power saw or by other approved method.

Form transverse joints by saw cutting back on the previous run to expose the full depth of layer with a power saw or other method approved by the Engineer or use a removable bulkhead. Skew transverse joints between 15-25 degrees.

Offset the longitudinal joints in one layer from the joint in the layer immediately below by at least 6 inches. Align the joints of the top layer at the centerline or lane lines. Where preformed marking tape striping is required, offset the longitudinal joint in the top layer not more than 12 inches from the edge of the stripe.

Uniformly coat joint surfaces below the final lift with tack coat conforming to Section 703 before placing any fresh HMA against the joint.

Before placing an adjacent panel of hot mix asphalt to form a joint in the top layer, apply Crafco Pavement Joint Adhesive No. 34524 Deery Cold Joint Adhesive or approved equal, to the edge of the existing panel. Edge surface preparation, application temperature, thickness, and method shall be according to manufacturer's recommendations.

For the top layer of hot mix asphalt, the minimum specification limit for longitudinal joint density is 91% of the MSG of the panel completing the joint. Cut one 6 inch diameter core centered on the longitudinal joint at each location the panel completing the joint is cored for acceptance density testing. Density will be determined in accordance with WAQTC FOP for AASHTO T 166/T 275.

In the top layer seal longitudinal joints with Asphalt Systems GSB-78 or approved equal, while the hot mix asphalt is clean, free of moisture, and before traffic marking. Longitudinal joint sealing shall be according to the manufacturer's recommendations and an application rate of 0.15 gallons per square yard. Apply the sealant at least 12 inches wide centered on the longitudinal joint.

Hot lapped joints formed by paving in echelon must be completed while the mat temperature is over 150°F. These joints do not need to be tacked and will be measured and evaluated for joint density.

Longitudinal joints will be evaluated for acceptance according to subsection 401-4.05.

401-3.15 SURFACE TOLERANCE. The Engineer will test the finished surface after final rolling at selected locations using a 10 foot straightedge. Correct variations from the testing edge, between any two contacts of more than 1/4 inch.

401-3.16 PATCHING DEFECTIVE AREAS. Remove hot mix asphalt that becomes contaminated with foreign material, is segregated, or is in any way determined to be defective. Do not skin patch. Remove defective hot mix asphalt for the full thickness of the course. Cut the pavement so that edges are vertical, the sides are parallel to the direction of traffic and the ends are skewed between 15-25 degrees. Coat edges with a tack coat meeting Section 402 and allow to cure. Place and compact fresh hot mix asphalt according to subsection 401-3.13 to grade and smoothness requirements.

Costs associated with patching defective areas are subsidiary to the Hot Mix Asphalt pay item.

401-4.01 METHOD OF MEASUREMENT. Section 109 and the following:

Hot Mix Asphalt.

a) By weighing. No deduction will be made for the weight of asphalt cement or anti stripping additive.

b) By the area of final hot mix asphalt surface.

Asphalt Price Adjustment. Calculated by quality level analysis under subsection 401-4.03.

Asphalt Cement. By the ton, as follows:

1. Percent of asphalt cement for each sublot multiplied by the total weight represented by that sublot. Percent of asphalt cement will be determined by ATM 405 or WAQTC FOP for AASHTO T 308. The same tests used for the acceptance testing of the sublot will be used for computation of the asphalt cement quantity. If no acceptance testing is required, the percent of asphalt cement is the target value for asphalt cement in the Job Mix Design.

2. Supplier's invoices minus waste, diversion and remnant. This procedure may be used on projects where deliveries are made in tankers and the asphalt plant is producing hot mix asphalt for one project only.

   The Engineer may direct, at any time, that tankers be weighed in the Engineers presence before and after unloading. If the weight determined at the project varies more than 1% from the invoice amount, payment will be based on the weight determined at the project.

   Any remnant or diversion will be calculated based on tank stickings or weighing the remaining asphalt cement. The Engineer will determine the method. The weight of asphalt cement in waste hot mix asphalt will be calculated using the target value for asphalt cement as specified in the Job Mix Design.

Method 1 will be used for determining asphalt quantity unless otherwise directed in writing. The procedure initially used will be the one used for the duration of the project. No payment will be made for any asphalt cement more than 0.4% above the optimum asphalt content specified in the Job Mix Design.

Job Mix Design. When specified, Contractor furnished Job Mix Designs will be measured at one per hot mix asphalt class and type.

Temporary Pavement. By weighing. No deduction will be made for the weight of asphalt cement or anti-stripping additive.

Longitudinal Joint Adhesive and Sealing. By the lineal foot of longitudinal joint.

Preleveling. By weighing. No deduction will be made for the weight of asphalt cement or anti stripping additive.

401-4.02 ACCEPTANCE SAMPLING AND TESTING. The quantity of each class and type of hot mix asphalt produced and placed will be divided into lots and the lots evaluated individually for acceptance.

A lot will normally be 5,000 tons. The lot will be divided into sublots of 500 tons, each randomly sampled and tested for asphalt cement content, density, and gradation according to this subsection. If the project has more than 1 lot, and less than 8 additional sublots have been sampled at the time a lot is terminated, either due to completion of paving operations or the end of the construction season (winter shutdown), the material in the shortened lot will be included as part of the prior lot. The price adjustment computed, according to subsection 401-4.03, for the prior lot will include the samples from the shortened lot.

If 8 or 9 samples have been obtained at the time a lot is terminated, they will be considered as a lot and the price adjustment will be based on the actual number of test results (excluding outliers) in the shortened lot.

If the contract quantity is between 1,500 tons and 4,999 tons, the contract quantity will be considered one lot. The lot will be divided into sublots of 500 tons and randomly sampled for asphalt cement content, density, and gradation according to this subsection except that a determination for outliers will not be performed. Hot mix asphalt quantities of less than 300 tons remaining after dividing the Contract quantity into sublots will be included in the last sublot. Hot mix asphalt quantities of 300 tons or greater will be treated as an individual sublot. The lot will be evaluated for price adjustment according to subsection 401-4.03 except as noted.

For Contract quantity of less than 1,500 tons (and for temporary pavement), hot mix asphalt will be accepted for payment based on the Engineer's approval of a Job Mix Design and the placement and compaction of the hot mix asphalt to the specified depth and finished surface requirements and tolerances. The Engineer reserves the right to perform any testing required in order to determine acceptance. Remove and replace any hot mix asphalt that does not conform to the approved JMD.

Samples collected at the plant from dry batched aggregates, the conveyor system, or the asphalt cement supply line shall be taken by the Contractor in the presence of the Engineer. The Engineer will take immediate possession of the samples.

1. Asphalt Cement. Hot mix samples taken for the determination of asphalt cement content will be taken randomly from behind the screed before initial compaction, at the end of the auger, or from the windrow according to WATC FOP for AASHTO T 168 and ATM 403, as directed by the Engineer. Hot mix asphalt samples taken for the determination of both asphalt cement content and gradation will be taken randomly from behind the screed before initial compaction or from the windrow according to WAQTC FOP for AASHTO T 168 and ATM 403.

Two separate samples will be taken, one for acceptance testing and one held in reserve for retesting if applicable. At the discretion of the Engineer, asphalt cement content will be determined according to ATM 405 or WAQTC FOP for AASHTO T 308.

2. Aggregate Gradation.

   a. Drum Mix Plants. Samples taken for the determination of aggregate gradation from drum mix plants will be from the combined aggregate cold feed conveyor via a diverter device, or from the stopped conveyor belt according to WAQTC FOP for AAHSTO T2, or from the same location as samples for the determination of asphalt cement content. Locate diverter devices for obtaining aggregate samples from drum mix plants on the conveyor system delivering combined aggregates into the drum. Divert aggregate from the full width of the conveyor system and maintain the diverter device to provide a representative sample of aggregate incorporated into the hot mix asphalt. Two separate samples will be taken, one for acceptance testing and one held in reserve for retesting if applicable. The aggregate gradation for samples from the conveyor system will be determined in accordance with WAQTC FOP for AASHTO T 27/T 11. For hot mix asphalt samples, the gradation will be determined according to WAQTC FOP for AASHTO T 30 from the aggregate remaining after the ignition oven (WAQTC FOP for AASHTO T 308) has burned off the asphalt cement.

   b. Batch Plants. Samples taken for the determination of aggregate gradation from batch plants will be from the same location as samples for the determination of asphalt cement content, or from dry batched aggregates according to WAQTC FOP for AASHTO T 2. Two separate samples will be taken, one for acceptance testing and one held in reserve for retesting if applicable. Dry batched aggregate gradations will be determined according to WAQTC FOP for AASHTO T 27/T 11. For hot mix asphalt samples, the aggregate gradation will be determined according to WAQTC FOP for AASHTO T 30 from the aggregate remaining after the ignition oven (WAQTC FOP for AASHTO T 308) has burned off the asphalt cement.

3. Density. Cut full depth core samples from the finished hot mix asphalt within 24 hours after final rolling. Neatly cut one 6 inch diameter core sample with a core drill at each location marked by the Engineer. Use a core extractor to prevent damage to the core. The Engineer will determine the density of the core samples in accordance with WAQTC FOP for AASHTO T 166/T 275. Do not core hot mix asphalt on bridge decks. Backfill and compact voids left by coring with new hot mix asphalt within 24 hours.

   Cores for longitudinal joint density shall be centered on the longitudinal joint at each location the panel completing the joint is cored for mat density acceptance testing.

4. Retesting. A retest of any sample outside the limits specified in Table 401-2 may be requested provided the quality control requirements of 401-2.05 are met. Deliver this request in writing to the Engineer within 7 days of receipt of the initial test result. The Engineer will mark the sample location for the density retest within a 2 foot radius of the original core. The original test results will be discarded and the retest result will be used in the price adjustment calculation regardless of whether the retest result gives a higher or lower pay factor. Only one retest per sample is allowed. Except for the first lot, gradation and asphalt cement content are determined from the same sample, retesting for gradation or asphalt cement from the first sublot of a lot will include retesting for the MSG; when separate samples are used, retesting for asphalt cement content will include retesting for MSG.

5. Asphalt Cement.

The lot size for asphalt cement will normally be 200 tons. If a project has more than one lot and the remaining asphalt cement quantity is less than 150 tons, it will be added to the previous lot and that total quantity will be evaluated for price adjustment as one lot. If the remaining asphalt cement quantity is 150 tons or greater, it will be sampled, tested and evaluated as a separate lot.

If the contract quantity of asphalt cement is between 85 – 199 tons, the contact quantity will be considered as one lot and sampled, tested, and evaluated in accordance with this subsection. Quantities of asphalt cement less than 85 tons will be accepted based on manufacturer's certified test reports and certification of compliance.

Asphalt cement will be sampled according to WAQTC FOP for AASHTO T 40, tested for conformance to the specifications in Section 702, and evaluated for price adjustment in accordance with 401-4.03. Asphalt cement pay reduction factors for each sample will be determined from Table 401-4. Three separate samples from each lot will be taken, one for acceptance testing, one for Contractor retesting, and one held in reserve for referee testing if applicable.

The total asphalt cement price adjustment is the sum of the individual lot price adjustments and will be subtracted under Item 401(6) Asphalt Price Adjustment.

401-4.03 EVALUATION OF MATERIALS FOR ACCEPTANCE. The following method of price adjustment will be applied to each type of Hot Mix Asphalt for which the contract quantity equals or exceeds 1,500 tons, except as specified in subsection 401-4.02.

Acceptance test results for a lot will be analyzed collectively and statistically by the Quality Level Analysis method as specified in subsection 106-1.03 to determine the total estimated percent of the lot that is within specification limits.

The price adjustment is based on the lower of two pay factors. The first factor is a composite pay factor for hot mix asphalt that includes gradation and asphalt cement content. The second factor is for density.

A lot containing hot mix asphalt with less than a 1.00 pay factor will be accepted at an adjusted price, provided the pay factor is at least 0.75 and there are no isolated defects identified by the Engineer. A lot containing hot mix asphalt that fails to obtain at least a 0.75 pay factor will be considered unacceptable and rejected under subsection 105-1.11.

The Engineer will reject hot mix asphalt that appears to be defective based on visual inspection. A minimum of two samples will be collected from the rejected hot mix asphalt and tested if requested. If test results are within specification limits, payment will be made for the hot mix asphalt. If any of the test results fail to meet specifications, no payment will be made and the cost of the testing will be subtracted under Item 401(6) Asphalt Price Adjustment. Costs associated with removal and disposal of the rejected hot mix asphalt are subsidiary to the Hot Mix Asphalt pay item.

Outlier Test. Before computing the price adjustment, the validity of the test results will be determined by SP-7, the Standard Practice for Determination of Outlier Test Results. Outlier test results will not be included in the price adjustment calculations.

When gradation and asphalt cement content are determined from the same sample, if any size on the gradations test or the asphalt cement content is an outlier, then the gradation test results and the asphalt cement content results for that sublot will not be included in the price adjustment. The density test result for that sublot will be included in the price adjustment provided it is not an outlier also.

If the density test result is an outlier, the density test result will not be included in the price adjustment, however, the gradation and asphalt cement content results for that sublot will be included provided neither is an outlier.

When gradation and asphalt cement content are determined from separate samples, if any sieve size on the gradation test is an outlier, then the gradation test results for that sample will not be included in the price adjustment. The asphalt cement content and density test results for that sublot will be included in the price adjustment provided neither is an outlier. If the asphalt cement content test result is an outlier, it will not be included in the price adjustment but the gradation and density test results for the sublot will be included provided neither is an outlier. If the density test result is an outlier, it will not be included in the price adjustment but the gradation and asphalt cement content test results will be included provided neither is an outlier.

Quality Level Analysis. Pay factors are computed as follows:

1. Outliers (determined by SP-7), and any test results on material not incorporated into the work, are eliminated from the quality level analysis.

The arithmetic mean ($\bar{x}$) of the remaining test results is determined: $\bar{x} = \frac{\Sigma x}{n}$

Where: Σ = summation of

x = individual test value to x_n

n = total number of test values

$\bar{x}$ is rounded to the nearest tenth for density and sieve sizes except the No. 200 sieve. $\bar{x}$ is rounded to the nearest hundredth for asphalt cement content and the No. 200 sieve.

2. The sample standard deviation(s), after the outliers have been excluded, is computed:

$$s = \sqrt{\frac{n\Sigma(x^2) - (\Sigma x)^2}{n(n-1)}}$$

Where: $\Sigma (x^2)$ = sum of the squares of individual test values.
$(\Sigma x)^2$ = square of the sum of the individual test values.

The sample standard deviation (s) is rounded to the nearest hundredth for density and all sieve sizes except the No. 200 sieve. The sample standard deviation (s) is rounded to the nearest 0.001 for asphalt cement content and the No. 200 sieve.

If the computed sample standard deviation (s) is <0.001, then use s = 0.20 for density and all sieves except the No. 200. Use s = 0.020 for asphalt cement content and the No. 200 sieve.

3. The USL and LSL are computed. For aggregate gradation and asphalt cement content, the Specification Limits (USL and LSL) are equal to the Target Value (TV) plus and minus the allowable tolerances in Table 401-2. The TV is the specification value specified in the approved Job Mix Design. Specification tolerance limits for the largest sieve specified will be plus 0 and minus 1 when performing PWL calculations. The TV for density is 94% of the maximum specific gravity (MSG), the LSL is 92% of MSG and the USL is 98%.

TABLE 401-2
LOWER SPECIFICATION LIMIT (LSL) & UPPER SPECIFICATION LIMIT (USL)

Measured Characteristics	LSL	USL
3/4 inch sieve	TV-6.0	TV+6.0
1/2 inch sieve	TV-6.0	TV+6.0
3/8 inch sieve	TV-6.0	TV+6.0
No. 4 sieve	TV-6.0	TV+6.0
No. 8 sieve	TV-6.0	TV+6.0
No. 16 sieve	TV-5.0	TV+5.0
No. 30 sieve	TV-4.0	TV+4.0
No. 50 sieve	TV-4.0	TV+4.0

Measured Characteristics	LSL	USL
No. 100 sieve	TV-3.0	TV+3.0
No. 200 sieve[1]	TV-2.0	TV+2.0
Asphalt %	TV-0.4	TV+0.4
Mat Density %	92	98

Note 1.Tolerances for the No. 200 sieve may not exceed the broad band limits in Table 703-3.

4. The Upper Quality Index (Q_U) is computed: $Q_U = \frac{USL - \bar{x}}{s}$

   Where: USL = Upper Specification Limit
   Q_U is rounded to the nearest hundredth.

5. The Lower Quality Index (Q_L) is computed: $Q_L = \frac{\bar{x} - LSL}{s}$

   Where: LSL = Lower Specification Limit
   Q_L is rounded to the nearest hundredth.

6. P_U (percent within the upper specification limit which corresponds to a given Q_U) is determined. See Subsection 106-1.03.

7. P_L (percent within the lower specification limit which corresponds to a given Q_L) is determined. See Subsection 106-1.03.

8. The Quality Level (the total percent within specification limits) is determined for aggregate gradation, asphalt cement content, and density.

   Quality Level = $(P_L + P_U) - 100$

9. Using the Quality Levels from Step 8, the lot Pay Factor is determined for Density (DPF) and gradation and asphalt cement content pay factors (PF) from Table 106-2. The maximum pay factor for the largest sieve size specification for gradation is 1.00.

10. The Composite Pay Factor (CPF) for the lot is determined using the following formula:

$$CPF = \frac{[f_{3/4\ inch}\ (PF_{3/4\ inch}) + f_{1/2\ inch}\ (PF_{1/2\ inch}) + \ldots . f_{ac}\ (PF_{ac})]}{\Sigma f}$$

The CPF is rounded to the nearest hundredth.

Table 401-3 gives the weight factor (f) for each sieve size and asphalt cement content.

TABLE 401-3
WEIGHT FACTORS

Sieve Size	Type I	Type II	Type III

	Factor "f"	**Factor "f"**	Factor "f"
1 inch sieve	4		
3/4 inch sieve	4	4	
1/2 inch sieve	4	5	4
3/8 inch sieve	4	5	5
No. 4 sieve	4	4	5
No. 8 sieve	4	4	5
No. 16 sieve	4	4	5
No. 30 sieve	4	5	6
No. 50 sieve	4	5	6
No. 100 sieve	4	4	4
No. 200 sieve	20	20	20
Asphalt Cement Content, %	40	40	40

The price adjustment will be based on either the CPF or DPF, whichever is the lowest value. The price adjustment for each individual lot will be calculated as follows:

Price Adjustment = [(CPF or DPF)* -1.00] x (tons in lot) x (PAB)

* CPF or DPF, whichever is lower.

PAB = Price Adjustment Base = $150.75 per ton

The total asphalt concrete price adjustment is the sum of all price adjustments for each lot and will be adjusted under Item 401(6) Asphalt Price Adjustment.

EVALUATION OF ASPHALT CEMENT

Asphalt cement will be randomly sampled and tested every 200 tons and evaluated for price adjustment. If the last sample increment is 100 tons or less, that quantity of asphalt cement will be added to the quantity represented by the previous sample and the total quantity will be evaluated for price adjustment. If the last sample increment is greater than 100 tons, it will be sampled, tested and evaluated separately. Asphalt cement pay reduction factors for each sample will be determined from Table 401-4.

The total asphalt cement price adjustment is the sum of the individual sample price adjustments and will be subtracted under Item 401(6) Asphalt Price Adjustment.

Table 401-4
ASPHALT CEMENT PAY REDUCTION FACTORS
(Use the single, highest pay reduction factor)

	Spec	Pay Reduction Factor (PRF)								
		0	**0.04**	**0.05**	**0.06**	**0.07**	**0.08**	**0.1**	**0.25**	**Reject or Engr Eval**
Tests On Original Binder										
Viscosity	<3 Pa-s	≤3		>3						
Dynamic Shear	>1.00 kPa	>1.00		0.88-0.99				0.71-0.89	0.50-0.70	<0.50
Toughness	>110 in-lbs	>93.5	90.0-93.4	85.0-89.9	80.0-84.9	75.0-79.9	70.0-74.9			<70.0
Tenacity	>75 in-lbs	>63.8	61.0-63.7	58.0-60.9	55.0-57.9	52.0-54.9	48.0-51.9			<48.0
Tests On RTFO										
Mass Loss	<1.00 %	<1.00		1.001-1.092				1.093-1.184	1.185-1.276	>1.276
Dynamic Shear	>2.20 kPa	>2.20		1.816-2.199				1.432-1.815	1.048-1.431	<1.048
Test On PAV										
Dynamic Shear	<5000 kPa	<5000		5001-5289				5290-5578	5579-5867	>5867
Creep Stiffness, S	<300 MPa	<300		301-338				339-388	389-450	>450
Creep Stiffness, m-value	>0.300	>0.300		0.287-0.299				0.274-0.286	0.261-0.273	<0.261
Direct Tension	>1.0 %	>1.0		0.287-0.299				0.274-0.286	0.261-0.273	<0.56

Asphalt Cement Price Adjustment for each sample = 5 x PAB x Qty X PRF
PAB = Price Adjustment Base
Qty = Quantity of asphalt cement represented by asphalt cement sample
PRF = Pay Reduction Factor from Table 401-4

Asphalt Cement Appeal Procedure. Once notified of a failing test result of an asphalt cement sample, the Contractor has 21 days to issue a written appeal. The appeal must be accompanied by all of the Contactor's quality control test results and a test result of Contactor's sample of this lot tested by an AASHTO accredited asphalt laboratory (accredited in the test procedure in question). The Engineer will review these test results and using ASTM D3244 determine a test value upon which to base a price reduction.

If the Contractor challenges this value, then the referee sample held by the Engineer will be sent to a mutually agreed upon independent AASHTO accredited laboratory for testing. This test

result will be incorporated into the ASTM D3244 procedure to determine a test value upon which to base a price reduction. If this final value incurs a price adjustment, the Contractor under Item 408(3) Asphalt Price Adjustment, shall pay the cost of testing the referee sample.

The total Asphalt Price Adjustment is the sum of all the price adjustments for each lot and will be included in 401(6) Asphalt Price Adjustment.

EVALUATION OF LONGITUDINAL JOINT DENSITY. Longitudinal joint density price adjustments apply when hot mix asphalt quantities are equal to or greater than 1,500 tons. A longitudinal joint density price adjustment for the top layer will be based on the average of all the joint densities on a project and determined as follows:

1. If project average joint density is less than 91% MSG, apply the following disincentive:

   Longitudinal joint density price adjustment equal to $3.00 per lineal foot is deducted under Item 401(6) Asphalt Price Adjustment.

2. If project average joint density is greater than 92% MSG apply the following incentive:

   Longitudinal joint density price adjustment equal to $1.50 per linear foot is added under Item 401(6) Asphalt Price Adjustment.

The longitudinal joint price adjustment will be included in Item 401(6) Asphalt Price Adjustment.

401-5.01 BASIS OF PAYMENT.

Separate payment will not be made for asphalt cement or anti-strip additives for Item 401(3) Temporary Hot Mix Aspahlt, or hot mix asphalt for leveling course.

Asphalt cement, anti stripping additives, tack coat, and crack sealing (401-3.07) are subsidiary to the hot mix asphalt unless specified as pay items.

Price adjustments will not apply to:

1. Hot Mix Asphalt for leveling course
2. Temporary Hot Mix Asphalt

Payment for furnishing and installing joint adhesive and sealing the pavement adjacent to the joints will be paid as 401(9) Longitudinal Joint Adhesive and Sealing.

Failure to cut core samples within the specified period will result in a deduction of $100.00 per sample per day. Failure to backfill voids left by sampling within the specified period will result in a deduction of $100.00 per hole per day. The accrued amount will be subtracted under Item 401(6) Asphalt Price Adjustment.

The Engineer will assess a fee of $2,500.00 under Item 401(6) Asphalt Price Adjustment, for each mix design subsequent to the approved Job Mix Design for each Type and Class of Hot Mix Asphalt specified.

Payment will be made under:

Pay Item	Pay Unit
401(1A) Hot Mix Asphalt, Type II; Class A	Ton
401(2) Asphalt Cement, Grade PG 52-28	Ton
401(6) Asphalt Price Adjustment	Contingent Sum
401(9) Longitudinal Joint Adhesive and Sealing	Linear Foot

R199USC04(06/07/06)

Delete this Section in its entirety and replace with the following:

SECTION 406

RUMBLE STRIPS

Special Provisions

406-1.01 DESCRIPTION. Form a series of indentations into the shoulders of the pavement and clean up debris where indicated on the Plans.

406-2.01 MATERIALS. None.

CONSTRUCTION REQUIREMENTS

406-3.01 MILLING. Construct rumble strips with a milling machine. The pavement should be compacted and be at a temperature below 80 degrees Fahrenheit. Make the edges of the indentation straight, smooth, and free of spalling.

Keep the travel lanes free of milling debris. Clean milling debris off pavement. Do not allow debris to impede road drainage or enter any waterways. Collect and dispose of milling debris outside the project limits or dispose as directed by the Engineer.

406-4.01 METHOD OF MEASUREMENT. Section 109 and as follows:

Station. Includes a single lineal payment for rumble strips on the shoulder measured by station along the centerline of the highway.

406-5.01 BASIS OF PAYMENT. Payment will be made under:

Pay Item	Pay Unit
406(2) Rumble Strips	Station

(02/20/03)ES02 (5/5/06)R&M

SECTION 501

STRUCTURAL CONCRETE

Special Provisions

501-1.01 DESCRIPTION. *Add the following*: This work also includes installing graffiti protection on the exposed face of headwall surfaces.

514-2.01 MATERIALS. *Add the following*:

Graffiti Protection	Use a two-step graffiti protection coating system designed specifically for this use. The system shall consist of a single component clear acrylic base coat covered by a clear urethane finish coat. This material is not a sealer or vapor barrier and no appreciable discoloration is allowed.

501-3.09 FINISHING CONCRETE SURFACES. *Add the following subitem*:

5. Graffiti Protection. Let all concrete surfaces set at least 28 days before applying any coatings. Trained personnel shall apply the material according to the manufacturer's recommendations. Apply the base coat with a roller or sprayer in accordance with the manufacturer's recommendations. Apply two coats of the finish coat after the base coat has cured for 72 hours. Apply appropriate masking as required.

501-4.01 METHOD OF MEASUREMENT. *Add the following:*

Graffiti protection will not be measured for payment.

501-5.01 BASIS OF PAYMENT. *Delete the first paragraph and replace with the following:*
The quantities of reinforcing steel and graffiti protection included in cast-in-place structures will be subsidiary to the Contract price for the concrete.
(02/28/01)R41USC (9/20/05)R&M

SECTION 504

STEEL STRUCTURES

Special Provisions

504-1.01 DESCRIPTION. *Add the following after the first paragraph:* This work includes designing, furnishing, erecting, and finishing prefabricated steel bridge, timber plank deck, and concrete abutments.

Design the prefabricated steel bridge according to the latest edition of the "AASHTO Guide Specification for Design of Pedestrian Bridges" to meet the dimensions shown on the Plans.

Conform to the "AASHTO LRFD Bridge Design Specifications" for pedestrian railing geometry and load requirements. Provide for a minimum service vehicle live load capacity of twenty-five percent (25%) of HS20 design vehicle.
(07/15/05)R224USC02

The bridge deck shall be timber plank treated in conformance with Section 506.
(09/20/05)R&M

Modify manufacturer's standard drawings to reflect the exact requirements and conditions unique to this project. Clearly specify relevant information such as member sizes, geometry, bearing reactions, design loads, material properties and other design information on the drawings. A licensed Professional Civil Engineer registered in the State of Alaska must stamp drawings.

504-2.01 MATERIALS. *Add the following:* Use Class A Concrete for bridge abutments as defined in Section 501.

Construct prefabricated steel bridge from ASTM A500 Grade B square and rectangular tubing and/or AASHTO M270 plate and structural shapes.

504-3.01 FABRICATION. *Add the following:*

8. Welding. Delete item e and f in the second paragraph and substitute the following:

   e. Names and qualifications of the NDE technicians
   f. Type and extent of NDE to be conducted, as required in the specifications and as shown on the approved shop drawings.

9. Prefabricated Steel Bridge

   Galvanize steel members.

Secure a nameplate to the structure indicating the bridge manufacturer's name, maximum load limits, and year of installation.

504-3.02 ERECTION.

2. Handling and Storing Materials.

Add the following: Propose a location for the storage of the prefabricated steel bridge for approval of the Engineer. Notify the Engineer 48 hours in advance of bridge delivery.

4. Method and Equipment.

Add the following: Follow the recommended lifting and erection procedure of the prefabricated steel bridge manufacturer. Provide a copy of the manufacturer's lifting and erection instructions to the Engineer prior to installation. Notify the Engineer 48 hours in advance of the bridge erection.

8. Setting Shoes and Bearings.

Add the following: Verify the abutment geometry for conformance to the specified tolerances prior to bridge installation.

504-4.01 METHOD OF MEASUREMENT. *Add the following*:

7. Prefabricated Steel Bridge. By each unit completed in place and accepted.
(07/15/05)R224USC02

504-5.01 BASIS OF PAYMENT. *Add the following*:

Prefabricated Steel Bridge. At the contract unit price shown on the bid schedule, for work, including design, fabrication, erection, timber plank decking, and abutments. Concrete for bridge abutments will be subsidiary to the respective bridge. Excavation and backfill required for placement of the bridge abutment will be paid for separately under Items 203(3) Unclassified Excavation and 203(6B) Borrow, Type B respectively.
(9/20/05)R&M

Payment will be made under:

Pay Item	Pay Unit
504(9) Prefabricated Steel Bridge (81')	Each

(07/15/05)R224USC02

SECTION 505

PILING

Special Provisions

505-2.01 MATERIALS. *Add the following to materials conformance list:*

Coping	ASTM A 36, Hot dip galvanized according to AASHTO M111
Spar Varnish	Marine grade modified Alkyd Urethane emulsion.

505-3.03 PILE BEARING VALUES. *Delete the first paragraph of this subsection and substitute the following:* Drive piles to the required tip elevation, or minimum installed length, shown on the plans.

505-3.09 DRIVING PILES. *Add the following to the end of the first paragraph*: Hard driving conditions, for example permafrost, should be anticipated at depths shallower that the required pile tip elevations shown on the plans – see test hole logs in Appendix E of these Special Provisions.

Delete the first sentence of the second paragraph and replace with: Submit a pile driving plan at least 30 days before mobilizing pile driving equipment to the project.

Add the following: Sites for the signal pole foundations can contain subsurface soils that consist of very dense sandy gravel with cobbles and boulders.

When the minimum pile length shown on the Plans can not be installed for a lighting standard foundation, install the pile tip to an elevation established by the Engineer.
(04/15/05)R65USC04

505-3.13 COATING OF STEEL PILES AND SHELLS. *Add the following paragraph*: Coat the inside of steel sheet piles exposed to embankment fills with marine grade Spar varnish according to the manufacture's recommendations.

Add the following Subsection:

505-3.15 COPING

Furnish and install steel coping, which has a channel cross section. Install channel coping in such a manner that it caps the top of all sheet pile walls exposed to pedestrian traffic and is fastened by welds, bolts, or the like.

505-4.01 METHOD OF MEASUREMENT. *Add the following to the second paragraph:*

Coping will not be measured for payment.

Do not measure steel pipe piles for signal and pedestrian pushbutton poles for payment.

505-5.01 BASIS OF PAYMENT. *Add the following to the second paragraph:* Include costs of furnishing and installing steel pipe piles for signal pole and pedestrian push button standards in Item 660(2), Flashing Beacon System Complete.
(04/15/05)R65USC04 (5/16/06)R&M

SECTION 507

BRIDGE RAILING

Special Provisions

507-1.01 DESCRIPTION. *Replace the first paragraph with the following:* This work consists of constructing pedestrian railing and concrete foundations as shown on the Plans.

507-2.01 MATERIALS. *Add the following:*

Aluminum Railing	Section 722, Use 6061-T6 Aluminum Structural Pipe, Schedule 40, for hand railing and vertical posts in fabrication of pedestrian railing.

(6/30/05)R&M

SECTION 603

CULVERTS AND STORM DRAINS

Special Provisions

603-1.01 DESCRIPTION. *Add the following:* This work shall also consist of installing culvert marker posts, and wrapping joints with a geotextile fabric.

603-2.01 MATERIALS. *Add the following*:

Geotextile Fabric	Subsection 729-2.01 use fabric meeting the requirements for Separation
Arctic Insulated Corrugated Steel Pipe	Subsection 707-2.01

Culvert marker posts shall meet the requirements of Subsection 730-2.05 Flexible Delineator Posts. The color shall be blue with no other markings. The 2.5-inch by 6-foot post shall be rectangular in cross-section with reinforcing ribs capable of a minimum bending radius of 9 inches. (08/27/03)R42USC

603-3.03 JOINING PIPE. *Add the following to the first paragraph under item 2. Metal Pipe.*: Wrap CSP pipe joints with geotextile fabric extending three feet on both sides of the coupling bands.

Add the following subitem:

4. Arctic Insulated Corrugated Steel Pipe. Join inner core of arctic pipe firmly according to the requirements for joining metal pipe. Complete the joint using half shell insulation inserts and coupling band around the outer jacket. Installation of all components shall be accomplished using the manufacture's recommendations. Insulation and outer jacket shall be cut back to allow installation of half shell insulation inserts at the joints. Half shell insulation shall be installed at all joints and jacketed with heat shrink sleeves. Field joints shall not have a gap between the adjacent insulation edges exceeding one-eighth (1/8)-inch. If a gap does exist, fill with a neoprene gasket or spray urethane foam. The heat shrink must fill the valleys of the outer jacket to prevent water intrusion. If the heat shrink material is unable to conform adequately to the corrugated shape, then the valleys shall be prefilled with mastic. A coupling band shall be installed around the joint to protect the heat shrink sleeve.

   Unless the Contractor's personnel are certified in the installation of arctic pipe, the pipe suppliers shall provide pipe personnel to instruct the Contractor in the handling, installation, and testing of their products. The Contractor shall provide for the on-site services of one supplier's representative at the start of

construction. Additional technical representative services, if necessary, will also be at the Contractor's expense.

Random tests of field joints will be made by the Engineer, as necessary, as a quality control measure. The Contractor shall be responsible for removal or repair of unsatisfactory joints.

Add the following Subsection:

603-3.06 CULVERT MARKER POSTS. Culvert marker posts shall be installed on the approach side of storm drain outfalls 30 inches and smaller, field inlets not in paved parking lots, all end sections to cross culverts, or as directed by the Engineer. Forty-two (42) inches of post shall remain above the ground after driving.

603-4.01 METHOD OF MEASUREMENT. *Add the following*: Culvert marker posts and geotextile fabric will not be measured for payment.

603-5.01 BASIS OF PAYMENT. *Add the following*: Culvert marker posts and geotextile fabric will not be paid for directly, but will be subsidiary to pipe items. (08/27/03)R42USC

Payment will be made under:

Pay Item	Pay Unit
603(26-) Inch Arctic Corrugated Insulated Steel Pipe	Linear Foot

(05/15/06)R&M

SECTION 606

GUARDRAIL

Special Provisions

606-1.01 DESCRIPTION. *Add the following:* This item includes furnishing and installing removable steel bollards and their foundations as shown on the plans.
(07/05/05)R&M

606-2.01 MATERIALS. *Delete* "Flexible Markers" *in its entirety and substitute the following*:

Flexible Markers. Use flexible markers with an over all length of 72 inches. The marker shaft shall have a coil spring at the bottom and a flag at the top. The shaft and spring shall be one piece and made from galvanized spring steel. The flexible marker shall have an orange HDPE flag which provides approximately 20 square inches of surface area. Use stainless or galvanized steel attaching hardware. The following is an example of an acceptable flexible marker:

Model:	FF2
Manufacturer:	Nordic Fiberglass, Inc. P.O. Box 27 Highway 75 South Warren, MN 56762
Phone:	(218) 745-5095
Fax:	(218) 745-4990
E-mail:	www.nordicfiberglass.com

If using another brand, submit specifications to the Engineer for approval prior to ordering the markers.
(4/06/06)R45aUSC

606-3.01 GENERAL. *Replace the second sentence of the first paragraph with the following:*
Conform with these Specifications and the Standard Drawings with the following exception. Modify Standard Drawing G-20.10 to only allow an offset of 1.5 feet for the ET-2000.
(05/12/04)R266

606-3.02 POSTS. *Delete the first two numbered items in this subsection and substitute the following:*

1. Exclusive of end treatments, use one type of post in each run of guardrail.

606-3.06 REMOVAL AND RECONSTRUCTION OF GUARDRAIL. *Add the following*:
Guardrail removed and to be replaced with new guardrail shall have the entire new run installed within 14 calendar days after removal.

Guardrail located within 50 feet of bridge ends shall have the new guardrail installed by the end of the shift in which the existing guardrail is removed.
(4/06/06)R45aUSC

606-3.07 REMOVAL AND DISPOSAL OF EXISTING GUARDRAIL. *Delete the last sentence and substitute the following:* Notify the Engineer a minimum of five (5) days prior to removing guardrail for disposal. The Engineer will notify ADOT&PF M&O (L. J. Davis at 907-543-2495) and have an M&O representative physically identify portions of guardrail to be salvaged. Deliver guardrail and associated hardware designated to be salvaged to the ADOT&PF M&O yard located at 3517 Chief Eddie Hoffman Hwy, Bethel Alaska. Remaining items removed become your property.
(06/12/03)R259M98

Add the following Subsections:

606-3.09 FLEXIBLE MARKERS. For each slotted rail terminal, a flexible marker shall be attached to the extreme piece of rail. The flexible markers shall be attached using hardware and attachment methods recommended by the manufacturer.

606-3.10 LENGTH OF NEED VERIFICATION. After shaping the slopes and staking the proposed guardrail locations, notify the Engineer to field verify the beginning and ends. The Engineer will approve the staked location of the guardrail before installation. The Engineer may determine additional guardrail is necessary and the Contractor shall comply without delay.
(4/06/06)R45aUSC

606-3.11 REMOVABLE STEEL POSTS. Removable steel posts shall be of steel conforming to the requirements of ASTM A36 and shall be galvanized in accordance with the requirements of ASTM M111. All galvanizing shall be done after fabrication.

606-4.01 METHOD OF MEASUREMENT. *Add the following item:*
4. Removable Steel Posts. Per each, installed in place.

606-5.01 BASIS OF PAYMENT. *Add the following item:*
4. Removable Steel Posts. At the contract price installed including all hardware and concrete foundation as shown on the plans.

Add the following pay item:

Pay Item	Pay Unit
606(17) Removable Steel Post	Each

(6/27/05)R&M

SECTION 608

SIDEWALKS

Standard Modifications

608-3.03 CURB RAMPS. *Replace this subsection with the following*: Construct curb ramps according to the details and the locations shown on the Plans. Follow the construction requirements of subsection 608-3.01. Give the exposed concrete surface a coarse broom finish. Install detectable warnings.

Add the following subsections:

608-3.04 DETECTABLE WARNINGS. Construct detectable warnings according to the details and the locations shown on the Plans. Install detectable warning tile by embedding tile flanges into cast in place concrete or in new asphalt construction so there are no vertical changes in grade exceeding 0.25 inches or horizontal gaps exceeding 0.5 inches. Align pattern on a square grid in the predominant direction of travel. Install Armor-Tile ADA-C Series tactile detectable warning tile made of composite materials, safety yellow color, slip resistant surface, full length flanges on bottom, and truncated dome pattern, or approved equal.

Detectable warnings shall be manufactured and installed according to the Americans with Disabilities Act Accessibility Guidelines.
(1/01/06)E25

Special Provisions

608-4.01 METHOD OF MEASUREMENT. *Add the following*:

Detectable Warning Tiles. By each installation specified on the Plans, complete in place.
(6/27/05)R&M

608-5.01 BASIS OF PAYMENT. *Add the following pay item*:

Pay Item	Pay Unit
608(10) Detectable Warning Tiles	Each

SECTION 611

RIPRAP

Special Provisions

611-1.01 DESCRIPTION. *Replace this Subsection with the following:* This work consists of performing the required excavation and furnishing and placing geotextile and protective covering of stone as shown on the Plans.
(7/8/05)R&M

611-2.01 MATERIALS. *Add the following after the first sentence*: Apparent specific gravity will be determined by WAQTC FOP for AASHTO T85.

Add the following: Erosion control geotextile material shall meet the requirements of Subsection 729-2.02, Subsurface Drainage and Erosion Control.

611-3.01 CONSTRUCTION REQUIREMENTS. *Add the following after the second sentence*: A minimum sample size of 5 cubic yards is required. A cubic foot volume will be calculated for each rock in the sample. The weight of individual rocks will be obtained by multiplying volumes by the apparent specific gravity and 62.43 lbs./ft^3.
R277USC(02/07/05)

Add the following: Place geotextile in accordance with Section 631, Geotextile for Subsurface Drainage and Erosion Control.

611-4.01 METHOD OF MEASUREMENT. *Add the following:* Erosion control geotextile material will not be measured for payment.

611-5.01 BASIS OF PAYMENT. *Delete the first sentence and replace with the following*: Excavation and erosion control geotextile are subsidiary.
(7/8/05)R&M

SECTION 615

STANDARD SIGNS

Standard Modifications

615-2.01 MATERIALS. *Delete the first paragraph of Item 2, including subitems a., b., and c. and replace with*:

2. Sign Fabrication. Use Type IV reflective sheeting (for lettering, symbols, borders, and background) on sheet aluminum panels for signs except the following:

   a. Orange Background Signs: Use either Type II or Type III orange reflective sheeting or use Type VII or Type IX fluorescent orange reflective sheeting. For temporary installations place reflective sheeting on sheet aluminum, plastic, or plywood panels.

   b. Railroad Crossbucks and Vertical Crossbuck Supports: Use white Type VIII or Type IX reflective sheeting for background of sign and strips.

   c. Non-Illuminated Overhead Signs with White Legends on Green Backgrounds: Use Type IX reflective sheeting for legends and background. Create the legend in one of the following ways:
      (1) Cut border and legend from white Type IX reflective sheeting and adhere to a green Type IX background, or
      (2) Cut stencil of border and legend out of green transparent acrylic film and use transparent adhesive to overlay the film on a white Type IX reflective background.

   d. Fluorescent Yellow-Green School Area Signs: Use Type VIII or Type IX reflective sheeting for background.

Add the following paragraph:

Reflective Sheeting Warranty. Supply manufacturer's warranty for reflective sheeting, including retention of fluorescent yellow-green (measured according to ASTM E 2301) for ten years according to the following criteria:

Minimum Fluorescent Luminance Factor	Y_F: 20%
Minimum Total Luminance Factor	Y_T: 35%

The warranty shall stipulate that: If the sheeting fails to meet the minimum fluorescence values within the first 7 years from the date of fabrication, the manufacturer shall, at the manufacturer's expense, restore the sign surface to its original effectiveness. If the reflective sheeting fails to meet the minimum fluorescence values within the 8th through the 10th year from the date of fabrication, the manufacturer shall, at the manufacturer's expense, provide enough new

replacement sign sheeting to the Department to restore the sign surface to its original effectiveness.
(1/1/06)E26

SECTION 616

THAW PIPE AND THAW WIRES

Standard Modifications

616-2.01 THAW PIPE. *In the second sentence delete:* "and Fittings"

Add the following sentence: Fittings ASTM A 234 galvanized according to AASHTO M 111. (6/30/04)E14

SECTION 618

SEEDING

Special Provisions

618-1.01 DESCRIPTION. *Add the following*: Topsoil and seed new or disturbed slopes and other areas directed by the Engineer. Track the soil and apply seed, mulch, fertilizer, and water. Provide a living ground cover on slopes as soon as possible.

618-2.01 MATERIALS. *Add the following to the list of material specifications*:

Mulch Subsection 727-2.01

618-3.01 SOIL PREPARATION. *Add the following*: Apply seed as detailed in Subsection 618-3.03 immediately after the shaping of the slopes. Cover all slopes to be seeded with topsoil according to Section 620. Prepare slopes for seed by "walking" a dozer transversely up and down the slopes, or by grading with a scarifying slope board, as determined by the Engineer. The resultant indentations shall be perpendicular to the fall of the slope. Complete slope preparation as soon as topsoil is placed on the slopes. Rounding the top and bottom of the slopes is acceptable to facilitate tracking and to create a pleasing appearance, but do not disrupt drainage flow lines.

618-3.02 SEEDING SEASONS. *Add the following:* Seeding shall be performed between May 15 and August 15.

618-3.03 APPLICATION. *Add the following*: Apply seed, mulch and fertilizer as follows per acre. Apply seed and mulch in one application if using the hydraulic method. Apply fertilizer with the hydraulic method.

Seed Mix	Component	Ingredients	Application Rate (per MSF)
Type A	Seed	Bering Hairgrass (Noarcoast) Red Fescue (Arctared) Polargrass (Alyeska) Glaucous Bluegrass (Tundra)	0.50 lbs. 0.30 lbs. 0.10 lbs. 0.10 lbs. Total = 1.00 lbs
	Soil Stabilizer Slope = 3:1 Slope >3:1	 Mulch Mulch with tackifier	 46 lbs. 45-58 lbs.
	Fertilizer	20-20-10	12.0 lbs.

Do not remove the required tags from the seed bags.

Upon the Engineer's approval, Nortran Tufted Hairgrass may be used as a substitute for Slender Wheatgrass (Wainwright) if Slender Wheatgrass (Wainwright) is commercially unavailable. If this substitution is made, apply at the same application rate.

618-4.01 METHOD OF MEASUREMENT. *Add the following:* The amounts of fertilizer, mulch and water for application used in this work, including any required reseeding, are subsidiary to other 618 items.

618-5.01 BASIS OF PAYMENT. The work described under Subsection 618-3.01, Soil Preparation is subsidiary to seeding.

Water required for the hydraulic method of application is subsidiary to seeding.
(11/06/02)R52USC

SECTION 620

TOPSOIL

Special Provisions

620-3.01 PLACING. *Delete paragraph in its entirety and substitute the following:* Topsoil shall be evenly spread on the designated areas to a minimum depth after settlement of 4 inches. Settlement shall be achieved by rolling the topsoil with a water-filled drum or other method approved by the Engineer.

Grade topsoil with a scarifying slope board or rake. The resultant indentations shall be perpendicular to the fall of the slope. Complete the grading as soon as topsoil is placed. The resultant indentations shall be perpendicular to the fall of the slope. The Contractor may round the top and bottom of the slopes to facilitate working the slope and to create a pleasing appearance. Do not disrupt drainage flow lines. All equipment performing the placement of 4 inches topsoil or other operations for this project shall be kept clear of wetland areas. If access into the wetland is required, it shall be approved by the Engineer and shall be performed under close supervision.

Do not place topsoil in heavy rainfall, snowfall, when the soil is frozen or during other conditions detrimental to the work. Keep all roadway surfaces clean of topsoil during hauling and spreading operations.

620-4.01 METHOD OF MEASUREMENT. *Add the following:* Limestone, if required, will not be measured for payment.

620-5.01 BASIS OF PAYMENT. *Add the following:* Limestone will be subsidiary to Item 620(1) Topsoil.
(7/16/05)R&M

SECTION 626

SANITARY SEWER SYSTEM

Special Provisions

626-1.01 DESCRIPTION. *Add the following*: This work consists of the installation Sewer Casing Pipe as shown on the Plans and as specified in these Special Provisions.

626-2.01 MATERIALS. *Add the following*: Use materials that conform to the following:

Geotextile Separation Fabric. Conform to the requirements of Section 630.

Insulation Board. Conform to the requirements of Section 635.

Add the following subsection:

626-2.02 OWNER FURNISHED MATERIALS. The 24-inch diameter steel conduit for the Utilidor Road Crossings, at the total lengths specified in the Plans, will be provided by the City of Bethel to the Contractor at no cost. The materials will be available at the City of Bethel's pipe lay-down yard located on South Port Access Road, which is routed along the north side of the Crowley Fuel Tank Farm. Contractor will schedule materials pickup with Wayne Ogle, City of Bethel Public Works Director (907-543-3110) during City of Bethel normal working hours (Monday through Friday between the hours of 8:00 am and 5:00 pm). Materials pickup must be scheduled a minimum of 24 hours in advance of pickup.

626-3.01 CONSTRUCTION REQUIREMENTS. *Add the following*: Deliver materials to the project site in a manner that protects said materials from damage. Conform to elevations and dimensions shown on the Plans within a tolerance of plus or minus 0.10 foot. Allow for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation.

Add the following subsections:

626-3.03 MAINTENANCE OF EXISTING UTILITIES. The Contractor shall be responsible for locating, shoring and protecting of all property, (real and personal) in the vicinity of each Sewer Casing Pipe installation. The approximate locations of known underground obstructions are shown on the Plans; however, it shall be the Contractor's responsibility to establish the location of each facility by calling for field locates in accordance with subsection 105-1.06, Cooperation with Utilities. Hand digging shall be required to expose all buried utilities.

The City of Bethel, PublicWorks has existing above ground sewer facilities within the project limits that will require shoring. Shoring will be required during excavation and installation of culverts, gabion walls, and rip rap placement operations. The following areas have been identified as locations that will potentially require shoring.

1. CEHH	27+15, Lt.
2. CEHH	45+70, Lt.
3. CEHH	60+98, Lt.
4. CEHH	70+60, Rt.
5. CEHH	76+25, Lt.
6. CEHH	100+70, Lt.
7. CEHH	107+10+/-, **Rt.**
8. CEHH	108+50, Lt to 122+60, **Lt.**
9. CEHH	109+64, Lt.
10. CEHH	111+20, Lt
11. CEHH	115+70, Lt.
12. CEHH	122+00, Lt to 122+70, Lt.
13. RC	63+53, Rt. to 65+99, Rt.

Shore existing sewer pipe as shown on the Plans at the locations noted above. Alternate methods may be used if approved by the City of Bethel, Public Works Director. Provide alternate shoring details to the City of Bethel, Public Works Director for review and approval 5-calendar days before if you begin excavation or placement operations.

626-3.04 DEWATERING. Shall be according to Section 641.

626-3.05 AS-BUILT DRAWINGS. The Contractor shall maintain a complete and accurately dimensioned record of deviations, deletions, additions and alterations from and to the Plans and Specifications to indicate the work as actually installed.

The Contractor shall as-built each utilidor road crossing. The as-built drawings shall include the elevation of the finish grade, project centerline at the crossing locations, line, grade and swing ties. Provide a Registered Land Surveyor who will document the location and elevation information for each Sewer Casing Pipe to be shown on the as-built document.

One set of final red lined as-built Plans shall be delivered to the City of Bethel.

626-4.01 METHOD OF MEASUREMENT. *Add the following*: Section 109.

626-5.01 BASIS OF PAYMENT. *Add the following*: Payment for Item 626(24) Sewer Casing Pipe shall be full compensation for loading, transporting, and installing the 24 inch steel conduits, provided by the City of Bethel; furnishing and installing the geotextile fabric, the 2- inch insulation board located at the bottom of the trench excavation, and backfill materials; excavation and backfill; dewatering; surveying and staking; completing as-built drawings; and all subsidiary items necessary to complete the work complete in place.

Shoring required for the above ground sewer will not be paid for directly but will be subsidiary to the following items 205, 203, 603, 636.

Payment will be made under:

Pay Item	Pay Unit
626(24) Sewer Casing Pipe	Each

(5/3/06)R&M

635

INSULATION BOARD

Special Provisions

635-2.01 MATERIALS. *Delete the second sentence under item Insulation Board., and replace with the following:* Meet or exceed the specified R value.* **deleted text *.**
(6/23/06)R&M

635-5.01 BASIS OF PAYMENT. ***Delete this Subsection in its entirety and substitute the following:***
Payment will be made under:

Pay Item	Pay Unit
635(2) Insulation Board	Square Foot

SECTION 636

GABIONS

Special Provisions

636-5.01 BASIS OF PAYMENT. *Delete the pay item and replace with the following:*

Payment will be made under:

Pay Item	Pay Unit
636(1B) Gabion, PVC Coated Mesh	Cubic Yard

(5/3/06)R&M

Delete this Section in its entirety and substitute the following:

SECTION 639

DRIVEWAYS

Special Provisions

639-1.01 DESCRIPTION. Construct approaches, residential or commercial driveways at the locations shown in the Plans. This work includes relocating or adjusting existing private improvements impacted by proposed approach improvements.

639-2.01 MATERIALS. Use materials that conform to the standards for the main roadway.

639-3.01 CONSTRUCTION. Construct driveways and approaches to the dimensions shown on the Plans.

639-4.01 METHOD OF MEASUREMENT. By the number of approaches constructed as shown on the Plans or as directed. Pavement removal, excavation, and relocating or adjusting existing private improvements as required beyond the limits of the adjacent mainline will be subsidiary.

639-5.01 BASIS OF PAYMENT. At the contract unit price shown in the bid schedule. The contract unit price for driveways and approaches shall be full compensation for furnishing equipment and labor necessary to complete the work as specified.

Materials required to construct driveways and approaches will be paid for separately under the respective items listed in the bid schedule.

Native material meeting the minimum requirements of Selected Material, Type C will not be paid for directly, but will be considered subsidiary to 639(6) Approach.
(05/09/02)R58M98(7/08/05)R&M

Payment will be made under:

Pay Item	Pay Unit
639(6) Approach	Each

SECTION 640

MOBILIZATION AND DEMOBILIZATION

Standard Modifications

640-1.01 DESCRIPTION. *Add the following:*

6. Comply with the Alaska Department of Labor and Workforce Development (DOLWD) requirements for Worker Meals and Lodging, or Per Diem; as described in their July 25, 2005 memo WHPL #197 (A2) and the State Laborer's and Mechanic's Minimum Rates of Pay (current issue).

   Ensure subcontractors comply with the DOLWD requirements.

   Ensure facilities meet the Alaska Administrative Code 8 AAC 61.1010 and 8 AAC 61.1040 *Occupational Safety and Health Standards*, 18 AAC *31 Alaska Food Code*, and U. S. Code of Federal Regulations 29 CFR Section 1910.142 *Temporary Labor Camps.*

   Do not consider the cost of Meals and Lodging, or Per Diem in setting wages for the worker or in meeting wage requirements under AS 23.10.065 or AS 36.05.

640-4.01 METHOD OF MEASUREMENT. *Delete the numbered paragraph 3 and substitute the following:*

3. The remaining balance of the amount bid for Mobilization and Demobilization will be paid after all submittals required under the Contract are received and approved.

   Add the following:

4. Progress payments for Worker Meals and Lodging, or Per Diem will be computed as equivalent to the percentage, rounded to the nearest whole percent, of the original contract amount earned.

640-5.01 BASIS OF PAYMENT. *Add the following pay item:*

Payment will be made under:

Pay Item	Pay Unit
640(4) Worker Meals and Lodging, or Per Diem	Lump Sum

(1/01/06)E27

SECTION 641

EROSION, SEDIMENT, AND POLLUTION CONTROL

Standard Modifications

641-1.02 DEFINITIONS. Item 6. *Delete "7" so sentence reads*: Use EPA Form 3510-13. (6/30/04)E15

SECTION 642

CONSTRUCTION SURVEYING AND MONUMENTS

Special Provisions

642-2.01 MATERIALS. *Add the following:*

Digital Measuring Instrument: Nu-metrics, Nitestar DMI (www.nu-metrics.com)

642-3.01 GENERAL. *Add the following:*

11. Document the Stationing of the beginning and ending of existing passing zones before work that will remove or obliterate the existing striping. Measure, as outlined below, sight distance for passing zones after the base course layer or pavement milling has been accepted. Use Table 642-1 to establish Minimum Passing Sight Distance. Move forward alongside the centerline or edge of traveled way in order to spot check and discover locations where the Minimum Passing Sight Distance drops below what is required for 10 MPH over the posted speed limit. Record the sight distance for each station location that falls below the posted speed limit plus 10 MPH. Continue to record the sight distance for each station location until the sight distance drops below what is required for the posted speed limit. Stations observed to exceed the values required for posted speed limit plus 10 MPH should be marked as "Pass" or "+". Stations observed to fall below the values required for the posted speed limit should be marked as "Fail" or "-".

    Measure from the roadway edge of traveled way, using a 3.5 foot object height (or "instrument height") at 100 foot station marks looking ahead to a 3.5 foot target height at the edge of traveled way for opposing traffic. Provide a list of each station result for each direction of travel along the roadway edge of traveled way. Certify and record the results on standard "letter" sized paper and provide 2 copies to the Engineer at least two weeks before laying out final pavement markings.

    The Engineer will forward one copy of the existing and proposed sight distance measurements on the form provided herein, to the Regional Traffic Engineer. Table 642-1 does not automatically ensure passing striping will be provided. The Regional Traffic Engineer's office will take up to two weeks to review and approve pass/no pass striping against operating speeds for the roadway before installation, using Table 642-1 and the Alaska Traffic Manual as a guide. No pass striping zones shall be at least 500 feet in length. Passing striping shall be long enough to meet the distances in Table 642-1. Passing striping will not extend into a segment of road without minimum sight distance. (3/22/06)R61USC04

TABLE 642-1
PASSING SIGHT DISTANCE

Operating Speed (mph)	Minimum Passing Sight Distance (ft)
25	450
30	500
35	550
40	600
45	700
50	800
55	900
60	1,000
65	1,100
70	1,200

12. Before any work on the project, stake and reference the centerline existing ground on the right side of the roadway alignment. Stake the centerline at 100 foot on tangents, and 50 foot intervals on curves from the beginning and ending of superelevation changes when the roadway is no longer at normal crown. Stake sign locations at proper offset. Stakes shall be a minimum of 1 inch by 2 inch by 2 feet and be offset 4 to 8 feet from the shoulder on the right side of the roadway. Lath stakes will be a minimum of 2 feet above ground. Show the offset distance to centerline and the station from the beginning of the project. Ensure stakes are visible from roadway by clearing as necessary. Maintain staking until the final roadway striping is completed. Clearing will not be paid for separately and is considered subsidiary to other 642 pay items. Staking accuracy work requires an electronic distance measuring instrument (DMI) be installed in the Contractor's vehicle. Calibrate the DMI to roadway alignments as stationed in the Plans before beginning work. Record calibration and staking information in the field book.

    Install a reference sign every 500 feet. These reference signs shall meet the following requirements:

    a. mounted a minimum of 5 feet above the shoulder,

    b. located a minimum of 10 feet from the edge of shoulder,

    c. marked with the station from the beginning of the project, in 6 inch high black lettering on an orange background.

Compute design centerline profile to best fit the existing profile. Prepare existing top of roadway cross sections for horizontal curves and transitions with design superelevated pavement plotted on each section. The Engineer may require adjustments to the roadway grades. This shall not be considered extra work. Provide this profile information to the Engineer (electronically in Excel format) immediately upon its completion, along with checked computations on all level loops, but in no case later than 7 calendar days before slope staking or blue topping.

Passing Sight Distance Survey Table

ROAD NAME:_____

Stationing FROM:_____ DATE:_____

TO:_____ Surveyor:_____

Project Station	Posted Speed Limit	Direction of Travel	Sight Distance Ahead	Remarks

Other Notes:

1.
2.
3.

Accepted By: _____ Date: _____

DOT/PF Project Engineer

Passing Sight Distance
Review Checked By:_____ Date: _____
DOT/PF Regional Traffic Engineer

642-4.01 METHOD OF MEASUREMENT. *Add the following:*

Item 642(16) Passing Sight Distance Measurement. By the number of stations on the project measured separately along centerline, once for each direction, only after the certified and recorded results have been accepted by the Engineer.

642-5.01 BASIS OF PAYMENT. *Add the following pay item:*

Pay Item	Pay Unit
642(16) Passing Sight Distance Measurement	Station

(3/22/06)R61USC04

SECTION 643

TRAFFIC MAINTENANCE

Special Provisions

643-1.03 TRAFFIC CONTROL PLAN. *Replace the last paragraph with the following:* A waiver may be requested of regulation 17 AAC 25 regarding oversize and overweight vehicle movements within this project in writing. If the waiver is approved, movements of oversize and overweight vehicles in or near traffic within the project limits will be done according to the provisions of an approved Traffic Control Plan. Maintain a minimum 12 foot lateral separation between the nonstreet legal vehicles and the motoring public. The Traffic Control plan shall specify the traffic control devices required for these operations.

Standard Modifications

643-2.01 MATERIALS. *Under Item 16. Flagger Paddles, replace the last sentence with the following*: Use reflective sheeting that meets AASHTO M 268 Type VIII or IX. Use background colors of fluorescent orange on one side and red on the other side.
(3/15/06)E29

Special Provisions

643-2.01 MATERIALS. *Add the following*:

17. Flexible Markers. Refer to subsection 606-2.01 Materials.

Standard Modifications

643-3.01 GENERAL CONSTRUCTION REQUIREMENTS. *Add the following:* Immediately notify the Engineer of a traffic related accident that occurs within the project limits as soon as becoming aware of the accident.
(3/15/06)E29

Special Provisions

643-3.01 GENERAL CONSTRUCTION REQUIREMENTS. *Add the following:* Whenever construction activity encroaches onto the safe route in a traffic control zone, station a flagger at the encroachment to assist pedestrians and bicyclists past the construction activity.

Maintain business accesses during flagging operations.

643-3.02 ROADWAY CHARACTERISTICS DURING CONSTRUCTION. * deleted text *

Standard Modifications

643-3.04 TRAFFIC CONTROL DEVICES.

In the sixth paragraph and also in Item 4.b., delete: "ATTSA" *and replace with* "ATSSA". (3/15/06)E29

Special Provisions

643-3.04 TRAFFIC CONTROL DEVICES. *Delete the first sentence of the eighth paragraph and substitute the following:* Items paid under this Section remain the Contractor's property unless stated otherwise.

Add the following to item 1. Embankments.: Close trenches and excavations at the end of each continuous work shift.

Add the following to item 3. Fixed Objects.: Remove obstructions greater than 4 inches above the nominal foreslope grade at the end of each continuous work shift.

Delete item 4.b. and replace with the following: Flagger Certification by ATSSA

Delete item 6 and replace with the following:

6. Street Sweeping. Keep free of loose material paved portions of the roadway and haul routes open to the public, including sections of roadway off the project where the Contractor's operations have deposited loose material using a street sweeper that can collect materials rather than eject them to the shoulder of the road.

7. Power Brooming. Keep free of loose material paved portions of the roadway and haul routes open to the public, including sections of roadway off the project where the Contractor's operations have deposited loose material using a power broom that can eject them to the shoulder of the road.

Change items 7 and 8 to 8 and 9 respectively.

Add the following:

10. ET-2000 LET. The price listed in the Traffic Control Rate Schedule will be full compensation for the purchase, installation, maintenance during construction, removal and salvaging the ET-2000 LET unit(s). Deliver the salvaged unit(s) to the nearest DOT &PF Maintenance and Operations' district office, or as directed by the Engineer.

643-3.05 AUTHORITY OF THE ENGINEER. *Replace the first sentence with the following:* When existing conditions adversely affect the public's safety or convenience, the Contractor will

receive an oral notice. A written notice will follow the oral notice according to subsection 105-1.01 Authority of the Engineer.

Add the following after the second sentence: In no case shall this time exceed 24 hours.

643-3.06 TRAFFIC PRICE ADJUSTMENT. *Add the following*: Failure to maintain an acceptable infrastructure or traffic control plan will result in a price adjustment equal to 100 percent of the applicable rate shown in Table 643-1, for the time the roadway or pedestrian facility is in an unacceptable condition.

Delete Table 643-1 and substitute the following:

TABLE 643-1
ADJUSTMENT RATES

Published ADT	Dollars/Minute of Delay/Lane
0-5,000	$30
5,001+	$40

643-3.08 CONSTRUCTION SEQUENCING. *Delete the last sentence and substitute the following*: Unless otherwise determined by the Engineer and on an approved Traffic Control Plan (TCP), do not restrict traffic **between the hours of 0700 to 0830 and 1600 to 1730, Monday thru Friday.**

Complete roadway reconstruction improvements through the final placement of Hot Mix Asphalt on Project Section 1 prior to commencing work on Project Section 2. Work for the Pedestrian Bridge, related sheet piling and approach embankments may occur concurrent with either Project Section. The Project Section work limits are as follows:

Project Section 1 B.O.P. (Station "CEHH" 8+13) through Station "CEHH" 139+19

Project Section 2 Station "CEHH" 139+19 through the E.O.P. (Station "RC" 80+25).

Prior to Winter Shutdown, the entire traveled roadway shall be surfaced with temporary, existing, or permanent pavement and all pavement markings, signs and roadway delineators shall be installed by October 15 of each construction year. If existing pavement is damaged by construction activities, make repairs to the satisfaction of the Engineer. Temporary pavement will be subsidiary to item 643(2) Traffic Maintenance. Provide positive drainage away from the roadway prior to acceptance for winter shutdown. Provide roadside safety protection measures according to Traffic Control Devices for Roadsides drawing. Traffic shall not use detours during winter shutdown.

Obtain the local school bus schedule and coordinate work efforts to ensure the school buses are not delayed through the construction zone. This plan shall be submitted, as a TCP, to the Engineer for approval before the implementation of the school bus coordination plan.

643-3.09 INTERIM PAVEMENT MARKINGS. *In the second paragraph, delete the words* "or cover them with black removable preformed marking tape."

Replace the first sentence in the last paragraph with the following: Apply final pavement markings according to subsection 670-3.01, Construction Requirements of these Special Provisions.

Standard Modifications

Add the following new subsection:

643-3.11. HIGH VISIBILITY CLOTHING. Ensure workers within project limits wear an outer visible surface or layer that complies with the following requirements:

1. Tops.

   Wear fluorescent vests, jackets, or coverall tops at all times. Furnish each vest, jacket, or coverall top with at least one 360 degree horizontal retroreflective band around the torso; and two vertical retroreflective bands that begin at the horizontal band or lower in front, reach over the shoulder, and end at the horizontal band or lower in back. Furnish each jacket and coverall top with two horizontal retroreflective bands on each sleeve; one above and one below the elbow.

2. Bottoms.

   Wear fluorescent red-orange pants or coverall bottoms during nighttime work (sunset to sunrise). Worksite traffic supervisors, employees assigned to traffic control duties, and flaggers wear fluorescent orange-red pants or coverall bottoms at all times. Furnish each pants or coverall bottom with two horizontal retroreflective bands on each leg.

3. Raingear.

   Raingear tops and bottoms, when worn as the outer visible surface or layer, shall conform to the requirements listed in this subsection 643-3.11.

4. Exceptions.

   When workers are inside an enclosed compartment of a vehicle, they are not required to wear high visibility clothing.

5. Standard.

   High visibility garments shall conform to the requirements of ANSI/ISEA 107-2004, Class 2 for tops or Class E for bottoms, and Level 2 retroreflective material.

   Retroreflective bands are made of material conforming to either:

   a. A 2 inch wide strip, fluorescent yellow-green color, made of retroreflective micro-prisms; or
   b. A 2 inch wide strip, silver color, made of retroreflective lenses bonded to a durable cloth backing; and on 2 long edges apply 1 inch wide strips, fluorescent yellow-green

color, made of durable cloth material. Total width of band is 4 inch.

6. Labeling.

Garments shall be labeled according to Section 10.2 of ANSI/ISEA-107-2004; except garments may be labeled to conform to ANSI/ISEA 107-1999 until 1/1/08.

7. Condition.

Furnish and maintain vests, jackets, coveralls, rain gear, hard hats, and other apparel in a neat, clean, and presentable condition. Maintain retroreflective material to Level 2 standards. (3/15/06)E29

Special Provisions

643-4.01 METHOD OF MEASUREMENT.

Replace the second sentence of Item 2 with the following: Special Construction Signs are measured by the total area of legend bearing sign panel, as determined under subsection 615-4.01 and compensation for a 24 hour period shall be made under Construction Signs in the Traffic Control Rate Schedule.

Add the following: No measurement required to provide a 24-hour toll free (1-800-###-####) "hotline road report" telephone with a prerecorded message, and weekly notices with daily updates. Work will be subsidiary to Item 643(1) or 643(2), Traffic Maintenance.

Standard Modifications

643-5.01 BASIS OF PAYMENT. *Add the following*: Payment for high visibility clothing for workers is subsidiary to other items.
(3/15/06)E29

Special Provisions

643-5.01 BASIS OF PAYMENT. *Add the following*: The Engineer does not require a change order/directive for Item 643(25) Traffic Control.

TRAFFIC CONTROL RATE SCHEDULE

Traffic Control Device	Pay Unit	Unit Rate
Construction Signs	Each/Day	$5.00
Special Construction Sign	Square Foot	$20.00
Type II Barricade	Each/Day	$ 3.00
Type III Barricade	Each/Day	$ 10.00
Traffic Cone or Tubular Marker	Each/Day	$ 1.00
Drums	Each/Day	$ 3.00

Traffic Control Device	Pay Unit	Unit Rate
Sequential Arrow Panel	Each/Day	$55.00
Portable Concrete Barrier	Each	$60.00
Temporary Crash Cushion / ET-2000 LET	Each	$3,000.00
Pilot Car	Hour	$65.00
Watering	M-Gallon	$ 20.00
Street Sweeping	Hour	$150.00
Power Broom	Hour	$75.00
Plastic Safety Fence	Foot	$.75
Portable Changeable Message Board Sign	Calendar Day	$150.00
Temporary Sidewalk Surfacing	Square Foot	$1.15
Flexible Markers	Each	$50.00
Removal of Pavement Markings	Foot	$1.25
Temporary Guardrail	Foot	$21.00

The Engineer will pay for Item 643(15) Flagging on a contingent sum basis at the rate of $38/hour. The Engineer does not require a change order/directive for the flagging pay item. Flagging associated with Change Order work will be paid at the prices according to subsection 109-1.05 Compensation for Extra Work.
(02/10/06)R222USC04

Delete Item 643(15) and substitute the following:

Pay Item	**Pay Unit**
643(15) Flagging	Contingent Sum

(02/10/06)R222USC04

SECTION 644

SERVICES TO BE FURNISHED BY THE CONTRACTOR

Special Provisions

644-2.01 FIELD OFFICE. *Delete this Subsection in its entirety and substitute the following*: Furnish and maintain a suitable office for the Engineer, available for occupancy from two (2) weeks prior to commencing work, through thirty (30) days after issuance of the notice of project completion as defined in Subsection 105-1.15. The following office requirements shall be met:

1. A minimum of 1,000 square feet of floor area. The office area shall be divided so that it contains an office room separated by a closable door. The office room shall have a minimum of 160 square feet of floor area.

2. A thermostatically controlled interior heating system with necessary fuel.

3. Adequate electrical lighting and 120 volt, 60 hertz power, with a minimum of six (6) electrical outlets.

4. A minimum of 100 square feet of window area and adequate ventilation.

5. Adequate parking for a minimum of 16 vehicles, with one handicap parking space meeting the requirements of Americans with Disabilities Act Accessibility Guidelines (ADAAG).

6. Attached indoor plumbing with sanitary lavatory facilities and potable drinking water provided.

7. Four (4) telephone service lines available at the office location.

8. If a part of the Contractor's building, it shall be completely partitioned off from the balance of the structure and provided with a separate outside door equipped with a lock.

9. Located within 3 miles of the project.

10. The Engineer's office shall be accessible by disabled individuals from the designated handicap parking space in accordance with the requirements of Americans with Disabilities Act Accessibility Guidelines (ADAAG).

11. Weekly janitorial service consisting of emptying trash receptacles, vacuuming office area and cleaning restrooms and counter areas.

12. Provide one mobilization and one demobilization of the Engineer's office equipment and furniture.

644-2.02 FIELD LABORATORY. *Delete sub-item g of item 2 and substitute the following:*

g. 500 gallon capacity tank with a pressure pump or a commercial pressurized system.

Add the following:

7. Supply 240 volt, 60 hertz power, a 100 pound propane bottle, and a 500 gallon capacity water tank with a pressure pump or a commercial pressurized system for a State provided portable asphalt lab at a location designated by the Engineer.

8. Provide one mobilization and one demobilization of the Engineer's laboratory equipment.
(11/19/02)R63USC

644-2.05 VEHICLES. *Delete the second and third paragraphs and substitute the following:*
Furnish Two (2) full-size four-wheel drive pickup(s) or sport utility vehicle(s) for exclusive use of the Department throughout the project. Provide vehicles less than 3 model years old, in good condition and with less than 36,000 miles on the odometer.

Furnish all fuels, maintenance and insurance. If you are working after October 1, provide studded snow tires for all vehicles you provide for the Department's use. Equip vehicles used by the Department with CB radios and yellow lightbars wired into the vehicle's electrical system with a dash mounted switch easily accessible to the vehicle operator. Provide Code 3; Model 6005H (formerly PE 6200 LE) lightbars, or approved equal. Approved equals shall have the following characteristics:

- Four (4) 55 watt rotators with amber filters
- 1200 flashes per minute
- Two diamond mirrors
- 55" in length

You are responsible for normal wear and tear, and any other incidental damage including broken windshields, occurring during the Department's operation and use. The Department is responsible for damage to any vehicle caused by its own negligent during operation.

644-3.01 METHOD OF MEASUREMENT. *Delete the third paragraph and substitute the following:*

Vehicle. Per each vehicle provided. If a replacement vehicle is necessary, no additional measurement will be made.
(02/03/03)R245USC

644-4.01 BASIS OF PAYMENT. *Add the following:* Electricity, propane and water supplied for the State provided portable asphalt lab will not be paid for separately, but will be subsidiary to Item 644(2) Field Laboratory.

(11/19/02)R63USC

Delete Item 644(7) and substitute the following:

Payment will be made under:

Pay Item	Pay Unit
644(8) Vehicle	Each

Add the following Section:

SECTION 645

TRAINING PROGRAM

Special Provisions

645-1.01 DESCRIPTION. This Training Special Provision implements 23 CFR 230, Subpart A, Appendix B.

As part of the Equal Employment Opportunity Affirmative Action Program, provide on-the-job training aimed at developing full journey status in the type of trade or job classification involved. The number of individuals to be trained and the number of hours of training to be provided under this contract will be as shown on the bid schedule.

645-2.01 Objective. Training and upgrading of minorities and women toward journey status is the primary objective of this program. Enroll minorities and/or women, where possible, and document good faith efforts prior to the hire of non-minority males in order to demonstrate compliance with this Training Special Provision. Specific good faith efforts required under this Section for the recruitment and employment of minorities and women are found in the Federal EEO Bid Conditions, Form 25A-301, items 7.b, 7.c, 7.d, 7.e, 7.i, 7.j and 7.l, located in the "yellow pages" of this document.

645-3.01 General. Determine the distribution of the required number of apprentices/trainees and the required number of hours of training among the various work classifications based upon the type of work to be performed, the size of the workforce in each trade or job classification, and the shortage of minority and female journey workers within a reasonable area of recruitment.

Training will be provided in the skilled construction crafts unless you can establish prior to contract award that training in the skilled classifications is not possible on a project; if so, the Department may then approve training either in lower level management positions such as office engineers, estimators, and timekeepers, where the training is oriented toward construction applications, or in the unskilled classifications, provided that significant and meaningful training can be provided. Some offsite training is permissible as long as the training is an integral part of an approved training program and does not comprise a significant part of the overall training.

Credit for offsite training hours indicated above may only be made to you where the apprentices/trainees are concurrently employed on the project and you do one or more of the following: contribute to the cost of the training, provide the instruction to the apprentice/trainee, or pay the apprentice's/trainee's wages during the offsite training period.

Where feasible, 25 percent of apprentices or trainees in each occupation shall be in their first year of apprenticeship or training.

Prior to award of the contract, submit Form 25A-311, Training Utilization Report, indicating the training program to be used, the number of apprentices/trainees to be trained in each selected classification, the number of hours of training to be provided, and the anticipated starting time for training in each of the classifications.

Training must begin within 2 weeks of the anticipated start date(s); unless otherwise authorized by a Directive. Such authorization will be made only after submission of documentation by you, and approval by the Engineer, of efforts made in good faith which substantiate the necessity for a change.

Contractors may use a training program approved by the U.S. Department of Labor, Bureau of Apprenticeship & Training (USDOL/BAT), or one developed by the Contractor and approved prior to contract award by the Alaska Department of Transportation and Public facilities (DOT&PF) Training Program Representative, using Form 25A-310.

The minimum length and type of training for each classification will be established in the training program selected by you. Training program approval by the Department for use under this Section is on a project by project basis.

It is expected that each apprentice/trainee will begin training on the project as soon as feasible after start of work utilizing the skill involved and remain on the project as long as training opportunities exist or until training has been completed. It is not required that apprentices/trainees be continuously employed for the duration of the contract.

If, in your judgment, an apprentice/trainee becomes proficient enough to qualify as a journey worker before the end of the prescribed training period and you employ that individual as a journey worker in that classification for as long as work in that area remains, the individual's training program will be considered completed and the balance of training hours required for that apprentice/trainee shall be waived.

Furnish each DOT&PF training program trainee a copy of the program (Form 25A-310) to be followed during training on the project, and with a written certification showing the type and length of training completed on the project. Existing USDOL/BAT apprentices should already have a copy of their program. No employee shall be employed for credit as an apprentice/trainee in a classification in which that employee has previously worked at journey status or has previously completed a training course leading to journey status.

Periodically review the training and promotion potential of minority and women employees and shall encourage eligible employees to apply for such training and promotion.

Provide for the maintenance of records and the furnishing of periodic reports documenting the progress of each apprentice/trainee. You must submit Form 25A-313 by the 15th of each month and provide each DOT&PF trainee written evaluation reports for each unit of training provided as established on Form 25A-310.

645-3.02 Wages. Trainees in DOT&PF approved training programs will be paid prevailing Davis-Bacon fringe benefits plus at least 60 (but less than 100) percent of the appropriate minimum journey rate specified in the contract for the first half of the training period, at least 75 (but less than 100) percent for the third quarter of the training period, and at least 90 (but less than 100) percent for the last quarter of the training period. Trainee wages shall be identified on Form 25A-310. Apprentices in USDOL/BAT training programs shall be paid in accordance with their approved program. Beginning wages of each trainee/apprentice enrolled in a Section 645 Training Program on the project shall be identified on Form 25A-312.

645-3.03 Subcontracts. In the event you subcontract a portion of the work, you shall determine how many, if any, of the apprentices/trainees are to be trained by the subcontractor. Any such subcontracts shall include this Section 645, Form 25A-311 and Form 25A-310, where appropriate. However, the responsibility for meeting these training requirements remains with you; compliance or non-compliance with these provisions rests with you and sanctions and/or damages, if any, shall be applied to you in accordance with Subsection 645-5.01, Basis of Payment.

645-4.01 Method of Measurement. You will be credited for each approved apprentice/trainee employed on the project and reimbursed on the basis of hours worked, as listed in the certified payrolls. There shall be no credit for training provided under this Section prior to your submittal and approval by the Engineer of Form 25A-312 for each apprentice/trainee trained under this Section. Upon completion of each individual training program, no further measurement for payment shall be made.

645-5.01 Basis of Payment. Payment will be made at the contract unit price for each hour of training credited. Where a trainee or apprentice, at your discretion, graduates early and is employed as a journey worker in accordance with the provisions of Subsection 645-3.01, you will receive payment only for those hours of training actually provided.

This payment will be made regardless of any other training program funds you may receive, unless such other funding sources specifically prohibit you from receiving other reimbursement.

Payment for training in excess of the number of hours specified on the approved Form 25A-311, may be made only when approved by the Engineer through Change Order.

Non-compliance with these specifications shall result in the withholding of progress payments until good faith efforts documentation has been submitted and acceptable remedial action has been taken.

Payment will be at the end of the project following the completion of all training programs approved for the project. No payment or partial payment will be made to you if you fail to do any of the following and where such failure indicates a lack of good faith in meeting these requirements:

1. Provide the required hours of training (as shown on the approved Form 25A-311),

2. Train the required number of trainees/apprentices in each training program (as shown on the approved Form 25A-311), or

3. Hire the apprentice/trainee as a journey worker in that classification upon completion of the training program for as long as work in that area remains.

Failure to provide the required training damages the effectiveness and integrity of this affirmative action program and thwarts the Department's federal mandate to bring women and minorities into the construction industry. Although precise damages to the program are impractical to calculate, they are at a minimum, equivalent to the loss to the individuals who were the intended beneficiaries of the program. Therefore, where you have failed, by the end of the project, to provide the required number of hours of training and have failed to submit acceptable good faith efforts documentation which establishes why you were unable to do so, you will be assessed an amount equal to the following damages to be deducted from the final progress payment:

Number of hours of training not provided, times the journey worker hourly scale plus benefits. The journey worker scale is that for the classification identified in the approved programs. (10/29/91)S16

Payment will be made under:

Pay Item	**Pay Unit**
645(1) Training Program, 2 Trainees/Apprentices	Labor Hour

SECTION 646

CPM SCHEDULING

Special Provisions

646-2.01 SUBMITTAL OF SCHEDULE. *Replace this subsection with the following:* Submit a detailed initial CPM Schedule at the preconstruction conference for the Engineer's acceptance as set forth below.

The construction schedule for the entire Project shall not exceed the specified contract time. Allow the Engineer 14 days to review the initial CPM Schedule. Revise promptly. The finalized CPM Schedule must be completed and accepted before beginning work on the Project.

646-3.01 REQUIREMENTS AND USE OF SCHEDULE. *Delete Item 2.* 60-Day Preliminary Schedule.

Delete the first sentence of: Item 3. Schedule Updates. *and substitute the following:* Hold job site progress meetings with the Engineer for the purpose of updating the CPM Schedule. Meet with the Engineer monthly, or as deemed necessary by the Engineer.
(12/13/02)R261M98

Add the following Section:

SECTION 647

EQUIPMENT RENTAL

Special Provisions

647-1.01 DESCRIPTION. This item consists of furnishing construction equipment, operated, fueled and maintained, on a rental basis for use in construction of extra or unanticipated work at the direction of the Engineer. Construction equipment is defined as that equipment actually used for performing the items of work specified and shall not include support equipment such as, but not limited to, hand tools, power tools, electric power generators, welders, small air compressors and other shop equipment needed for maintenance of the construction equipment.

The work is to be accomplished under the direction of the Engineer, and the Contractor's operations shall at all times be in accordance with the Engineer's instructions. These instructions by the Engineer shall be to the Contractor's supervisory personnel only, not to the operators or laborers. In no case shall these instructions by the Engineer be construed as making the Department liable for the Contractor's responsibility to prosecute the work in the safest and most expeditious manner.

647-2.01 EQUIPMENT FURNISHED. In the performance of this work, the Contractor shall furnish, operate, maintain, service, and repair equipment of the numbers, kinds, sizes, and capacities set forth on the Bid Schedule or as directed by the Engineer. The operation of all equipment shall be by skilled, experienced operators familiar with the equipment.

The kinds, sizes, capacities, and other requirements set forth shall be understood to be minimum requirements. The number of pieces of each equipment to be furnished and used shall be as the Engineer considers necessary for economical and expeditious performance of the work. The equipment shall be used only at such times and places as the Engineer may direct.

All equipment shall be in first-class working condition and capable of full output and production. The minimum ratings of various types of equipment shall be as manufactured and based on manufacturer's specifications. Alterations will not be considered acceptable in achieving the minimum rating. Equipment shall be replaced at any time when, in the opinion of the Engineer, their condition is below that normal for efficient output and production.

All equipment shall be fully operated, which shall be understood to include the operators, oilers, tenders, fuel, oil, air hose, lubrication, repairs, maintenance, insurance, and all incidental items and expenses.

647-2.02 EQUIPMENT OPERATORS AND SUPERVISION PERSONNEL. Equipment operators shall be competent and experienced and shall be capable of operating the equipment to its capacity. All personnel furnished by the Contractor shall be, and shall remain during the work hereunder, employees solely of the Contractor.

The Contractor shall furnish, without direct compensation, a job superintendent or Contractor's representative together with such other personnel as are needed for Union, State, or Federal requirements and in servicing, maintaining, repairing and caring for the equipment, tools, supplies, and materials provided by the Contractor and involved in the performance of the work. Also, the Contractor shall furnish, without direct compensation, such transportation as may be appropriate for the personnel.

647-3.01 CONSTRUCTION REQUIREMENTS. The performance of the work shall be in accordance with the instructions of the Engineer, and with recognized standards and efficient methods.

The Contractor shall furnish equipment, tools, labor, and materials in the kinds, number, and at times directed by the Engineer and shall commence, continue, and stop any of the several operations involved in the work only as directed by the Engineer.

Normally, the work is to be done when weather conditions are reasonably favorable, 6 days per week, Mondays through Saturdays, holidays excepted.

The Engineer will begin recording time for payment each shift when the equipment begins work on the project. The serial number and brief description of each item of equipment listing in the bid schedule and the number of hours, or fractions thereof to the nearest one-quarter hour, during which equipment is actively engaged in construction of the project shall be recorded by the Engineer Each day's activity will be recorded on a separate sheet or sheets, which shall be verified and signed by the Contractor's representative at the end of each shift, and a copy will be provided to the Contractor's representative.

647-4.01 METHOD OF MEASUREMENT. The number of hours of equipment operation to be paid for shall be the actual number of hours each fully operated specified unit of equipment, or each fully operated specified combination of units of equipment, is actually engaged in the performance of the specified work on the designated areas in accordance with the instruction of the Engineer. The pay time will not include idle periods, and no payment will be made for time used in oiling, servicing, or repairing of equipment, or in making changeovers of parts to the equipment. Travel time to or from the project, will not be authorized for payment.

647-5.01 BASIS OF PAYMENT. Payment for Item 647(5), Backhoe, 4WD, 1 cy Bucket, 75 hp, 15 foot Depth will be paid on a contingent sum basis at the rate of $125/hour on a per hour basis at the rate shown on the bid schedule. This shall be full compensation for furnishing, operating, maintaining, servicing and repairing the equipment, and for all incidental costs related to the equipment. Furnishing and operating of equipment of heavier type, larger capacity, or higher wattage than specified will not entitle the Contractor to any extra compensation.

Payment will be made under:

Pay Item	Pay Unit
647(5) Backhoe, 4WD, 1 cy Bucket, 75 hp, 15 foot Depth	Contingent Sum

(08/24/05)R15USC(6/8/06)R&M

SECTION 660

SIGNALS AND LIGHTING

Special Provisions

660-1.01 DESCRIPTION *Add the following*: This work also includes furnishing and driving steel pipe piles to the depths shown on the Plans.

660-2.01 MATERIALS.

1. Equipment List(s) and Drawings. *Delete item a in its entirety and the last sentence in item d and substitute the following:*

   a. Materials on the *Approved Products List*: The Approved Products List does not apply to the 660 items. Provide catalog cuts of materials to the Engineer for review and approval.

   d. Materials Not Requiring Certification: Only submit these materials for review and approval if they are included on the Materials Certification List (MCL).

2. As-Built Plans. *Add the following:*

   The Engineer will deliver one copy each to State Maintenance and Operations; Technical Services; and attach the appropriate sheets of the last set in clear plastic envelopes to the inside of each controller assembly and load center.

CONSTRUCTION REQUIREMENTS

Special Provisions

660-3.01 GENERAL. *Delete items 3 through 5,7 & 8 in their entirety and substitute the following:*

3. Excavating and Backfilling. Complete excavation and backfill required to install the signal and lighting components embedded in the roadway as shown in the Plans, including foundations, conduits, junction boxes, and loop detectors. Provide traffic control to complete this work according to the requirements of Section 643. Place excavated materials where it will not interfere with surface drainage.

   Support and protect conduits and utilities scheduled to remain in service when encountering them during excavation.

   Excavate trenches wide enough to install the number of conduits specified side by side, to provide clearances of at least 2½ inches around 2 inch conduits and at least 2 inches around conduits larger than 2 inches, and to compact the bedding and backfill materials according to these specifications.

To install conduits, excavate trenches deep enough to allow for 6 inches of bedding material, the depth of the largest conduit, and the minimum burial depth specified between the top of the conduit and finished grade of the ground above the conduit. Keep the longitudinal profile of trench bottoms free of irregularities that would prevent the assembled conduit run from continuously contacting the top of the bedding material.

Dispose of, according to subsection 203-3.01, excavated materials that remains after completing backfill work and excavated material not meeting the requirements of Selected Material, Type C, as defined in subsection 703-2.07.

Dewater excavations immediately before and during embedding and backfilling operations. Backfill excavations with materials that meet the following requirements

a. Around formed foundations and the tops of pipe pile foundations, use material that meets the requirements of Selected Material, Type A that passes through a 3 inch sieve,
b. Within the limits of the typical section, embed conduits and backfill trenches using material that meets the requirements of the lift where it is located, reusing excavated materials if it meets the requirements of the applicable lift,
c. In other locations, embed conduits and backfill trenches using material that meets the requirements of Selected Material, Type C, reusing excavated materials if it meets this requirement.
d. Import, when ordered, embedment and backfill materials that satisfy the preceding materials requirements.

Embed conduit(s) between two 6 inch lifts of material gleaned free of rocks exceeding a 1 inch maximum dimension. Grade and compact the first lift to provide a surface that continuously contacts the assembled conduit run.

Within 6 feet of paved surfaces and around foundations, backfill in uniform layers no more than 6 inches deep and compact each layer according to subsection 203-3.04. In other locations, compaction may be as approved by the Engineer.

4. Welding. Complete welding according to subsection 504-3.01.8. Welding and approved shop drawings.

Submit shop drawings of the proposed work with the welding plans for approval. The shop drawings shall include material specifications, component dimensions, the types of welds that will be made, and the proposed type and extent of weld inspection.

Repair the holes, which were used to mount equipment, in reused poles and mast arms by welding in disks flush with the adjoining surface. For the disk material, use steel that matches the ASTM designation, grade, and thickness of the steel used to fabricate each pole. Cut disks that match the dimensions of the hole being repaired from pieces of steel plate bent to match the pole's radius at the hole. Grind the welds smooth and flush with

the adjoining pole and disk surfaces. Repair the damaged finish according to subsection 660-3.01.8.

5. Removing and Replacing Improvements. The Contractor shall complete the following work at the Contractor's expense.
   a. Remove improvements that block completion of the work detailed in the Plans as specified herein.
   b. Reconstruct with new materials the non-reusable improvements the Contractor removed to complete the work, unless other items in the contract cover the improvements.
   c. Replace with new materials the reusable items damaged by the Contractor, that are specified for reuse.
   d. Reconstruct with new materials improvements that the Contractor damaged or removed, that do not conflict with the work and are not scheduled for removal.

Non-reusable improvements consist of cast in place items, including: asphalt concrete pavement, sidewalks, curb and gutter, lawns, and traffic markings. Reusable improvements include the items that were made before installation. Crushed aggregate base material may not be used as backfill in the base course if excavation depth exceeds the thickness of the base course.

Complete reconstruction work, including materials, according to the applicable sections of the Alaska SSHC, and leave the work in a satisfactory and serviceable condition. In completing the reconstruction work, match the alignments, widths, thicknesses, shapes, sizes, cross sections, and finishes of the existing improvements.

If removing a portion of sidewalk or curb and gutter, remove an entire segment between the weakened plane contraction joints or between an expansion joint and a weakened plane contraction joint.

Before removing a segment of Portland or asphalt cement concrete material, cut completely through the material with a saw along the outline of the area to be removed. Make cuts neat and true and prevent shatter outside the area removed.

To replace lawns, leave the top of the backfilled excavation low enough to install 4 inches of compacted topsoil. Match the top of the topsoil with the bottom of the vegetative mat. Apply seed and keep the seeded areas watered according to Section 618.

Remove, keep alive, and replant trees, shrubs, and plants according to Section 621. Replace the trees, shrubs, and plants that do not survive with plants of like size and type.

7. Field Tests. Electrical circuits must pass the following tests before the Engineer will accept the work for payment. Perform these tests in the presence of the Engineer, and document the results of each test on a per circuit basis. Retain a copy of test results and

give the original documents to the Engineer. Furnish equipment needed to perform these tests.

Replace or repair at the Contractor's expense, and in an approved manner, faulty materials and work revealed by these tests. After making repairs, repeat tests on the repaired circuit and continue this process until circuits have passed required tests. The Department reserves the right to have the Contractor retest circuits, and to use the retest results to accept or reject individual circuits.

a. Grounds. Before completing the circuitry and functional tests, physically examine conduits ends, junction box lids, load centers, and the foundations for signal posts and poles, lighting poles, and controller cabinets to ensure the grounding system required by subsections 660-3.06 and 661-3.01 has been installed and splices and connections are mechanically firm.

b. Continuity. Test each loop detector circuit for continuity at the roadside junction box before splicing the loop detector to the lead-in cable. Each loop detector must have a resistance less than 0.5 ohms.

After splicing the loop detectors to the lead-in cables, test each pair at the controller or detector cabinet. Each pair must have a value less than 5 ohms for single pair lead-in cables and 10 ohms for multipair lead-in cables. The continuity test ohm reading at the cabinet must be greater than the ohm reading measured for the loop detector at the junction box.

c. Insulation Resistance (megohm) Test. Complete this test to verify the integrity of each conductor's insulation after pulling the conductors and cables into position and before terminating the conductors. At 500 volts DC, each conductor's insulation shall measure a minimum resistance of 100 megohms or the minimum specified by the manufacturer. With single conductors, complete the test between each conductor and ground. In each multiconductor cable, complete the test between conductors and between each conductor and ground.

After splicing the loops to the shielded pairs in the lead-in cables, measure each pair in the lead-in cables at the controller or detector cabinet between one conductor and the cabinet ground rod.

d. Inductance Test. Measure each detector loop and [redacted] cable system at the controller or detector cabinet. The inductance must be in the range of 50 to 500 microhenries.

e. Circuit. Energize every signal indication circuit with lamps installed before installing the load switches.

f.

g. Functional. Perform the following tests on each signal and lighting system after the component circuits have satisfactorily passed the tests for continuity, grounding, insulation integrity, and circuitry.

1) For each new traffic signal system, complete at least 24 hours of flashing operation, followed by not less than 5 days of continuous, satisfactory operation. The Engineer may decide to omit the flashing portion of the test for modified signal systems and for new signals that replaced existing signals that remained in operation during the construction phase.

If the Engineer omits flashing operation and the system performs unsatisfactorily, correct the condition and repeat the test until the system runs for five days with continuous, satisfactory operation.

Begin the signal functional tests between 9:00 a.m. and 2:00 p.m. on any day, except a Friday, Saturday, Sunday, a legal holiday, or the day before the legal holiday.

Before each system turn on, aim signal faces according to subsection 660-3.08 and ensure equipment specified in the Plans is installed and operable, including: pedestrian signals and push buttons; signal backplates and visors; vehicle detectors; highway lighting; and regulatory, warning, and guide signs.

2) Perform the functional test for each highway lighting system and sign illumination system until the systems burn continuously 5 days without the photocell, followed by a 5 day operational test using the photocell.

3) Perform the functional test for each flashing beacon system for not less than 5 days of continuous, satisfactory operation.

A shut down of the electrical system due to a power interruption does not constitute discontinuity of the functional test if the system functions normally when power is returned.

8. Repairing Damaged Finishes. Examine new, reused, and State furnished equipment for damage to its finish before putting the equipment into service. Repair the damaged finishes found according to the following:

a. Galvanized. Repair damaged areas more than 12 inches away from welds and slip fit areas, by applying a minimum 7.8 mils of zinc based alloy applied according to ASTM A780.

If the damaged areas are within 12 inches of welds and slip fit areas, make the repair by applying a minimum 7.8 mils of zinc rich paint applied according to ASTM A780.

b. Painted. Repair damage to painted finishes according to the following

(1) Wash the equipment with a stiff bristle brush using a solution containing two tablespoons of heavy-duty detergent powder per gallon of water. After rinsing, wire brush surfaces to remove poorly bonded paint, rust, scale, corrosion, grease, or dirt. Remove dust or residue remaining after wire brushing before priming.

(2) Factory or shop cleaning methods may be used for metals if equal to the methods specified herein.

(3) Immediately after cleaning, coat bare metal with pretreatment, vinyl wash primer, followed by 2 prime coats of zinc chromate primer for metal.

(4) Give signal equipment, excluding standards, a spot finishing coat on newly primed areas, followed by 1 finishing coat over the entire surface.

(5) Give nongalvanized standards 2 spot finish coats on newly primed areas.

Paint coats may be applied either by hand brushing or by approved spraying machines. Perform the work in a neat and workmanlike manner. The Engineer reserves the right to require the use of brushes for the application of paint, should the work done by the paint spraying machine prove unacceptable.

Add the following:

9. Regulations and Code. Complete work according to the standards of the NEC, the NESC, and local safety codes as adopted and amended by the authority having jurisdiction.

660-3.02 FOUNDATIONS. *Under item 2. Pile Foundations.,*

Delete subitem b. and replace with the following:

b. Install pipe ples open-ended and to a depth shown on the Plans.

Add the following new item g:

g. Use no more than one splice per foundation. Locate the splice at least 7 feet from the top of pile.

Replace subsection 660-3.03 with the following:

660-3.03 CONDUIT. Electrical conductors shall be installed in conduit, except for overhead wiring, wiring inside poles, and when otherwise specified. Use rigid metal conduits (RMC) and fittings for raceways, including bored casings, except when the Plans specify using polyethylene conduits. Install conduits of the sizes specified along the routes detailed on the Plans. When routing is not shown, route conduits as directed by the Engineer.

1. Install conduits at least 30 inches below the finished grade of the ground above the conduit, except conduits that will be sealed under a minimum 4 inch thick Portland cement concrete sidewalk may be installed a minimum of 18 inches below the top back of curb or surface above the conduit, whichever is lower.

2. Install conduits that cross unpaved areas and paved roadways that will be overlaid in excavated trenches. Excavate, bed conduits, and backfill trenches according to subsection 660-3.01.3, Excavating and Backfilling.

3. Install conduit(s) under paved roadways and approaches that will not be overlaid by boring or drilling methods. Jacking conduits into position is allowed. However, if subsurface conditions prevent the successful completion of the work, install the conduit(s) by boring or drilling methods without additional compensation.

4. Sweep both rigid metal and polyethylene conduits through the open bottom of junction boxes by installing 90 degree rigid metal elbows on the ends of conduit runs. To each elbow, install a nipple that terminates 5 to 12 inches above the bottom edge of each junction box.

5.

6. Drill a 3/8 inch drain hole in the bottom of the lower straight section of elbows and in the bottom of conduits at the low points of conduit runs. Smooth the edges of the drilled holes on the inside of elbows to prevent scraping the conductors. Cover the holes with a wrap of approved filter cloth secured with 2 self clinching nylon cable ties.

7. Keep conduits clean. Install grounding bushings and approved plastic insert type plugs on the ends of conduit runs before backfilling around the conduit ends.

8. At the low points of conduit runs, install sumps containing a minimum 2 cubic-feet of coarse concrete aggregate material that conforms to subsection 703-2.02. Compact the aggregate sumps as directed to prevent settlement of the trench backfill.

9. Install conduits that must cross existing facilities such as storm drain pipes, duct systems, and other underground utilities at the minimum depths specified, going under the facilities if necessary. Install additional drains and aggregate sumps at the low spots, if any.

10. Position conduits in trenches, junction boxes, and foundations to provide clearances of at least 2½ inches around 2 inch conduits and at least 2 inches around conduits larger than 2 inches.

11. Fabricate rigid metal conduits less than 10 feet long from standard lengths of conduit. Cut conduits squarely to ensure the threading die starts squarely on the conduit. Cut the same number of threads as found on the factory threaded ends. Ream the inside of conduit ends cut in the shop or field to remove burrs and sharp edges. Do not use slip joints or pieces of running thread pipe.

12. Coat drilled holes, shop and field cut threads, and the areas with damaged zinc coating with zinc rich paint.

13. When standard couplings cannot be used to join conduit components, use approved threaded unions.

14. Bury a continuous strip of 4 mils thick, 6 inch wide polyethylene marker tape above underground conduit runs. Install the tape 9 inches (± 3 inches) below finished grade, using two strips side by side to mark road crossings. Furnish tapes with a black legend on a red background.

15. If encountering obstructions during jacking or drilling operations, obtain approval and cut small holes in the pavement to clear the obstruction. Locate the bottom inside face of the bore pit no closer than the catch point of a 1¼ to 1 slope (a horizontal to vertical ratio) from the edge of pavement. Do not leave these pits unattended until installing an approved means of protection.

16. When the Plans specify using polyethylene conduit, install RMC in structures and foundations, between type 2 and 3 load centers and the nearest junction box, and on the surfaces of poles and other structures.

17. In foundations, install 90 degree elbows and conduits of the size and quantity shown on the Plans. Extend the conduits a maximum of 2 inches above the top of the foundations for posts and poles with breakaway bases and 4 inches above the top of foundations for fixed base structures.

18. Seal conduits leading to electrical equipment mounted on soffits, walls, and other locations below the grade of the serving junction box with an approved duct sealing compound.

19. Install expansion fittings in conduits that cross expansion joints.

20. Install a polypropylene pull rope with a minimum 200 pound tensile strength in future use or spare conduits, and reinstall the plugs. Double back at least two feet of pull rope into both ends of each conduit.

21. The Contractor may install conduits larger than the sizes specified. If used, it must be for the entire length of the run. Reducing couplings or bushings are not allowed. Complete work associated with installing conduits larger than specified without extra compensation.

22. Clean existing conduits that will remain in service using a heavy duty air compressor that delivers at least 125 cubic feet of air per minute at a pressure of 110 pounds per square inch. Clean the conduits before pulling in new cables and after removing cables specified to be removed or replaced as follows:

    a. When the conduits contain cables that will remain in service, leave the cables in place during the cleaning, and
    b. Ream empty conduits with a mandrel or cylindrical wire brush before blowing them out with compressed air.

23. When modifying existing conduit runs, complete the work as required for new installations using the same sizes and types of conduit. When extending existing conduits, add no more than 90 degrees of horizontal bend to the extension.

24. When installing a junction box in a continuous run of existing conduit, remove a length of conduit in each conduit run and complete the work of installing the conduits, elbows, and nipples as required for a new installation.

25. When adjusting existing junction boxes to a new grade, remove cables and replace the nipples as required to provide the clearances specified for new installations.

26. Remove the ends of abandoned conduits from junction boxes that will remain in service.

27. When Plans call for connecting polyethylene conduit to RMC use an electrofusion coupler rated for direct bury application. The coupler must be rated for same wall thickness as the adjoining conduits.

Replace subsection 660-3.04 with the following:

660-3.04 JUNCTION BOXES. Install precast reinforced concrete junction boxes of the types specified. For junction boxes that contain traffic signal conductors, furnish cast iron lids with the word TRAFFIC inscribed into them. For junction boxes that contain lighting conductors exclusively, furnish cast iron lids with the word LIGHTING inscribed into them.

Junction Box Location

When shown, install junction boxes at the station and offset locations specified. When lateral locations are not specified, install junction boxes 8 feet from the face of curb or edge of pavement. If the 8 feet offset falls:

1. In a pedestrian facility separated less than 7 feet from the roadway face of curb or edge of pavement, increase the offset and install the junction boxes on the backside of the facility. When lacking the right of way to install junction boxes outside the pathway, install at locations as directed, avoiding curb ramps, curb ramp landings, and the middle of walkways.
2. In a pedestrian facility separated at least 7 feet from the roadway face of curb or edge of pavement, reduce the offset and install the junction box next to the facility.
3. Outside the right of way, install the boxes just inside the right of way line.
4. In a raised median, install junction boxes near the center of the median.
5. In a ditch bottom or area that collects drainage, install the junction boxes at locations as directed.
6. Behind guardrails that shield slopes steeper than 3:1 (a horizontal to vertical ratio), install junction boxes between posts and at least 5 feet back from the face of rail.
7. On top of underground utilities or storm drains, install the junction boxes at locations as directed.

Longitudinally, install junction boxes adjacent to the loop detectors or pole they serve, except avoid installing type 1A junction boxes in driveways and in locations subject to use by heavy trucks. When shown near the ends of medians, install junction boxes at least 10 feet from the median end. When the offsets for electroliers and flashing beacon posts place them near the junction boxes that serve them, install the junction boxes on the side of the electroliers and posts downstream of traffic flow.

Limit the distance between adjacent junction boxes to the following dimensions:
1. 400 feet for conduits that contain signal interconnect cable only.
2. 300 feet for conduits that exclusively contain two loop lead-in cables.
3. 300 feet for conduits that contain a single cable other than signal interconnect.
4. 190 feet for conduits that contains more than one cable.

If the preceding limitations require installing additional junction boxes not shown on the Plans, the Engineer will pay for them as extra work, otherwise, installing additional junction boxes will be at the Contractor's expense.

After grading the roadside, vertically adjust those junction boxes that do not conform to the following criteria. In unpaved areas that will not be seeded, in areas adjacent to pedestrian facilities, and in paved medians, install the tops of junction boxes 1 inch below finished grade. In seeded areas, install the tops of junction boxes to 2 inches below the seeded surface.

Bond junction box lids to an equipment grounding conductor according to subsection 660-3.06. Attach the jumpers to the lids with brass or stainless steel hardware.

Install a stone drain under each junction box. Drains shall consist of coarse aggregate for concrete that conforms to subsection 703-2.02. Minimum drain dimensions include an 18" depth and a length and width equal to those of the junction box it drains. Compact the aggregate material as directed to prevent junction box settlement.

In every new and reused junction box, install an electronic marker that consists of an antenna encapsulated in a 4 inch diameter red polyethylene ball. Furnish markers that conform to the American Public Works Association standards for locating power. Markers shall respond to locator devices up to 5 feet away, work at all temperatures, and contain no internal power source.

660-3.05 WIRING. *Delete the second paragraph in its entirety and substitute the following:*

Conditions

Do not pull conductors into conduits until the following conditions are met:

a. The prescribed clearances around conduit ends are provided,
b. Crushed rock sumps are installed under junction boxes,
c. Conduit ends protrude above the bottom of junction boxes within the prescribed range,
d. New conduits are free of material that became lodged in them during the completion of the work,
e. Reused conduits are cleaned according to subsection 660-3.03,
f. Junction boxes are set to grade, and
g. Grounding bushings are installed on the ends of metallic conduits.

Delete item 3 in its entirety and substitute the following:

3. Pull, as a unit, the conductors specified to be installed into clean conduits, leaving existing conductors that will remain in service in place.

Delete items 11 and 12 in their entirety and substitute the following:

11. Encapsulate illumination cable splices in rigid 2 piece plastic molds filled with an insulating and sealing epoxy resin. Furnish molds large enough to complete the splices and encase the cable jackets in the epoxy resin. Furnish molds rated for 600 volts AC operation and feature fill and vent funnels for epoxy resin. Fill the splice mold bodies with epoxy resin that is resistant to weather, aromatic and straight chain solvents, and that will not sustain combustion.

    When approved by the Engineer, 1 splice may be used in the following cases;

    a. An in-line splice may be used when a planned cable run exceeds the length available from the manufacturer on a single spool of cable.
    b. In a run of 1,000 liner feet or more.

    When a cable is spliced it shall occur within an appropriately sized j-box or in the base of an electrolier designed for said splice.

12. Encapsulate loop lead-in and telemetry cable splices in rigid, transparent, PVC molds filled with reenterable polyurethane electrical insulating and sealing compound. Furnish splice kits rated for 1000 volts AC operation and direct burial.

Provide reuseable four piece molds that are held together with stainless steel hose clamps. Two pieces form a cylinder and two flexible end caps seal the ends and allow the conductor entry. Use molds with dimensions suitable for the splice made, encase the cable jackets, and have fill and vent funnels.

Insert a loose woven polyester web that allows a full ¼ inch of insulating compound to flow between the splice and the inside of the mold. Fill the PVC molds with reenterable polyurethane electrical insulating and sealing compound that cures transparent, is nontoxic, is noncorrosive to copper, and does not support fungi or mold growth

Add the following items:

18. Retrofit reused poles with new tap wires, fused disconnect kits, and fuses.

19. Whenever conductors can not be terminated as specified in the Plans in circuit breakers due to size, splice a piece of #8 AWG power conductor onto the end of each conductor using an overlap type, irreversible compression connector. Insulate the splice with heat shrink tubing. Complete the splice in the space between the top of the load center foundation and the bottom of the cabinet. Limit the length of the #8 AWG conductor to 5 feet.

Replace subsection 660-3.06 with the following:

660-3.06 BONDING AND GROUNDING. Bond and ground branch circuits according to the NEC and the following requirements. Make noncurrent carrying but electrically conductive components, including: metal conduits, junction box lids, cabinets, transformer cases, and metal posts and poles, mechanically and electrically secure to an equipment grounding conductor. Make fixtures mounted on metal poles, including signal components and luminaires, mechanically and electrically secure to the pole.

Install grounding bushings with insulated throats on the ends of metallic conduits.

Install a bare stranded copper wire for the equipment grounding conductor in conduits, except those conduits installed for future use. Install size 8 AWG conductors, except in those conduits that contain circuit conductors larger than 8 AWG. In this case, install a wire equal in size to the largest circuit conductor. Attach the grounding conductors to the grounding bushings, leaving 12 inches of slack between each bushing. Connect grounding conductors together using irreversible compression type connectors to form a fully interconnected and continuous grounding system.

Retrofit existing spare conduits that will contain new cables exclusively with new grounding bushings. When the Plans require installation or removal of conductors from existing conduits, retrofit with new grounding conductors sized according to the preceding paragraph.

Bond junction box lids to the grounding conductor using copper braid with a cross sectional area equal to an 8 AWG conductor and eyelets spaced at 6 inch intervals. Connect bonding jumpers to the grounding conductors using irreversible compression type connectors. Replace missing or damaged conduit and junction box lid bonding jumpers.

Join the equipment grounding conductors from the conduits to the 4 AWG grounding electrode conductor using irreversible compression connectors at Portland cement concrete foundations. For pile foundations, attach the equipment grounding conductor from the conduit to the pile cap adapter with a listed mechanical grounding connector.

When installing signal poles, signal posts, and lighting standards with frangible coupling bases, run a 4 feet long grounding conductor from the grounding bushing on the conduit to the grounding lug located in the hand hole of each pole.

Bond slip base type standards and pedestals by using 2 conductors from the conduit, one attached with a ground rod clamp to an anchor bolt and the other connected to the grounding lug located in the hand hole of each pole.

Ground one side of the secondary circuit of a transformer.

Install a ¾ inch by 10 feet copper clad ground rod inside each controller cabinet foundation and a 6 AWG bare stranded copper wire for the grounding electrode conductor.

Replace subsection 660-3.08 with the following:

660-3.08 SIGNAL AND LIGHTING INSTALLATION REQUIREMENTS. Install signal and lighting equipment according to the details shown on the Plans and the following:

Apply anti-seizing compound to the following fasteners: frangible couplings, mechanical grounding connectors, bolts that secure hand hole covers and signal mounting hardware to poles and mast arms. Remove the fasteners from luminaire mounting brackets, fused disconnect kits, grounding bushings, and signal faces which secure the visors, and apply anti-seizing compound to these fasteners before completing the installation.

Before passing conductors through the holes made in posts, poles, and mast arms for wireways, remove the burrs and sharp edges from the inside and outside of these holes.

Until each traffic signal and/or flashing beacon goes into operation, keep the vehicular and pedestrian signal faces covered with beige colored canvas shirts sized to fit the signal faces shown in the Plans. Each signal shirt shall feature elasticized openings that fit over the visors and at least

two straps to secure it to the signal. Provide shirts with a legend that reads "out of service" and a center section that allows an operator to see the indications during system tests.

When not shown in the Plans, determine the shaft lengths of lighting and signal poles and signal mast arm connector plate locations to provide the plan mounting heights of luminaires and traffic signal heads.

Furnish work to install foundations for relocated poles, including: conduit, excavation, reinforcing steel, class A concrete, anchor bolts, nuts, and washers.

1. Electrolier Installation. Before installing electroliers, check the socket position of each luminaire to verify it matches the position indicated in the instructions for the light distribution type shown on the Plans.

   Install electroliers with mast arms with a slight rake by plumbing the side of the pole opposite the mast arm. After the pole has been plumbed, level the luminaire as recommended by the manufacturer.

   Install electroliers without mast arms with the centerline of the pole plumb.

2. Signal Pole Installation. Install signal poles with a slight rake by plumbing the side of the pole opposite the mast arm just above the base plate. Tighten the nuts on the anchor bolts as described in subsection 660-3.02k.

   Cover the gap between the foundation and base plate by installing a metal skirt around the base plate, secured with stainless steel sheet metal screws.

3. Vehicular Signal Head Installation. With two piece mast arms, do not install signal heads within 12 inches on either side of the slip type field splice.

   Attach each side mounted terminal compartment with two ½" x 13 bolts, with washers, threaded into holes tapped into the side of the pole at the location shown on Standard Drawing T-30. Install the vertical pipe members plumb.

   When installing 5 section vertically stacked signal heads on the sides of poles, secure the vertical pipe to the pole using a steel conduit hanger mounted 6 inches below the top horizontal pipe.

   Aim through phase vehicular signal faces at a point located a distance from the face as shown in Table 660-2. If two through signal faces are not visible from this point at a height of 42 inches above finished grade, consult the Engineer for corrective measures.

TABLE 660-2	
THROUGH PHASE SIGNAL FACE AIMING POINTS	
85th Percentile Speed (mph)	Minimum Visibility Distance (feet)
20	175
25	215
30	270
35	325
40	390
45	460
50	540
55	625
60	715

4. Pedestrian Signal and Push Button Installation. Orient pedestrian signal faces at the center of the crosswalk on the opposite side of the street. Attach each clamshell bracket with two ½" x 13 bolts threaded into holes tapped into the side of the pole. Install a spacer, furnished by the bracket manufacturer, on each bolt.

   Install the push button on the crosswalk side of the pole. Install R10-4B (R or L) push button signs above each push button. Furnish signs with the arrow pointing in the direction of the appropriate crosswalk. When channel is used for mounting push button signs, tap the top and bottom sign bolts into the pole.

   Install an R10-101 sticker, The Meaning of Pedestrian Signals, on each pole with one or two pedestrian push buttons. With two pedestrian push buttons on a pole, install the sticker between and above the R10-4B signs. With one pedestrian push button, install the sticker directly above the R10-4B sign.

5. Flashing Beacon Installation. When the Plans specify using the flasher in a signal controller cabinet to energize beacons, furnish a two pole, fused block with built in fuse pullers and two fuses to protect the flasher. Furnish and leave 5 feet of cable in the cabinet. Others will install the fused block and terminate the beacon cables.

660-5.01 BASIS OF PAYMENT. *Add the following:* The amount bid for an item shall include full compensation for:

a. Excavation, bedding, backfill, steel pipe pile, and driving pipe pile to install the components shown in the Plans. Dewatering excavations is subsidiary to completion of the excavation work.

b. Removing and repairing existing improvements to complete the work, unless other items in the contract cover the repairs.

The cost of repairing damage to finishes on new equipment is subsidiary.
R66USC04(3/31/06) (5/15/06)R&M

SECTION 661

ELECTRICAL LOAD CENTERS

Special Provisions

661-2.01 MATERIALS. *Under Meters, add the following*: Furnish meter sockets and landing pads rated for 200-ampere services.

Add the following: Ground Rods. Furnish one-piece ¾" diameter by 10 feet long copper clad steel rods.

Ground Rod Clamps. Furnish one piece bronze clamps with a hex head setscrew, which are suitable for direct burial and for use with copper clad ground rods.

Under Photoelectric Controls, delete the first sentence and substitute the following:
Use three wire photoelectric controls that directly switch a circuit from one conductor to another. Furnish two-piece photoelectric controls that consist of a plug-in photoelectric control unit and a locking type receptacle set in a cast aluminum adapter.

Furnish photoelectric control units that consist of a light sensitive element connected directly to a normally closed, single-pole, single-throw, control relay free of intermediate amplification. For highway lighting, use horizontal or zenith type sensing units that:

a. Operate at voltages between 120 and 277 volts AC, 60 Hz,
b. Handle loads up to 1,800 volt-amperes
c. Operate at temperatures from -40 °F to +150 °F
d. Consume less than 10 watts of power
e. Feature a 3-prong, EEI-NEMA standard, twist-lock plug
f. Turn-on between 1 and 5 footcandles and turn-off at light levels between 1.5 and 5 times those at turn-on.

Measurements must meet the procedures in EEI-NEMA *Standards for Physical and Electrical Interchangeability of Light-Sensitive Control Devices Used in the Control of Roadway Lighting.*

Furnish twist lock type, phenolic resin receptacles set in one of the following cast-aluminum adapters.

a. For photoelectric controls installed on signal poles and load centers, furnish a mounting adapter with a threaded connection that fits conduit outlet bodies threaded for ½ inch rigid metal conduit, General Electric model MB-PECTL or approved equal.

b. For photoelectric controls installed atop lighting poles (with mast arms), furnish a pole top adapter: equipped with a terminal block, made to slip over the ends of poles 3½ to 4½ inches in outside diameter, and secured by set-screws, General Electric model PTA-PECTL or approved equal.

Furnish 3-inch wide screens that reach the top of photoelectric control units to prevent artificial light from interfering with normal photoelectric control operation. Furnish screens constructed of 0.063-inch minimum thick aluminum meeting ASTM B 209, alloy 3003-H14.

Under Equipment List(s) and Drawings, replace item 1 and the last sentence in item 3 with the following:

1. Materials on the *Approved Products List*: The Approved Products List does not apply to the 661 items. Provide catalog cuts of materials to the Engineer for review and approval.
3. Materials Not Requiring Certification: Only submit these materials for review and approval if they are included on the Materials Certification List (MCL).

661-3.01 CONSTRUCTION REQUIREMENTS.

Delete the 11th paragraph, and substitute the following: Install two ground rods at least 6 feet apart at each load center. Connect the neutral bus to the ground rods with a soft drawn bare copper conductor sized per the NEC, 6 AWG minimum. Bond all non-current carrying metal parts in each load center to the ground bus. At Type 1 load centers; install one ground rod inside the base, readily accessible though the removable cover, and the second ground rod outside the base. Route the grounding electrode conductor to the second ground rod through one of the knockouts.

Delete the 12th paragraph, and substitute the following: Install photoelectric controls at the locations indicated. Orient photoelectric control units to face the north sky. Install a screen to prevent artificial light from interfering with normal photoelectric control operation.

For photoelectric controls installed on load centers, install a Myers hub in a cabinet wall shielded from traffic. To the hub, attach an assembly that consists of a type LB conduit body, a length of conduit, and a type C conduit body. Fabricate the conduit at least 3 feet long and locate the photoelectric control a foot above the top of the load center. Mount the photoelectric control adapter on the type C conduit body. Install a conduit hanger to brace the top of the conduit.

For photoelectric controls installed on signal poles, install a Myers hub in the center of the rain cap. Attach a type C conduit body to the hub with a close nipple. Mount the photoelectric control adapter on the conduit body. Use five-conductor 14 AWG wire to connect the photoelectric control to the load center.

For photoelectric controls installed on electroliers, install a pole top adapter. When the photoelectric control is on a lighting standard with a slip base or frangible coupling style base, use an approved breakaway disconnect in the base of the light standard. Restrain the cable in a similar manner as the illumination cable in the pole base. Use five-conductor 14 AWG wire to connect the photoelectric control to the load center.

Add the following: Prior to calling Bethel Utilities Corporation (BUC) for a service to be placed to any new load center the Contractor shall have all new load centers inspected and accepted

(tagged and dated). Once the load centers have been accepted, the Contractor can call BUC to schedule the service to each load center.

661-5.01 BASIS OF PAYMENT. *Add the following:* Payment of any fees required by the local authority for an electrical inspection and the costs of correcting the deficiencies noted during the inspection shall be considered incidental to the Section 661 items.
(5/12/06)R&M

Add the following Section:

SECTION 669

AUTOMATED TRAFFIC RECORDERS

Special Provisions

669-1.01 DESCRIPTION. This work shall consist of complete removal and demolition of existing automated traffic recorder station and furnishing and installing a new automated traffic recorder station.

An Automated Traffic Recorder (ATR) station is a vehicle detection system and may contain a traffic volume counter, an Automated Vehicle Classifier (AVC), a Weigh-In-Motion (WIM) system and/or other equipment. ATRs are operated and maintained by personnel of the Highway Data Section (HDS); main office located at 2200 E. 42nd Ave., Anchorage, phone (907) 269-0876.

A typical AVC consists of inductive loop and piezoelectric sensors connected to a traffic counter. In each traffic lane, two inductive loops are separated by a specific travel distance and buried beneath the pavement. A single piezoelectric sensor is located between them, embedded in the pavement surface. Lead wires run in underground conduit from the sensors to a type CBA2 cabinet located at the side of the road. Inside the type CBA2 cabinet, the lead wires connect to the traffic counter. The traffic counter detects the presence and speed of passing vehicles from inductive loop signals. The traffic counter detects axle number and center-to-center axle spacing from piezoelectric signals. Presence, speed and axle passage information is processed by the traffic counter to classify the number and type of vehicles, which is stored for later retrieval.

ATR stations may be equipped with a Temperature Data Probe (TDP), which consists of temperature sensors connected to a datalogger. Sampled conditions may include air temperature, pavement profile temperatures and subgrade profile temperatures. Temperature sensors send voltage signals to the datalogger. Sensor voltage levels are processed by the datalogger to yield temperature information that is stored for later retrieval.

The locations of traffic detection sensors and cabinets, shown on the plans are approximate and the Engineer shall establish the exact locations in the field.

Install AVC, TDP, new load center and CBA2 cabinet with electrical and phone service.

Equipment	# of Lanes	Presence Loops	Piezo sensor	T D P	ADR 2000+	Load Center	CBA2 Cabinet
A V C	**2**	**4**	**4**	**1**	**1**	**1**	**1**

Supply and install the CBA2 cabinet, electrical load center, Junction Boxes, Conduit, wire, AVC traffic counter, datalogger, temperature sensors, loop presence sensors and piezoelectric sensors as shown on the plans.

Install Inductive Loop Presence Sensors beneath the new pavement as shown on the plans. Install Piezoelectric Sensors in the surface of the new asphalt concrete pavement by sawcutting as shown on the plans.

Remove and dispose of the existing traffic count station, conduit, conductors, junction boxes, and cabinet. The existing load center is to be upgraded to current standards. Coordinate with the local utility company in the disconnect and reconnect of the existing traffic count station circuits from the load center.

669-1.02 REGULATIONS AND CODE. Materials and workmanship shall conform to the standards of the Underwriter's Laboratories, Inc. and the National Electrical Safety Code and local safety code requirements, where applicable.

Electrical equipment shall conform to the standards of the National Electrical Manufacturer's Association, where applicable.

669-2.01 MATERIALS. Materials provided shall be new, unless otherwise stated, and shall meet the following requirements:

1. Wiring. Wiring shall be according to subsection 660-3.05, Wiring. Single wire conductors and cables shall have clear, distinctive and permanent markings on the outer surface throughout the entire length giving the manufacturer's name or trademark, the insulation type-letter designation, the conductor size, voltage rating and the number of conductors if a cable. Wires and cables must be home run labeled in each junction box and cabinet; for example, W1SLA (for wire) and GaSLA (for cable) as shown on the plans.

2. Conduit. Conduit shall be according to subsection 660-3.03, Conduit. Conduit, except for PVC conduit forming the inductive loops, shall be galvanized rigid metal. Grounding bushings shall be plastic-sleeved to minimize the potential for insulation damage during wire pulls.

3. Junction Boxes. Junction boxes shall be according to subsection 660-3.04, Junction Boxes. The covers of junction boxes used for loops or sensor wires shall be labeled 'TRAFFIC'. The covers of all junction boxes used to provide electrical service to ATR installations shall be labeled 'ELECTRIC'. Junction boxes for 120V/240V electrical service shall be kept completely separate from junction boxes containing loop or sensor wiring

4. Terminal Blocks. Terminal blocks shall have nickel, silver or cadmium plated brass binder-head screw terminals. Terminal blocks shall be a barrier type, rated 600 VAC at 20 Amps, sized for 12-18 AWG wire with removable shorting bars in each position and with integral type marking strips.

5. Presence Loops. Presence loops shall be according to subsection 740-2.05, Conductors. Conductors used for detector presence loops shall be UL listed as IMSA specification #51-5-1984 single conductor PVC nylon with tube jacket, type THHN, #14 AWG.

Multiple pair loop lead-in cable shall consist of twisted pairs of 18AWG stranded tinned copper wire. Each twisted pair shall have its own 20AWG tinned copper drain wire. An aluminum foil shield shall surround each individual bundle of twisted pair and drain wire. Multiple pair loop lead-in cable shall have an overall PVC or PE outer jacket.

6. Electrical Load Centers. Electrical Load Centers shall be NEMA Type 3R and provide a 120/240V 2.5KVA single-phase, three-wire-circuit electrical service.

7. Style CBA1 Cabinets. Cabinets shall meet or exceed a NEMA Type 3R rating. Style CBA1 cabinets shall meet the following requirements:

Cabinet Construction. The cabinet and hinged door shall be constructed from sheet aluminum alloy, and shall be unpainted with a smooth exterior finish. Welds shall be neatly formed and free of irregularities. Inside and outside edges of the cabinet shall be free of burrs. Provide cabinet with aluminum mounting plate as shown on the plans.

8. Style CBA2 Cabinets. Cabinets shall meet or exceed a HOFFMAN #357JFL NEMA Type 3R rating. Cabinets shall be third party certified as an assembly. Style CBA2 cabinets shall meet the following requirements:

   a. Cabinet Dimensions. Unless otherwise shown on the plans, the cabinet shall be 48-in high, 30-in wide, and 18-in deep.

   b. Cabinet Construction. The cabinet and door shall be constructed from 5052-H32 or better sheet aluminum alloy with a minimum thickness of 1/8-in. The cabinet shall be unpainted, with a smooth grain finish on the exterior. Welds shall be neatly formed and free of cracks, blow holes and other irregularities. Inside and outside edges of the cabinet shall be free of burrs. The cabinet shall be designed with a sloped top to prevent the accumulation of water on its top surface.

   c. Door. The door opening shall be double flanged on all four sides to prevent dirt and liquids from entering the enclosure when the door is opened. A door restraint shall be provided to prevent door movement in windy conditions. The cabinet door shall be a minimum of 80% of the front surface area and shall be hinged on the right side when facing the cabinet. The door shall be furnished with a gasket that satisfies the physical properties found in UL508 table 21.1 and shall form a weather tight seal between the cabinet and the door. The hinge shall be continuous and made either of stainless steel or of minimum of 1/10-in thick aluminum. The hinge shall either be securely welded along a quarter or

more of its length, or bolted to the cabinet utilizing stainless steel bolts and non-slip nuts.

d. Latch/Lock. The latching mechanism shall be a 3-point draw roller type. The center catch and pushrods shall be either stainless steel or cadmium plated, Type II Class 1, equal or better. Rollers shall have a minimum diameter of 3/4-in and will be made of nylon. A stainless steel operating handle shall be furnished with a 3/4-in shank. The lock shall be a Corbin #2 lock keyed to match existing Highway Data Section (HDS) cabinets. Two keys shall be furnished with each lock.

e. Ventilation. Ventilation shall be provided with louvered vents in the front door with a removable air filter. Louvers shall satisfy the NEMA rod entry test for 3R ventilated cabinets. The filter shall cover the vents and shall be held firmly in place with bottom and top brackets and a spring-loaded top clamp. Exhaust air shall be vented out between the top of the cabinet and the door.

f. Shelves. Adjustable equipment shelves shall be mounted on "C" mounting channels inside of cabinet and be supported on both sides. There shall be 2 vertical channels mounted on both sides of the cabinet and on the back, for a total of 6 inside each CBA2 cabinet. Shelves shall be constructed from 5052-H32 or better sheet aluminum alloy with a minimum thickness of 1/8 inches. The shelf depth shall be a minimum of 10.5 inches. Shelves shall be adjustable to within 4 inch of the bottom and to within 8 inches of the top of the cabinet.

g. Keyboard Tray. A retractable tray shall be mounted as shown in the plans.

h. Terminal Blocks. Terminal Blocks shall be mounted horizontally as shown in the plans.

Style CBA2 cabinets which include electrical service shall also meet the following requirements:

i. Circuit Breaker Panel. The circuit breaker panel shall conform to the UL67 and NEMA PB1 standards. The circuit breaker panel shall be an MLO, Two-Pole, 3 wire configuration, rated 40 Amp (minimum) 120/240 Volts, in a NEMA Type 2 enclosure with separate neutral and ground buses. Circuit breakers shall consist of two 20 amp single-pole types with a minimum short-circuit interrupting rating of 10,000 AIC. Circuit breaker #1 will serve the utility and equipment receptacles, and circuit breaker #2 will serve the thermostatically controlled outlet, cooling fan, and cabinet light.

j. Transient Voltage Surge Protection. Transient voltage surge protection, rated minimum 500 Volts at 3000 Amps, shall be integral to the circuit breaker panel, or integral to each individual circuit breaker.

k. Interior Light. The interior light fixture shall be a fluorescent, 120 volt single-tube lamp rated 13 watts minimum with a ballast that will start the lamp at temperatures of 0°F. A single pole, illuminated toggle switch, mounted inside of the cabinet door, will control the light.

l. Cooling Fan. A thermostatically controlled fan in the top of the cabinet shall operate at a settable high temperature limit and exhaust air through a filtered and hooded vent at the top front of the cabinet.

m. Thermostatically Controlled Outlet. A thermostatically controlled single duplex outlet shall operate at a settable low temperature limit.

n. Thermostats. Thermostats for the thermostatically controlled outlet and cooling fan shall be remote bulb types with SPDT contacts rated for 16 amps @ 120 VAC for combined motor and resistive loads. Thermostats shall be Tradeline T6031A1029 (equal or better), White-Rogers, Johnson Controls, or Sunne brands. Thermostats for the "Thermostatically Controlled Outlet" shall have a contact that closes on lowering temperature and set at 35°F. The thermostat for the "Cooling Fan" shall have a contact that closes on rising temperature and set at 90°F. Mount sensing bulbs as shown on the Plans.

o. Conduit, Raceway and Layup. Wiring for 120V equipment including circuit breaker panelboard, light, vent fan, and power receptacles shall be in EMT, liquid tight metal flex conduit or metal clad. Other low voltage wiring shall be terminated on terminal blocks and neatly trained within cabinet using wiring duct or ties.

p. Certification. The Cabinet Assembly consists of the cabinet itself and high voltage (greater than 24 volts) components that are permanently installed, including the circuit breaker panel, receptacles, light and fan as shown on the drawings or described herein. Obtain certification that the cabinet and associated permanently installed equipment, as a unit, complies with recognized applicable national standards through an authorized local or national testing agency or fabrication shop that complies with ANSI Z34.1-1987 "Third-Party Certification Programs for Products, Processes, and Services", including but not limited to; Electrical Testing Laboratories (ETL), Underwriters Laboratories (UL), Canadian Standards Association (CSA), Electro Test Incorporated (ETI), or other certified testing agency recognized by the Labor Standards & Safety Division of the State of Alaska Department of Labor.

9. Pavement. Pavement materials shall meet the following requirements:

   a. Asphalt Pavement. Materials used for asphalt pavement shall conform to Section 401, Asphalt Concrete Pavement, Type II and shall be approved by the Engineer.

   b. Concrete Pavement. Materials used for concrete pavement shall conform to Section 501, Structural Concrete, and the amendments contained herein.

10. Environmental Sensors. Provide environmental sensors.

   a. Road Temperature Thermocouple. The Datalogger Road Temperature Thermocouples shall be equal to or better than a Campbell Scientific Model 105-L100 Road Temperature Thermocouple.

   b. Air Temperature Thermocouple. The Datalogger Air Temperature Thermocouple shall be equal to or better than a Campbell Scientific Model 07-L50 Air Temperature Thermocouple.

   c. Radiation Shield. The Datalogger Air Temperature Thermocouple Radiation Shield shall be equal to or better than a Campbell Scientific Model No. 41301 6-Plate Gill Radiation Shield.

   Environmental Sensors are available from:

   Campbell Scientific, Inc.
   815 W. 1800 N
   Logan, Utah 84321-1784
   http://www.campbellsci.com
   voice: (801) 753-2342
   fax: (801) 752-3268

11. Vertical Temperature Probes. The vertical temperature probes shall be equal to or better than an MRC Model TP101-16 temperature probe. The temperature probes shall meet the following requirements:

   a. Thermistors. Total of 16 thermistors. Each thermistor shall be accurate to ± 0.2°F.

   b. Top Thermistor. Thermistor number one shall function at the end of a 1-ft lead connected to the top of the temperature probe.

   c. Thermistor Placement. Thermistors shall be placed along the length of the probe at 3" spacing for first 12". Thermistors shall be placed along the length of the probe at 6" spacing from 12" to 72".

d. Connection Cable. The interface cable shall project radially from the top of the temperature probe. The interface cable shall have sufficient length (minimum of 100') to reach the cabinet without splices (does not require 4-prong plug)

Vertical Temperature Probes are available from:

Measurement Research Corporation
4126 4th Street NW
Gig Harbor, WA 98335
voice: (206) 851-3200

669-3.01 CONSTRUCTION REQUIREMENTS.

1. Wiring.

   a. Referenced Requirements. Wiring shall be installed according to subsection 660-3.05, Wiring.

   b. Termination. At junction boxes, unused pairs shall be terminated within splices. At cabinets, unused pairs shall be terminated to a terminal block. At terminal blocks, conductors, including unused spares, shall terminate and be soldered to "spade" type terminal lugs.

   c. Relief. Wiring shall have at least 2-ft of slack cable in each junction box and at least 6-ft of slack cable available in the equipment cabinet before the terminal block.

   d. Labeling. Wiring shall be labeled in junction boxes and at terminal blocks.

2. Conduit.

   a. Referenced Requirements. Conduit shall be installed according to subsection 660-3.03, Conduit, or as indicated on the plans.

   b. Pull Cords. Nylon pull cords shall be left in conduits larger than 1 inch and in spare conduits.

   c. Bushings. Plastic or plastic-sleeved bushings shall be in place before wire pulls are performed.

3. Junction Boxes.

   a. Referenced Requirements. Junction boxes shall be installed according to subsection 660-3.04, Junction Boxes, or as indicated on the Plans.

b. Voltage Limitation. Junction boxes used for ATR installations shall not contain any wiring of systems at or greater than 24 V or conduits carrying wiring of systems at or greater than 24 V.

4. Terminal Blocks.

a. Terminal Block Placement. Terminal blocks within cabinets shall be mounted so that terminals are easily accessible from the front of the cabinet.

b. Labeling. Terminal blocks and wire pairs shall be clearly labeled on the block.

c. Termination. Conductors, including unused spares, shall terminate and be soldered to "spade" type terminal lugs.

5. Presence Loops.

a. Referenced Requirements. Presence loops shall be installed and constructed according to subsection 660-3.05, Wiring, unless otherwise specified on the Plans.

b. Placement Design Adherence. The plans are not schematics; installation of the presence loops shall closely conform to the location and layout of conduit runs shown in the Plans.

c. Presence Loop Dimensions. Unless otherwise noted, presence loops shall be formed of four turns of wire, and shall be 6 ft square with plus-or-minus 1 inch (±1 inch) tolerance.

d. Presence Loop Dimensions for On-Ramps and Off-Ramps. Presence loops in On-Ramps and Off-Ramps shall be formed of four turns of wire, and shall be rectangular 8 ft. wide and 6 ft. long with plus or minus 1 inch (±1 inch) tolerance.

e. Lead-in Conduit. Lead-in conduit from edge of pavement to the presence loops shall be straight and perpendicular to the centerline of the road.

f. Presence Loop Alignment. Presence detector loops shall be centered in the traffic lane plus or minus 1 inch (±1 inch) tolerance.

g. Presence Loops in Asphalt.

1) Presence Loop Interval. Unless otherwise noted on the plans, presence loops in a lane shall be located 16-ft from leading edge to leading edge with plus or minus 1 inch (±1 inch) tolerance. Presence loops located in adjacent lanes shall be aligned within plus or minus 1 inch (±1 inch) tolerance.

2) Presence Loops In Existing Asphalt. Presence loops installed through existing asphalt pavement shall be installed using full lane width cuts a minimum of 8 ft. length. Inductive loops shall be centered in the 8 ft. cut and spaced a minimum distance of 1 ft. from the edge of the cut. Edges of the cuts shall be heated and tack coated during patching to ensure full adhesion. Full-width patches shall be rolled sufficiently to ensure compaction equal or better than the existing asphalt, and to prevent edge ridges or settling of the patch from 'telegraphing' through the final lift asphalt.

Compaction tests shall be required at the discretion of the Project Engineer.

3) Presence Loops In New Asphalt. Loops installed in new asphalt paving shall be installed immediately before final paving of the particular section of road. Installation of loops after final lift paving shall not be permitted.

h. Presence Loops in Concrete.

1) Presence Loop Placement. Unless otherwise noted on the plans, presence loops in a lane shall be located 24-ft from leading edge to leading edge with plus or minus 1 inch (±1 inch) tolerance. Presence loops located in adjacent lanes shall be aligned plus or minus 1 inch (±1 inch) tolerance.

2) Presence Loop-Install Concrete Saw Cutting. Saw cutting for inductive detector loops shall not be performed until after the Project Engineer confirms that the PCC pavement has been ground, straight edged and brought into tolerances as provided in these Special Provisions and subsection 501-3.09.3, Finishing Concrete Surfaces: Concrete Decks.

A diagonal cut shall be placed 6 inch inside each square corner of presence loop slots cut into the PCC pavement. These diagonal cuts allow avoidance of sharp corners and bends that may damage the presence loop wire.

The Contractor will not begin sawcutting until the Engineer approves the sawcutting method.

Slot cuts in the pavement shall be washed clean, blown out and thoroughly dried before installing presence loop wire. After the loop wire is placed, the sawcut shall be filled with 3M epoxy loop sealant or an approved equal.

6. Piezoelectric Sensors.

a. Manufacturer's Recommendations: Piezoelectric sensors shall be installed according to AVC equipment and piezoelectric sensor manufacturer's

recommendations. Piezoelectric sensor installations will be observed and approved by the piezoelectric sensor manufacturer's representative, or a piezoelectric sensor manufacturer-certified installation technician.

b. Placement Design Adherence. The plans are not schematics; installation of the piezoelectric sensors shall closely conform to the location and layout of conduit runs shown in the plans.

c. Sawcut Requirement. Piezoelectric sensors shall be installed in sawcut slots in final pavement. "Blockouts" shall not be used.

d. Coaxial Cable. Coaxial cables shall be run to the equipment cabinet without splices and terminated on the specified terminal block, with at least 6 ft. of slack cable available in the equipment cabinet before the terminal block.

e. Lead-in Conduit. Lead-in conduit from edge of pavement to the piezoelectric sensors shall be straight and perpendicular to the centerline of the road. Lead-in conduits for piezoelectric sensors shall be installed and capped at the sensor end with tape or sealant before paving. Lead in conduits shall extend beyond the edge of the pavement. Lead in conduit runs to junction boxes and cabinets may be completed before or after paving.

f. Piezoelectric Sensor Alignment. Unless otherwise noted, Piezoelectric Sensors shall be centered in the traffic lane plus or minus 1 inch (±1 inch) tolerance.

g. Piezoelectric Sensor Alignment for Shouldered Lanes. Piezoelectric Sensors in Shouldered Lanes shall be offset from centerline toward the outside shoulder. Piezoelectric Sensors in Shouldered Lanes shall extend 1 foot beyond the fog line plus or minus 1 inch (±1 inch) tolerance.

h. Piezoelectric Sensor Interval. Unless otherwise noted, each piezoelectric sensor shall be centered in the travel interval between that sensor's adjoining inductive loops. Piezoelectric sensor placement shall be within plus or minus 1 inch (±1 inch) tolerance.

i. Piezoelectric Sensor Replacement In Existing Pavement. Any piezoelectric sensors and epoxy to be replaced shall be completely removed by sawcutting. Sawcuts for piezoelectric sensor removal shall be straight and square. Sawcut slots resulting from piezoelectric sensor removal shall be filled with the same type epoxy as used to install piezoelectric sensors. Epoxy patched sawcut slots shall be formed by grinding to match the pavement surface profile.

Replacement piezoelectric sensors shall be centered 1 ft. from the original location of removed sensors, offset in the direction opposite of lane traffic flow.

j. Piezoelectric Sensors in New Asphalt. Piezoelectric sensors installed in new asphalt pavement shall be installed only after final paving and three day's normal traffic use of the particular section of road.

k. Piezoelectric Sensor Install Concrete Saw Cutting. Saw cutting for piezoelectric sensors shall not be performed until after the Project Engineer confirms that the PCC pavement has been ground, straight-edged and brought into tolerances as provided in these Special Provisions and subsection 501-3.09.3, Finishing Concrete Surfaces: Concrete Decks. The Engineer shall approve the sawcutting method before beginning cutting. Saw cuts in the pavement shall be washed clean, blown out and thoroughly dried before installing piezoelectric sensors.

7. Cabinets.

a. Cabinet Placement and Orientation. Cabinets shall be installed out of the clear zone and with the doors facing away from the road.

b. Conduit Entry. Conduits entries for any above-ground enclosure shall be made through the bottom of the enclosure. No conduit runs shall be cut through the sides or top of any above-ground enclosure.

c. Style CBA1 Cabinets.

1) Mounting. The Style CBA1 cabinets shall be mounted on a 2.5 inch perforated steel tube and supported with a sleeved concrete foundation as shown on the plans.

2) Terminal Blocks. Terminal blocks in CBA1 cabinets shall be mounted vertically as shown on the plans.

d. Style CBA2 Cabinets.

1) Mounting. The Style CBA2 cabinets shall be mounted on 4 inch GRMC or DN100 galvanized pipe and supported with a reinforced concrete foundation as shown on the plans.

8. Utilities.

a. Electrical. Provide and install the Load Center according to the plans, specifications and the requirements of the appropriate Electrical Utility. Wiring from the Load Center to the equipment in the cabinet shall be provided and installed by the Contractor. request inspection of the Load Center by the Department of Labor, Division of Mechanical Inspection (DOL/DMI). After approval of the Load Center by the DOL/DMI, inform the Resident Engineer as to when electrical service is needed at the Load Center, with sufficient time to

schedule the installation with the Electrical Utility before commissioning of the equipment. The Electrical Utility will provide service to the Load Center upon request of the Engineer.

b. PSTN (public switched telephone network). The Telephone Utility will provide and install a Network Interface Device (NID) in or near the Cabinet. Underground wiring for telephone service shall be provided and installed by the Telephone Utility. Provide and install a type RJ-11 telephone jack inside the Cabinet, and shall install all wiring to connect the telephone jack with the NID. Inform the Engineer as to when telephone service is needed at the telephone jack, with sufficient time to schedule the installation with the Telephone Utility before commissioning of the equipment. The Engineer will make arrangements in writing with the Telephone Utility to install and connect the NID. The Engineer will inform the Contractor of the telephone number at the NID.

9. Asphalt Pavement Smoothness: There shall be no transverse seams, joints or roughness within 50 ft. of any inductive loops placed in asphalt pavement section. The finished surface of the asphalt shall be tested with a straightedge 10 ft. long. The surface shall not vary more than ¼ inch from the lower edge of the straightedge within 50 ft. of sensors at the ATR installations.

10. Concrete Pavement Smoothness: The Portland Cement Concrete pavement smoothness shall be done according to subsection 501-3.09.3, Finishing Concrete Surfaces: Concrete Decks.

11. Field Inspection. Before installation of conduit, wiring, inductive loops, bending plate equipment, piezoelectric sensors, temperature sensors or cabinets, notify the Engineer. Notification shall be given in writing, through the Project Engineer, a minimum of 3 working days before installation (excluding Saturday, Sunday and State or Federal Holidays). The Engineer shall be present to approve the installation before final burial or encasement. Any unacceptable installations shall be corrected and re-inspected for completeness before burial or encasement. Any burial or encasement without approval by the Engineer shall be uncovered, removed, and/or replaced at the Contractor's expense. Any expense or delay in the project scheduling will be the responsibility of the Contractor.

669-3.02 ACCEPTANCE TESTING. Perform acceptance testing on all ATR installations.

1. General Tests. Perform tests for the ATR installations according to subsection 660-3.01.7, Field Tests.

2. AVC Acceptance Tests.

a. Scope and Governance. In addition to the General Tests, perform Acceptance Tests on all AVC installations. AVC Acceptance tests govern acceptance or rejection of the AVC installation.

b. Manufacturer Participation. Acceptance tests shall be observed and assisted by the AVC counter manufacturer's representative, or an AVC counter manufacturer-certified installation technician.

c. Engineer Participation. The Engineer shall be on-site during final acceptance testing. Provide documentation of the test vehicle's gross weight and measured axle spacing to the Engineer before testing. The Engineer must approve the test vehicle before testing. The Engineer must approve the scheduling of data sampling and testing for each lane before testing.

d. Results Certification. The Engineer shall certify in writing when the installation has met the accuracy requirements of the acceptance tests.

e. Acceptance Test Procedure. The contractor will perform the Acceptance Tests as follows:

Acquire a set of test data for the AVC sensor array. Test data shall be obtained by passing a test vehicle over the AVC sensors in each lane. Test data shall consist of 10 valid samples per lane for the test vehicle. Test data samples will include FHWA class designation and computed axle spacing for each sensor pass.

To be considered valid, sample data must be obtained under the following conditions:

1) The test vehicle must maintain good lane discipline while traversing the entire sensor array.
2) The test vehicle must maintain a constant speed, between 40mph and the maximum speed limit, while traversing the entire sensor array.
3) Data for a particular lane must be acquired using the same vehicle.
4) Sample data must be from successive sensor passes of the test vehicle. Data may not be omitted or included out of order for any 10 samples.

f. Accuracy Requirements. The Automated Vehicle Classifier must meet the following requirements separately in each lane:

1) The AVC system correctly assigns FHWA class designation for 6 out of 10 successive sensor passes of the test vehicle.
2) The AVC system computes axle spacings to within 6-in of the actual measurements, for 9 out of 10 successive sensor passes of the test vehicle.

g. Test Vehicle. Provide, and arrange for, the test vehicle and drivers as needed for the acceptance testing.

h. Class 6 Vehicle. The Class 6 vehicle shall meet the following requirements:

1) spacing between the steering axle and the drive axle group of 11.3 to 24.6 ft
2) spacing between the drive axles of 3.5 to 6.0 ft

i. Vehicle Loading. Ensure that the test vehicle is loaded with non-shifting material to a minimum of 50% of legal load during testing.

j. Tire Inflation. Ensure that all tires on the test vehicle are inflated to recommended pressures during testing.

k. Weighing Method. The gross weight of the test vehicle and the weight of the test vehicle's axle groups shall be determined by weighing on a static scale at a scale house operated by the State of Alaska Department of Commerce, Division of Weights and Measures.

An axle group is defined as any two axles whose centers are within 8 ft. of each other.

A Class 6 single trailer test vehicle has three axle groups.

669-3.05 DELIVERABLES. Deliverables shall be submitted to the Engineer before final approval of the work or as otherwise called for herein.

1. Materials Submittal.

a. Format and Contents. Provide a Materials Submittal of proposed equipment and materials for the ATR installations. The Materials Submittal shall consist of three collated copies of an equipment and materials portfolio. Each identical portfolio shall contain information of sufficient detail to determine the suitability of the equipment and materials proposed.

b. Table of Contents. Each portfolio shall include a table of contents listing each item's intended uses, item description, product name, manufacturer, model or part number and reference to associated information within the portfolio.

c. Reference Drawings. The Materials Submittal shall include a detailed shop drawing of each equipment cabinet showing the location of all mounted components.

d. Delivery Interval. The Materials Submittal shall be delivered for review and approval of the Engineer within thirty days following award of the contract.

e. Liability. The State of Alaska will not be liable for any materials purchased, labor performed, equipment used or delay to the work before all equipment and materials have been reviewed and approved.

2. Utility Schedule.

a. provide a Utility Schedule identifying actions required to ensure activation of electrical and telephone service before installation and commisioning of ATR equipment at affected sites. The Utility Schedule shall consist of three collated copies of the lists of action items.

b. A separate list of chronologically and sequentially organized actions will be created for each affected ATR station.

c. On the lists, each action item shall include:

1) a description of the action
2) when the action will occur
3) the name, employer, position title and telephone number of the point of contact for initiating the action
4) the name, employer, position title and telephone number of the party responsible for completing the action.

d. The Utility Schedule shall be delivered for review and approval of the Engineer within thirty days following award of the contract.

3. As Built Plans.

a. Prepare four complete sets of as-built plans that will be current with the construction. These as-built plans shall detail all construction changes made to the ATR design and include the following information on the appropriate sheets:

1) location and depth of all inductive loops, piezo sensors, conduit runs and scales.
2) locations of all equipment cabinets and junction boxes.
3) station and offset of all junction boxes

b. Three sets of as-built plans shall be presented to the Engineer, and one set shall be affixed to the inside of the cabinet door at the appropriate Automated Traffic Recorder Installation in a waterproof, clear plastic holder.

c. Redlines of full size construction plans will be acceptable as builts.

4. Photographs.

a. Provide photographic paper prints, and Kodak Picture CD format (JPEG) CDROMs documenting sensor installations.

b. Photographs, and CDROMs shall be delivered organized in one or more white colored, D ring style, 3 ring binders with clear insert overlays on fronts and spines. Photographs will be mounted in archival quality polypropelene pocketed sheets. CDROMs will be placed in CD storage sheets inside the binders.

c. The photographs shall be 5 in. x 7 in. color prints.

d. Each photograph shall be labeled with the identification of its subject. ATR station and device designation as indicated on the plans will be used as identification whenever possible (example: H1-W1NLA). Labels will be photographed with the subject and will be rendered large enough to be read with the unaided eye.

e. The photographs shall show the inductive loops and conduit in place before covering with gravel and pavement for asphalt pavement sites, or before covering with epoxy compound for concrete pavement sites. The photographs shall include:

1) two or more overall views of each ATR installation showing placement of the inductive loops.
2) one or more views of each loop showing the loop and the conduit to the nearest junction box
3) one or more views of each piezo sensor conduit showing the coaxial cable, sawcut, and conduit to the nearest junction box
4) one or more views of each temperature sensor showing the lead cables, sawcut, and conduit to the nearest junction box

5. Test Results.

a. Written or printed copies of the final results of all tests, signed by the Contractor, shall be provided to the Engineer prior to acceptance of the Automated Traffic Recorder Installation. Tests will be conducted in accordance with subsection 660-3.01.7, Field Tests.

b. AVC Test Results.

An AVC Test Report shall be provided to the Engineer before acceptance of the Automated Traffic Recorder Installation.

The AVC Test Report shall include both an electronic copy and a paper copy of the AVC counter's per-vehicle-record log of the AVC tests.

The AVC Test Report shall include an electronic copy and a paper copy of the final AVC calibration test data. Included AVC calibration test data shall be sorted by test vehicle, tabulated in a spreadsheet and certified by the AVC manufacturer's representative.

6. Manuals. Provide to the Engineer all installation, repair and operation manuals for all Automated Traffic Recording equipment, telemetry equipment, dataloggers, and environmental sensors.

7. Materials.

   a. Provide to the Engineer any ATR equipment and sensors remaining after installation.

   b. Ppalletize the Deliverable Materials.

   c. The Contractor shall group the contents of each pallet by like items.

   d. The Contractor shall attach to each pallet a sealed plastic pouch containing complete copies of Material Safety Data Sheets that apply to the contents of that pallet.

e. Provide an itemized list of Deliverable Materials. For each item, the list shall detail:

   1) Item description: including nature of the item, brand name, manufaturer name, model number, type number and serial number.
   2) Item condition
   3) Item quantity

f. Provide complete copies of Material Safety Data Sheets that apply to the Deliverable Materials. The Contractor shall attach these Material Safety Data Sheets after the last page of the Deliverable Materials list.

669-4.01 METHOD OF MEASUREMENT. The quantity to be paid for will be the actual number of completed and accepted Automated Traffic Recorder Installations as shown on the plans or as directed by the Engineer.

669-5.01 BASIS OF PAYMENT. The contract unit bid price for all Automated Traffic Recorder installations shall be full compensation for furnishing equipment, labor and materials necessary to complete the work as specified, with the following exceptions:

1. Backfill materials required will be paid for under their respective pay items.

2. Asphalt required will be paid for under a separate pay item.

3. Concrete required will be paid for under a separate pay item.

4. Installation of wiring and service to the Load Center(s) will be paid for under the Utility Agreement for Electrical Service. Installation of wiring and service to the Network Interface Device(s) (NIDs) will be paid for under the Utility Agreement for Telephone Service.

5. Excavation, load centers, as-built plans, the manufacturer's representative and acceptance testing required for these installations will not be paid for separately, but will be subsidiary to the Automated Traffic Recorder Installations.

6. Type II and Type IA J-Boxes, 1 inch rigid conduit, and 2 inch rigid conduit associated with the Automated Traffic Recorders are subsidiary to the 669 items. Traffic Control required to install Automated Traffic Recorders is paid for under 643 items.

20% of the Billing for item 669(1) will be withheld until the

1) deliverables have been provided to the Engineer, as required, ensure full compliance under this section, and

2) the Highway Data Section has approved the deliverables in writing.

This is done to ensure full compliance under this Section.

Payment will be made under:

Pay Item	**Pay Unit**
669(1) Automated Traffic Recorders	Each

SECTION 670

TRAFFIC MARKINGS

Special Provisions

670-1.01 DESCRIPTION. *Delete this subsection in its entirety and substitute the following:*
This work consists of furnishing, preparing and placing durable pavement markings at the locations shown on the Plans or as directed. Meet these Specifications and the applicable portions of the Alaska Traffic Manual.

Durable pavement markings consist of either preformed pavement markings or methyl methacrylate pavement markings at the Contractor's option. Once selected, only one durable pavement marking shall be used throughout the project.

670-3.01 CONSTRUCTION REQUIREMENTS. *Delete all paragraphs under item 4. Methyl Methacrylate Pavement Markings. and substitute the following:*

a. General. 15 days before starting work meet with the Engineer for a prestriping meeting. At this meeting, do the following:

1. Furnish a striping schedule showing areas and timing of work, placing materials and the Traffic Control Plans to be used.
2. Discuss placement of materials, potential problems.
3. Discuss work plan at off ramps, on ramps and intersections.
4. Discuss material handling procedures.
5. Provide copies of the manufacturer's installation instructions and copies of the Material Safety Data Sheets.

b. Manufacturer's Representative. Provide the services of a manufacturer's representative (the "Manufacturer's Representative"). Ensure the Manufacturer's Representative observes the application of the pavement marking materials. Cooperate with the Manufacturer's Representative and the Engineer to ensure that the materials are placed according to these Specifications and the manufacturer's recommended procedures.

c. Manufacturer Certified Installers. Install methyl methacrylate pavement markings using only striping installers certified by the marking materials manufacturer for the specific striping material and method. Submit these certifications to the Engineer at the Preconstruction Conference.

d. Preparation. Prepare the roadway surface to receive methyl methacrylate according to these Specifications and the manufacturer's recommendations. Clean and dry the roadway surface. Completely remove contaminants such as dirt, loose asphalt, curing agents, surface oils, or existing road marking materials before applying pavement marking material.

e. Application. Apply methyl methacrylate marking material according to these Specifications and the manufacturer's recommendations. Use equipment designed and capable of properly mixing at the point and time of application and approved by the manufacturer for the type of product being installed. Unless specified otherwise marking shall be surface applied as defined below.

For longitudinal markings use truck mounted automatic extrusion equipment capable of installing a double centerline and a single shoulder line in a single pass. Use automatic bead applicators that place a uniform layer of beads on the lines. Hand units will not be allowed.

For inlaid applications use grooving equipment that produces a dry cut. Use vacuum shrouded equipment or other equally effective containment procedures. Install markings in the same work shift as the grooving operation.

(1) Longitudinal Markings Surface Applied. Apply markings for lane lines, edge lines, and centerlines to yield a minimum thickness of 90 mils as measured from the surface of the pavement. Use Type B material, as specified in subsection 712-2.17.

(2) Longitudinal Extruded Markings Inlaid. Apply markings for lane lines, edge lines, and centerlines to yield a thickness of 250 mils as measured from the surface of the pavement. Groove the area for the inlaid markings to a depth of 250 mils.

(3) Transverse and Symbol Markings Inlaid. Apply markings for onlys, arrows, stop bars, gore stripes, railroad symbols, and cross walks to yield a thickness of 250 mils as measured from the surface of the pavement. Use Type C material, as specified in subsection 712-2.17. Groove the area for inlaid marking to a depth of 250 mils.

(4) Traverse and Symbol Markings Surface Applied. Apply markings for onlys, arrows, stop bars, gore stripes, and cross walks to yield a thickness of 120 mils as measured from the surface of the pavement. Use Type C material.

f. Disposal of Waste. Waste material becomes the Contractor's property. This includes grindings and removed marking material. Do not dispose of or store stripe removal wastes material or asphalt grindings on State property. Dispose of waste material according to applicable Federal, State, and local regulations.

g. Sampling. On the form provided by the Engineer, record the following readings, and the locations where they were taken using project stationing, and submit them to the Engineer within 24 hours for evaluation. Thickness of material and depth of slot are measured from the surface of the pavement.

(1) For inlay applications, record the depth of the slot every 300 feet during the grinding operation.

(2) For other longitudinal applications, measure the thickness of the lines (above the pavement surface), at the time of application, every 300 feet.

(3) For surface applied transverse markings measure the thickness in three locations for each marking.

(4) Inspect the markings initially, and again two weeks after placement, to ensure the material has cured properly. Remove soft spots or abnormally darkened areas and replace with material meeting specifications.

(5) Measure the retroreflecivity of each transverse marking at three locations, and of each line at intervals not to exceed 1,500 feet. Take these measurements using a Delta LTL2000 Retrometer, a 100 foot retro-reflectometer, or approved similar device. Perform testing within 72 hours of curing.

The Engineer may elect to use the Contractors readings or perform additional sampling.

670-3.04 PAVEMENT MARKING REMOVAL. *Add the following:* Coordinate removal work with construction activity. Remove pavement markings the same day permanent markings are applied, unless otherwise directed. Use vacuum shrouded equipment or other equally effective containment procedures.

Add the following subsection:

670-3.07 TOLERANCES FOR METHYL METHACRYLATE PAVEMENT MARKINGS.

1. Length of Stripe. ± 2 inches.
2. Width of Stripe. ± 1/8 inch.
3. Lane Width. ± 4 inches from the width shown in the Plans.
4. Stripes on Tangent. Do not vary more than 1 inch laterally within a distance of 100 feet when using the edge of the stripe as a reference.
5. Stripes on Curves. Uniform in alignment with no apparent deviations from the true curvature.
6. All Stripes. Keep the center of the stripe within 4 inches from the planed alignment.
7. Double Stripes. ± ¼ inches
8. Thickness of surface applied. Minimum specified to a maximum of + 30 mils.
9. Depth of Inlay Slot. Minimum 250 mils to a maximum of 290 mils.
10. Thickness of Inlaid Marking Material. Fill inlay area completely from the bottom of the inlay to the surface of the pavement.

If it is determined that the material is being placed too thin, or otherwise not to specification, make immediate adjustments to correct the problem.

Methyl methacrylate pavement markings applied by any method will be unacceptable if:

1. The marking is not straight or wide enough.
2. The thickness of the line is not uniform or less than specified.
3. The top of the line is not smooth and uniform.
4. The material is uncured.
5. The material blackens or is inconsistent in color.
6. The inlay slot is not ground to the specified depth.
7. The inlay slot is not filled to the specified depth.
8. The edge of the markings are not clear cut and free from overspray.
9. The reflective elements are not properly embedded.
10. The markings exhibit poor adhesion.
11. The retro-reflectivity of the markings is less than specified.
12. The color is not as specified.

Perform repairs using equipment similar to the equipment initially used to place the materials. Do not perform repairs in a "patch-work" manner. If more than one repair is required in a single 300 foot section, grind and repair the entire section.

670-4.01 METHOD OF MEASUREMENT. *Add the following:* Thickness will be measured from the top of the marking to the top of the pavement surface. Marking material placed in a depression left by pavement line removal will not be included in measuring the thickness of the line.

Delete Items 2 and 3 and replace with the following:

2. Square Foot Basis. Transverse pavement marking lines, stop bars, cross walks and gore stripes will be measured by nominal width times actual length. This does not include 24" wide lines required for Railroad Markings.

3. Each. Symbol pavement markings only's and arrow's will be measured on a unit basis with each separate word or symbol constituting a unit. Railroad Markings will be measured by the complete unit shown for each lane of travel.

4. Foot Basis: Longitudinal Pavement Markings, surface applied or inlaid, will be measured by the linear foot of 4 inch wide line. Wider striping will be measured in multiples of 4 inches.

670-5.01 BASIS OF PAYMENT. *Add the following:* There will be no separate or additional payment for the following:

- Over-runs of material caused by the variation of the gradation of the asphalt.
- Additional material required to achieve the thickness specified an open graded pavement.

Traffic control required for the installation of the permanent and temporary markings is subsidiary to 670 items.

Temporary traffic markings required for all phases of the construction of the roadway is subsidiary to 670 items.
(01/04/06)R246usco04

Payment will be made under:

Pay Item	Pay Unit
670(13A) Durable Pavement Markings Longitudinal Surface Applied	Lineal Foot
670(13C) Durable Pavement Marking Only and Arrow Surface Applied	Each
670(13D) Durable Pavement Transverse Markings Surface Applied	Square Foot

(01/04/06)R246usco04 (05/02/06)R&M

SECTION 703

AGGREGATES

Special Provisions

703-2.03 AGGREGATE FOR BASE. *Delete Table 703-2 and substitute the following*:

TABLE 703-2
AGGREGATE FOR UNTREATED BASE
Percent Passing By Weight

Sieve Designation	Grading C-1	Grading D-1	Grading E-1
1 ½ inch	100		
1 inch	70-100	100	100
¾ inch	60-90	70-100	70-100
3/8 inch	45-75	50-79	50-85
No. 4	30-60	35-58	35-65
No. 8	22-52	20-47	23-50
No. 30	10-33	10-26	13-31
No. 50	6-23	6-19	10-26
No. 200	0-6	0-6	8-15

(06/07/06)R199usc04

Replace subsection 703-2.04 with the following:

703-2.04 AGGREGATE FOR ASPHALT CONCRETE PAVEMENT.

Coarse Aggregate (retained on the No. 4 sieve). Crushed stone or crushed gravel consisting of sound, tough, durable rock of uniform quality. Remove natural fines passing a #4 sieve before crushing aggregates for Type V or VH asphalt concrete mixtures. Free from clay balls, organic matter, and other deleterious material. Not coated with dirt or other finely divided mineral matter. Meet the following requirements (note A or B indicate class of mix, see Table 401-1), the Engineer may modify the fracture requirements if the hard aggregate sources stated in 106-1.02 do not meet specifications:

		Type IIA, IV	**Type I, IIB, III**	**Type V**	**Type VH**
LA Wear, % max	**AASHTO T 96**	**45**	**45**	**45**	**45**
Degradation Value, min	**ATM 313**	**30**	**30**	**30**	**30**
Sodium Sulfate Loss % max (5 cycles)	**AASHTO T 104**	**9**	**9**	**9**	**9**

		Type IIA, IV	Type I, IIB, III	Type V	Type VH
Fracture, min %	**WAQTC FOP for AASHTO TP61**	**90,2 face**	**80, 1 face**	**98, 2 face**	**98, 2 face**
Thin-Elongated Pieces, max % **1:5** **1:3**	**ATM 306**	 **8** **20**	 **8** **-**	 **3** **8**	 **3** **8**
Nordic Abrasion, max.%	**ATM 312**			**12**	**8**
Absorption, max. %	**AASHTO T85**	**2.0**	**2.0**	**2.0**	**2.0**

TABLE 703-3
BROAD BAND GRADATIONS FOR ASPHALT CONCRETE PAVEMENT AGGREGATE
Percent Passing by Weight

	GRADATION				
SIEVE	**Type I**	**Type II**	**Type III**	**Type IV**	**Type V, VH**
1 inch	100				
¾ inch	80-90	100			100
½ inch	60-84	75-90	100	100	65-80
3/8 inch	48-78	60-84	80-90	80-95	48-60
No. 4	28-63	33-70	44-81	55-70	30-45
No. 8	14-55	19-56	26-70	35-50	20-30
No. 16	9-44	10-44	16-59	20-40	≤ 22
No. 30	6-34	7-34	9-49	15-30	≤ 17
No. 50	5-24	5-24	6-36	10-24	≤ 14
No. 100	4-16	4-16	4-22	5-15	≤ 12
No. 200	3-8	3-8	3-8	3-8	3-8

(06/05/06)R199usc04

Fine Aggregate (passing the #4 sieve. Meet the quality requirements of AASHTO M 29, including S1.1, Sulfate Soundness.

For Type IV, V and VH mixes, remove natural fines passing a #4 sieve before crushing aggregates for this asphalt concrete mixture. Consist entirely of aggregate produced from aggregate crushing process and be non-plastic as determined by WAQTC FOP for AASHTO T 90, and meets the following:

Property	Test Method	Requirement

Fine Aggregate Angularity	AASHTO T 304	45% min.

(10/25/05)R199usc04

SECTION 707

METAL PIPE

Special Provisions

707-2.01 CORRUGATED STEEL PIPE, PIPE ARCHES, AND UNDERDRAINS. *Add the following*:

Fabricate arctic insulated pipe using low density rigid urethane foam with a minimum closed cell content of 90% (ASTM D-2856) for insulation of the Arctic pipe's inner pipe and outer jacket. Urethane foam shall exhibit properties and characteristics that meet ASTM D2341 cell classification 550674970034. Core insulation density range shall be between 2.6 ± 0.3 lb/ft^3 (ASTM D-1622). The diameter shown on the Plans and listed in the Bid Schedule shall be the nominal inside diameter of the inner core pipe. Inner core pipe shall be corrugated steel pipe (CSP). The inside diameter of the outer jacket shall be a minimum of five (5) inches greater than the outside diameter of the inner core pipe and centered within a one-quarter (1/4)-inch tolerance of the outer jacket's center. Submit shop drawings and product data sheets detailing methods and materials used in the fabrication of arctic insulated pipe

SECTION 712

MISCELLANEOUS

Special Provisions

712-2.13 GABIONS. *Add the following*:

PVC Coating. Supply baskets with polyvinyl-chloride (PVC) coated wire mesh as specified. The PVC coating will meet the following:

a. Specific gravity: 81-84 pcf in accordance with ASTM D792-00, Table 1;
b. Hardness: between 50 and 60 Shore D, according to ASTM D 2240-04;
c. Tensile strength: not less than 2,985 psi, according to ASTM D412-98a;
d. Modulus of elasticity: not less than 2,700 psi, according to ASTM D412-98a;
e. Abrasion resistance: the percentage of the weight loss shall be less than 12%, according to ASTM D1242-95a.
f. Heat Aging Test: prior to UV and abrasion degradation, the PVC polymer coating shall have a projected durability life of 60 years when tested in accordance with UL 746B

(01/04/06)R&M

712-2.17 METHYL METHACRYLATE PAVEMENT MARKINGS. *Delete the first and second paragraphs under item 1. Quality Requirements: and substitute with the following:* Use a marking material formulated for the application type specified. Use a marking material manufactured from new materials and free from dirt and other foreign material. Use a methyl methacrylate based resin system for part "A". Use benzoyl peroxide system for part "B".

Extruded application: Material formulated for extruded application with factory intermix beads and anti skid aggregate, and additional surface applied beads.

2. Performance Properties: *Add the following:*

1.	Color:	Yellow, PR-1 chart, 33538 Federal Yellow. White, minimum daylight reflectance of 84.

712-2.18 GLASS BEADS FOR METHYL METHACRYLATE PAVEMENT MARKINGS. Delete *the bead table and substitute the following:* Use the type and amount of beads specified in writing by the marking material manufacturer necessary to meet the performance requirements.
(01/04/06)R246usco04

SECTION 716

STRUCTURAL STEEL

Special Provisions

716-2.02 GENERAL REQUIREMENTS. *Delete Item number 2. and replace with the following:*

2.	Structural Steel	ASTM A 36 or ASTM A 709 Gr. 50 as required.

(07/11/05)R&M

SECTION 722

BRIDGE RAILING

Special Provisions

722-2.01 BRIDGE RAILING. *Add the following*:

Aluminum pipe rail and post elements ASTM B429
(6/30/05)R&M

SECTION 724

SEED

Special Provisions

724-2-02. MATERIALS. *Delete Table 724-1 and substitute the following:*

TABLE 724-1
SEED REQUIREMENTS

Species	Sproutable Seed*, %, Min.
Arctared Red Fescue	78
Egan American Sloughgrass	67
Norcoast Bering Hairgrass	71
Nortran Tufted Hairgrass	71
Wainwright Slender Wheatgrass	88
Alyeska Polargrass	71
Bluejoint	71
Tilesy Sagebrush	71
Tundra Glaucous Bluegrass	76
Gruening Alpine Bluegrass	72
Nugget Kentucky Bluegrass	76
Beach Wildrye	70
Annual Ryegrass	76
Perennial Ryegrass	76

* Sproutable Seed is the mathematical product of Germination and Purity.

(11/06/02)R52USC

Delete this Section in its entirety except for Table 726-1 and substitute the following:

SECTION 726

TOPSOIL

Special Provisions

726-2.01 TOPSOIL. Furnish topsoil that is representative of the existing, natural organic blanket of the project area. Perform a quality test, as defined by ATM 201, on the soil to determine the organic content of the soil. Supply the results to the Engineer.

Soil with an organic content of 5 percent or more may be reused and spread on the finished slopes where topsoil is noted on the plans. Remove roots, stumps, unnatural material, and rocks greater than 3 inch in diameter from the organic material before it is graded onto the finished slope.

Soil with an organic content of less than 5 percent cannot be used as topsoil for the project. In this case, furnish topsoil consisting of a natural friable surface soil without admixtures of undesirable subsoil, refuse, or foreign materials having an organic content of 5 percent or more, as determined by ATM 201. The material shall be reasonably free from roots, clods, hard clay, rocks greater than 3 inches in diameter, noxious weeds, tall grass, brush, sticks, stubble or other litter, and shall be free draining and nontoxic. Notify the Engineer of the location topsoil is to be furnished at least 30 calendar days before delivery of topsoil to the project from that location. The Engineer will inspect the topsoil and its sources before approval will be granted for its use. (04/01/05)R208USC

Use the application rates, as determined by the Engineer, of limestone per acre of ground area of topsoil, based on soil analysis tests so that the total natural and applied chemical constituents are as follows:

(7/08/05)R&M

SECTION 729

GEOTEXTILES

Special Provisions

729-2.01 GEOTEXTILE, SEPARATION AND STABILIZATION. *Delete item* 2. Stabilization. *and replace with the following:*

2. Stabilization. Meet AASHTO M 288 for Stabilization and the Class specified, except provide a minimum permittivity of 0.08 sec^{-1}.
(7/12/05)R&M

SECTION 730

SIGN MATERIALS

Special Provisions

730-2.04 SIGN POSTS. *Add the following item*:

7. Structural Tubing and W-Shape Beams.

a. Structural tubing shall conform to either ASTM A500, grade B, or ASTM A501. The tubing shall be square and of the dimensions called for in the Plans with 0.2-inch thick walls. .0.4-inch diameter holes shall be drilled as required to permit mounting of the sign.

b. W-shape beams shall conform to ASTM A36.

a. Structural tubing and W-shape beams shall be hot dip galvanized according to 1.b. of this subsection. Damaged and abraded tubes and beams shall be repaired according to 1.c. of this Subsection.

(06/22/04)R81USC04

SECTION 740

SIGNALS AND LIGHTING MATERIALS

Special Provisions

Replace subsection 740-2.02 with the following:

740-2.02 SIGNAL AND LIGHTING POLES.

1. Design. Design and fabricate highway lighting and traffic signal structures with pole shaft lengths to 65 feet long to conform to the 1994 Edition of AASHTO *Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals* with interim revisions. For the design and fabrication of high tower poles, see subsection 740-2.04.

   A registered professional engineer shall design the structures and provide stamped shop drawings and calculations. Submit the stamped drawings and calculations for each pole to the Engineer for approval. Design for stresses on the completed structure with hardware in place.

   a. In the stamped calculations, indicate the edition of Standard Specifications to which the poles are being designed and provide the input data used to design each pole and mast arm, including: design wind speed, cross section shape, yield strengths of the component materials, dimensions of the pole components, and a summary of the loads used.

   b. On the stamped shop drawings, provide design wind speed and the details for building the poles and mast arms, including: materials specifications, slip fit joint dimensions, pole component dimensions, welds that will be made, and the welding inspection that will be done.

   Submit the mill certifications for the steel items (piles, plates, bolts, and other related items) to the Engineer for approval.

   Design poles for 110 mph winds with a 1.3 gust factor.

   Design each electrolier to support a sign with an area of 16 square feet with its centroid located 14 feet above the base of the pole.

2. Fabrication. Fabricate signal and lighting structures from tapered steel tubes with a round or 16 sided cross section. Orient hand holes located near the base of poles to face downstream of traffic flow.

Provide traffic signal poles, lighting poles, and signal mast arms in lengths evenly divisible by 5 feet.

Furnish poles and mast arms up to 40 feet long in one piece. Poles and mast arms longer than 40 feet may be furnished in one piece or in two segments with a slip type field splice. For slip type joints, provide a minimum overlap of two feet or 1.5 times the inside diameter of the female section whichever is larger. In mast arms, locate these splices at least one foot away from the Plan location of signal heads and signs. In signal poles, locate the edge of the female section at least 6 inches above the top of the signal mast arm connection.

Fabricate tubes with walls up to ½ inch thick from the prequalified base metals listed in AWS D1.1 and which feature maximum yield strengths of 70,000 psi. Fabricate elements greater than ½ inch thick from steel that conforms to ASTM A 709 and meets the Fracture Critical Impact Test requirements for zone 3. The Department will not accept structures that contain or are made with laminated steel elements.

Fabricate each tube from no more than 2 pieces of steel. When using 2 pieces, place the longitudinal welded seams directly opposite one another. Place the welded seams on adjacent sections to form continuous straight seams from the base to the top of the pole.

When tenons are needed to install traffic signals and luminaires, make them from two inch nominal schedule 40 pipe that conforms to ASTM A 53 Grade B.

Fabricate 10 feet long signal posts from 11 US Standard Gage sheet steel. Fabricate each post with a minimum inside diameter of five inches at the base plate. Use a 3½-inch long piece of four inch nominal schedule 40 pipe that conforms to ASTM A 53 Grade B as a post-top adapter.

The Department does not allow holes made for lifting purposes in the ends of tubular segments, except in the free ends of luminaire mast arms. To add lift points, weld them to the tube opposite the longitudinal seam weld on the outside of female segments and on the inside of male segments. Before shipment, remove lift points added to the outside of the tubes, grind the area smooth with the base metal, and hot stick repair the finish according to subsection 660-3.01.8.a. Lift points added to the inside of tubes in place may be left in place.

Hot dip galvanize lighting and signal structures to meet AASHTO M 111 and these specifications. Completely submerge pole and mast arm segments in one dip in a kettle of concentrated zinc ammonium chloride flux solution heated to 130 °F, then completely submerge in one dip in a separate kettle of prime western grade zinc heated to approximately 825 °F. Galvanize bolts and fasteners to meet AASHTO M 232.

After the poles and mast arms are galvanized, remove all excess zinc from all drip lines and points and the surfaces of all tube ends that form slip type joints to provide a smooth finish.

The Department will reject poles and mast arms that are:

a. Not fabricated according to these specifications or the approved shop drawings,

b. Bowed with sweeps exceeding ¾ inch throughout the length of the pole, mast arm, or segment, if furnishing a 2 piece pole or mast arm,

c. Out of round. Sections are out of round when the diameters of round members or the dimension across the flats of multisided members exceed 2 percent of the dimension specified on the shop drawings.

Fabricate pile cap adapters from grade X42 steel line pipe that conforms to API 5L and from steel plate that conforms to ASTM A 709 Grade 50. Attach the anchor plate to the pile section with a complete joint penetration (CJP) weld. Fabricate the anchor plate to match the base plate of the lighting standard.

3. Welding. Perform welding to conform to subsection 504-3.01 8. Welding and the following:

a. Make welds continuous.

b. Use partial joint penetration (PJP) welds in longitudinal seams. PJP welds must provide at least 60% penetration.

c. Use CJP groove welds to connect base plates to tubes with walls 5/16 inch thick and thicker. When CJP groove welds are used, the designer may use additional fillet welds when deemed necessary.

d. Use socket type joints with two fillet welds to connect base plates to tubes with walls less than 5/16 of an inch thick.

e. On steels 5/16 of an inch thick and thicker, inspect 100 Percent of CJP welds by either radiography (RT) or ultrasound (UT).

f. Inspect a random 25 percent of PJP and fillet welds by magnetic particle (MT). If a defect is found, inspect 100% of the PJP and fillet welds made to fill the order. In steels less than 1/8 inch thick, complete the tests according to AWS D1.3.

g. Only visually inspect welds made on luminaire mast arms.

4. Miscellaneous. Finish the edges of poles and mast arms to conform to the following requirements. Before hot dip galvanizing, neatly round the following features to the radius specified

a. On holes through which electrical conductors pass, provide a 1/16 inch radius on both the entrance and exit edges,

b. On pole base plates, provide a 1/8 inch radius on edges along which plate thickness is measured and a smooth finish on all other exposed edges,

c. On the ends of tubes that form slip type joints, complete the following tasks on the two surfaces that contact one another. First, provide 1/16 inch radii on the inside and outside edges of the female and male segments, respectively. Then for the length of the joint plus 6 inches grind down welds until they feature a radius concentric with the mating surface and remove material protruding from the two surfaces, and

d. Grind exposed welds flush with the base metal, except fillet welds and seam welds on top of mast arms. Grinding seam welds on multisided poles is not required, except in slip type joints.

Provide caps to cover the free ends of poles and mast arms.

Identify critical information for poles and arms with visible permanent aluminum tags that contain the information shown in Table 740-1. The measurements shown are for illustration purposes only. Use tags large enough to include required information using ¼ inch high text, 3/8 inch of space between successive lines of text, and at least 3/8 inch of space between the edges of the tag and the text. Secure the tags with two 1/8 inch blind rivets at the base of poles and the under side of mast arms. If furnishing a two piece signal mast arm with slip type joint, mark both pieces with the same message.

TABLE 740-1

POLE MARKINGS

Note: *Italic type indicates additional Tag Markings if poles have 2 luminaire or 2 signal mast arms.*

	MEASUREMENTS	TAG MARKINGS
Signal Poles		
a) Signal mast arm length	45 ft./*55 ft.*	SMA 45/*SMA 55*
b) Luminaire mast arm length	22 ft./*18 ft.*	LMA 22/*LMA 18*
c) Pole height	36 ft.	PH 36
d) Intersection number (if more than one) -pole number		1 - P 4
e) Sum of signal mast arm moments about centerline of signal pole		SM 4000/*SM 3200*
f) Design wind speed	100 mph	DWS 100

TABLE 740-1 POLE MARKINGS		
Note: *Italic type indicates additional Tag Markings if poles have 2 luminaire or 2 signal mast arms.*		
	MEASUREMENTS	**TAG MARKINGS**
Light Poles		
a) Luminaire mast arm length	15 ft./*15 ft.*	LMA 15/*LMA 15*
b) Pole height	37 ft.	PH 37
Signal Mast Arm		
a) Mast arm length	40 ft.	SMA 40
b) Intersection number (if more than one) -pole number		1 - P 4
c) Sum of signal mast arm moments about centerline of signal pole		SM 3740
d) Design wind speed	100 mph	DWS 100
Luminaire Mast Arm		
a) Mast arm length	18 ft.	LMA 18
b) Pole number (if unique arm design)		P 4

740-2.05 CONDUCTORS. *Replace Table 740-2 with the following*:

TABLE 740-2
CONDUCTOR TERMINATION TABLE

CONDUCTORS PER CABLE	CIRCUIT	WIRE COLOR	AWG. NO.	BAND LEGEND
7	Vehicle Red Vehicle Yellow Vehicle Green Common Neutral Spare Spare Spare	Red Orange Green White White/Black Black Blue	14	Head No.
7	Vehicle Red Arrow Vehicle Yellow Arrow Vehicle Green Arrow Common Neutral Spare Spare Spare	Red Orange Green White White/Black Black Blue	14	Head No.
7	Vehicle Red Vehicle Yellow Vehicle Green Common Neutral	Red Orange Green White	14	Head No.

TABLE 740-2
CONDUCTOR TERMINATION TABLE

CONDUCTORS PER CABLE	CIRCUIT	WIRE COLOR	AWG. NO.	BAND LEGEND
	Spare Vehicle Yellow Arrow Vehicle Green Arrow	White/Black Black Blue		
4	Pedestrian Don't Walk Pedestrian Walk Common Neutral Spare	Red Green White Black	14	Head No.
4	Pedestrian Pushbutton Neutral Spare Spare	Black White Red Green	14	Head No.
5	Photo Electric Control Load to Contactor Neutral Spare Spare	Black Red White Orange Green	14	PEC
3	Flashing Beacon Neutral Spare	Black White Red	14	Head No.
3	Preemption Neutral Spare	Black White Red	20	"PRE"
3	Preemption Confirmation Neutral Spare	Black White Red	14	"PRECON"
3	Highway Luminaire Highway Luminaire Highway Luminaire Spare	Black Red White	8 or 6	Circuit No. Circuit No.
3	Service to Controller Neutral Spare	Black White Red	6 or 4	"SIG" No Band No Band
3	Sign Luminaire Sign Luminaire Sign Spare	Black Red White	8	SIGN SIGN

Replace Item 7. with the following:

7. Detector Loops. Use No. 14 AWG conductors for detector inductive loops that meet IMSA Specification 51-3, Type RHW/USE, or IMSA Specification 51-5, when called for on the Plans or specified in the Special Provisions.

Replace subsection 740-2.06 with the following:

740-2.06 ELECTRICAL CONDUIT AND FITTINGS. Unless specified otherwise, use rigid metal conduit and fittings for raceways. Furnish galvanized rigid type conduit and elbows that conform to UL-6 and are manufactured of mild steel according to ANSI C80.1. Furnish third party certified fittings designed for rigid metal conduit.

For loop detectors, use Schedule 80 polyvinyl chloride (PVC) conduit that conforms to UL-651. Use PVC fittings meeting NEMA TC 3.

When polyethylene conduits are specified in the Plans, use a smooth wall, schedule 40, high-density polyethylene (HDPE) pipe that conforms to UL 651 B.

Furnish insulated throat grounding bushings made of malleable iron or steel with a mechanically galvanized or zinc plated finish. Grounding lugs shall either be an integral part of the bushing or consist of an attached tin plated copper saddle. Grounding lugs shall feature a stainless steel screw, the centerline of which falls within 20 degrees of conduit centerline. The bushings furnished shall also feature a stainless steel or brass mounting screw that locks the bushing onto the conduit end.

Furnish conduit outlet bodies and their covers with a hot dip galvanized finish and stainless steel screws. For loop detectors, furnish type X bodies and, for photoelectric control installation, furnish types C and LB conduit bodies.

When Myers hubs are specified, furnish rain tight, grounding type hubs made of malleable iron with a hot dip or mechanically galvanized finish.

At expansion joints, provide watertight expansion fittings capable of the following movements without damaging the conduits attached to it or the conductors that pass through it. The movements include: axial expansion or contraction to ¾ inch, angular misalignments in any direction to 30 degrees, and parallel misalignment of the conduits to ¾ inch. The fittings shall also include a braided copper bonding jumper equal to an 8 AWG conductor, bushings to prevent scraping the conductors, and a smooth inner sleeve that maintains a constant diameter regardless of conduit alignment.

740-2.11 CONTROLLER CABINET. *Add the following to the first paragraph of subpart (1) of subitem c. Cabinet Wiring. of item 1. Standard Features.*: Furnish controller cabinets wired to accommodate five 4 channel inductive loop detector units and two 2 channel inductive loop detector units.

Replace bullet (e) of subpart (3) Field Terminal Blocks of subitem c. Cabinet Wiring. of item 1. Standard Features. with the following: On the right side of controller cabinets, install two 16 position bus bars, for terminating the equipment grounding and neutral conductors used inside the cabinets. On the left side of the controller cabinets, install two 32 position bus bars, for terminating the equipment grounding and neutral conductors from field wiring.

Replace the first three sentences of subpart (5) Light Fixture. of subitem D. Cabinet Accessories. of item 1. Standard Features. with the following : Mount a third party certified, incandescent luminaire on the inside of each cabinet near the top edge of the door opening. Install white porcelain, surface mounted lamp holders that fit medium base lamps and are rated for a minimum 600 watts and 250 volts ac. Furnish each lamp holder with a 100 watt soft white incandescent lamp.

740-2.12 STANDARD AUXILIARY EQUIPMENT. *Under item 3. Conflict Monitors, add the following:*

d. Supply conflict monitors with an RS-232 serial port that allows the monitor to download information through an external dial up modem or to a personal computer using the Microsoft Windows NT operating system.

740-2.13 SPECIAL AUXILIARY EQUIPMENT. *Add the following items:*

6. Opticom Priority Control System. Install the following components of the 3M Company's Opticom Priority Control System according to 3M's written installation instructions at the signalized intersections listed on the Plans.

   Install the quantity of model 711, 721, and 722 optical detectors on the signal pole mast arms shown on the Plans. Before installing the detectors, gain approval of their final lateral location from the Engineer. See the Plans for installation details.

   Install Model 138 Optical detector lead in cable between the end of each signal mast arm and the controller cabinet. Furnish enough slack in these cables for them to extend 2 feet beyond the end of each signal mast arm and to leave 10 feet of slack in the controller cabinet. Seal both ends of each lead in cable with mastic lined, heat shrink tubing end caps.

   Before attaching the conductors to the optical detectors, strip the insulation for the conductors and attach four conductors to ground in the controller cabinet. Attach the signal cable to the confirmation light. The Municipality of Anchorage Signal Maintenance Section (MOA Signal Maintenance) will tie down the conductors in the controller cabinet under Item 660(26) Signal Timings and Adjustments.

   Furnish each controller cabinet with a Model 754 phase selector, a Model 760 card rack, and an Opticom Panel Assembly, U.S. Traffic Corporation part number 103303. The panel assembly interfaces the card rack to the controller cabinet. Furnish new controller

assemblies with these parts installed by the controller assembly manufacturer. To retrofit existing controller assemblies, deliver the parts to MOA Signal Maintenance, who will install the parts under Item 660(26) Signal Timings and Adjustments.

7. Traffic Logging System. Furnish, and others will install in the controller cabinet, a stand alone unit that collects, time stamps, and stores data in an unattended manner. The traffic logging system shall conform to the following:

   a. Operation. The unit shall accept a new operating program, operational parameters, and the date and time stamp from a personal computer, downloaded through an RS-232 cable. The use of replaceable proms to change the operational program is unacceptable. Data collection shall be automatic and not require an operator to reset or start operation..

      In the event of a power interruption, data collection shall automatically restart at the proper time. Other than, the current sample being collected, the unit shall not lose stored data because of the power interruption. At power up or at the restoration of power after an outage, the unit shall log the date and time at the start of data collection.

      The unit shall maintain the operating program, data storage, and date/time for a minimum of 5 years from when power is removed from the unit. The internal program/data size shall be a minimum of 32,000 bytes.

   b. Input Interface. The unit shall have a minimum of 28 inputs. Furnish new and existing controller cabinet only with a loose Detector Systems TLS-1-C1 interface cable to connect the unit to the output of the loop detector units. The Municipality of Anchorage's Signal Maintenance Section will install the interface cable in the controller cabinets under Item 660(26) Signal System Timing and Adjustments. Do not furnish new controller cabinets with a built in interface panel.

   c. Output Interface. Furnish units with an RS-232 serial port that allows a user to download and upload directly between the unit and a personal computer using the Microsoft Windows NT operating system or the external dial-up multi-port modem.

740-2.14 VEHICULAR SIGNAL HEADS. *Replace the first sentence of Item 1. b. with the following:*

Use red, yellow, and green LED signal modules that meet the requirements of Chapter 2a of *Equipment and Material Standards of the ITE* (Publication ST-0017A), Vehicle Traffic Control Signal Heads (VTCHS2), and the following:

Replace item 4 with the following and add item 5:

4. Backplates. Backplates shall not be louvered. Install backplates around vehicular signal faces except post-mounted flashers. Furnish backplates constructed of 0.063 inch minimum thickness aluminum alloy sheet meeting ASTM B 209, alloy 3003-H14. For those backplates fabricated from 2 or more pieces of sheeting, furnish them fastened together with 3/16" aluminum rivets or bolts peened after assembly.

   For traffic signals that consist of all 8 inch or all 12 inch signal sections, furnish 5 or 5½ inch wide backplates regardless of where the signals are installed, i.e. on mast arms, on top of posts, or on the sides of poles.

   For traffic signals that consist of combinations of vertically stacked 8 and 12 inch signal sections, furnish backplates with nominal borders of 8 inch for the 8 inch sections and 5 inch for 12 inch sections.

   Furnish backplates with the back and front faces factory finished with 2 coats of dark olive green enamel and 2 coats of flat black enamel, respectively.

5. Signal Mounting Hardware: Furnish elevator plumbizers, elbow pipe fittings, and post top adapters (without a terminal compartment) with integral serrated contacts that feature 72 teeth.

   Provide signal heads that will be mounted on mast arms or pipe tenons with ferrous or bronze elevator plumbizers.

   For signal faces installed on the sides of poles, furnish signal frames that consist of watertight assemblies of 1½ inch nominal diameter standard steel pipe, malleable iron or brass pipe fittings, and bronze terminal compartments. The side of the terminal compartment opposite the door shall feature a saddle shape for wobble free mounting on round poles and include a cable guide and two holes for mounting the compartment.

   Furnish vehicular signal frames with a horizontal dimension between the center of the terminal compartment and the axis of the adjacent signal face of 22 inches in side mounted frames and 11 inches in post top installations.

   Post top adapters shall slip fit over 4 inch nominal standard pipe and feature two rows of three cadmium plated steel setscrews. Furnish post top adapters with terminal compartments, except one way signal heads may be installed on adapters without a terminal compartment provided the adapters include offset openings. Provide post top adapters without a terminal compartment made of cast iron.

   Furnish terminal compartments with a terminal block containing 12 poles, each with two screw type terminals. Each terminal must accommodate at least three 14 AWG conductors. Provide terminal compartments with a rain tight door that provide ready access to the terminal block.

For mounting each terminal compartment, furnish two ½" x 13 hot dip galvanized bolts that conform to ASTM A 325 and two ½" hot dip galvanized washers that conform to ASTM F 436.

740-2.15 PEDESTRIAN SIGNALS. *Add the following as item 12:* Furnish pedestrian signals side mounted on poles with a 2 piece, hinge connected, cast aluminum clamshell bracket that mounts directly between the pole and the side of the housing. The bracket shall fit round poles with outside diameters of 4.5 inches and greater without wobbling and allow a minimum rotation of ±15 degrees when mounted on a 4.5 inch O.D. pole. The bracket shall feature a rain-tight terminal compartment and include a 12 position terminal block. Installed, the bracket shall take less than three inches of space between the housing and pole.

For mounting each clamshell bracket, furnish two ½" x 13 hot dip galvanized bolts that conform to ASTM A 325 and two spacers provided by the bracket manufacturer to keep the bolt head clear of the recess that holds the nut in a through bolted installation.

Replace subsection 740-2.17 with the following:

740-2.17 FLASHING BEACONS. Furnish beacons that consist of one or more traffic signal sections meeting the requirements of subsection 740-2.14 Vehicular Signal Heads. See the Plans for the number, size and color of the signal sections required for each beacon.

Use the flasher in signal controller cabinets to energize beacons that flash continuously and are installed near traffic signals. Otherwise, each flashing beacon controller assembly consists of the following 120 volt ac equipment housed in a NEMA 3R enclosure: a circuit breaker, a radio interference suppressor, a transient voltage suppressor, a NEMA type 3 flasher, neutral and ground busses, and terminal blocks.

Controller assemblies for school zone speed limit sign beacons shall also include a time switch and a second 120 volt ac circuit breaker that protects a thermostat and heater.

The NEMA 3R enclosure shall feature a single shelf and a top hinged cover with a hasp and staple for sealing and locking the cabinet door.

The radio interference and transient voltage suppressors shall meet the requirements of subsections 740-2.11.1.d.(3) and (4), respectively.

Use a solid state NEMA Type 3 flasher meeting the requirements of NEMA Standard TS 1-1989, Traffic Control Systems.

Use 20 ampere, 600 volt barrier type phenolic terminal blocks with plated brass screw type terminals and integral strips can be marked with a pen or pencil.

Furnish an RTC Manufacturing model AP41-L time switch complete with wiring harness, or an approved, calendar programmable, solid-state time switch with liquid crystal display, keyboard, input/output port, and wiring harness. The approved time switch shall:

1. Operate on line voltages from 95 to 135 volts ac, operate in temperatures from -22° F to 165° F, and include a capacitor that provides 48 hours of back up power to retain programming and time when the unit is disconnected from ac voltage.
2. Include a backlit display and provide 2 lines of alphanumeric legend with 16 characters per line. The display shall automatically prompt the operator while programming the device through the keyboard for ease of use.
3. Include an input/output port and keyboard activated special functions that transfer the program to other units and download the program to a printer for a hard copy record of the program.
4. Automatically compensate for changes in Daylight Savings Time and leap years and include a keyboard activated special function to quickly change the dates for the begin and end of Daylight Savings Time.
5. Provide at least 10 basic plans for daily and/or weekly use and at least 200 program steps that are equally divided amongst the actual number of basic plans. Each program step shall be assignable to a single day, weekend, weekday, or every day. The time switch shall also include 20 plans that activate the basic plans to provide one year of time based control.
6. Include at least 4 single pole double throw, relay controlled outputs rated for 15 amperes of resistive load at 115 volts ac. Each pole shall be independently activated for steady on or momentary on and be manually switched on through the keyboard.

When a signal controller cabinet flasher is used to energize a beacon, furnish a two pole, fused block with built in fuse pullers to protect the flasher. Furnish third party certified blocks that hold 13/32" x 1-1/2" midget ferrule fuses, are rated for 30 amperes, and feature tubular screw terminals that accommodate conductors to 8 AWG. Furnish blocks with two fast acting, 3 ampere (BAF-3) fuses and flat bases that can be directly mounted on a dead panel.

Replace subsection 740-2.18 with the following:

740-2.18 ROADWAY LUMINAIRES. Furnish luminaires that conform the following specifications and provide the light distributions specified. When luminaire performance criteria are specified, luminaires shall also:

- Meet or exceed the minimum initial light levels indicated.
- Provide light distribution uniformity ratios and veiling luminance ratios equal to or less than the maximums indicated.

When luminaire performance criteria are specified, submit the following information for each luminaire type and light distribution type specified: luminaire specifications, the lumen output of the lamps that will be furnished, and current electronic photometric data to the Engineer for approval. Furnish the photometric data in Illuminating Engineering Society (I.E.S.) format. The Engineer will use software that calculates light levels and uniformity ratios according to the American National Standard Practice for Roadway Lighting, A.N.S.I./I.E.S RP-8 to verify each

luminaire provides the light levels, uniformities, and veiling luminance ratios specified.

When cut off distributions are specified, furnish luminaires with flat glass lenses and a full cutoff light distribution as defined in the American National Standard Practice for Roadway Lighting, A.N.S.I./I.E.S RP-8, dated 2000.

Furnish each luminaire with a high pressure sodium lamp of the wattage specified and matching ballast with an input voltage equal to circuit voltage. Furnish lamps that feature a rated life of 24,000 hours based on 10 hours per start and ballasts that conform to subsection 740-2.21.

Luminaries General

Install luminaires that feature:

1. Corrosion resistant enclosures with gray paint finish and space for the ballast.
2. Third party certification for use in wet locations.
3. Glass lenses, unless polycarbonate resin refractors are specified.
4. Terminal blocks for attaching the illumination tap conductors.
5. Aluminum reflectors with an ALZAK or ALGLAS finish.
6. Optical components free of substances that affect photometric performance, e.g. paint.
7. Housings cast with no provision for a photoelectric control receptacle.
8. Airtight reflector and lens units that breathe through activated charcoal filters and include elastomer gaskets to seal the gap between the two components. Gasket material must withstand the temperatures involved and be securely held in place.
9. Plug in starting aids in fixtures with lamps through 400 watts.

Luminaries – Cobrahead

Each cobrahead luminaire shall also include:

1. An easily removed hinged door used exclusively for mounting the ballast.
2. A second door that frames the lens, hinges on the house side, and fastens on the street side with an automatic type latch.
3. A four bolt mounting brackets that fit 2 inch nominal diameter standard pipe and feature a center pivot for leveling the luminaire.

Offset luminaires shall also include knuckle style pole top adapters that are sized to fit 2 inch nominal diameter standard pipe and feature a wire way meeting NEC requirements for installing three size 10 AWG conductors between the pole and the terminal block located in the luminaire.

Lenses.

When polycarbonate resin lenses are specified, furnish lenses the fabricator certifies conforms to the following criteria.

1. The lenses are molded in a single piece from virgin polycarbonate resin.

2. The lenses are free from cracks, blisters, burns, and flow lines, and furnished with the natural molded surface.
3. The lenses are of uniform density throughout and free from air, gas, or moisture pockets, and uncured areas.
4. The lenses are transparent with a clear bluish tint, produced from ultraviolet stabilized resin to reduce the effects of ultraviolet radiation on their color properties.
5. The resins used meet the requirements for the self extinguishing classification of ASTM D 635 and feature a minimum impact strength, Izod notched of 12 foot pounds per inch when tested according to ASTM D 256, Method A, using a 1/8 inch by ½ inch bar molded according to ASTM recommended practice.

Delete subsection 740-2.20, Illumination Control, in its entirety.
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