PPM
DICK PERREAULT

Special Provisions
for
Palo Verde Road T.I.

ADVERTISEMENT FOR BIDS

BID OPENING: October 8, 1987 at 11:00 a.m.

PROJECT AND LOCATION:
I-10-2-507 Ehrenberg-Phoenix Highway
(Palo Verde Road T.I.)

ROUTE NO.	MILEPOST to	DISTRICT	ITEM NO.	FUND CODE
I-10	109.7	3	336	82513

The location and description of the proposed work and the representative items and approximate quantities are as follows:

The proposed work is located in Maricopa County, on Palo Verde Road at the Interstate Route 10 Traffic Interchange Milepost 109.7, beginning at Station 5770+00 and extends easterly to Station 5800+00 for a distance of 0.57 miles and consists of grading and draining the roadway; furnishing and placing asphaltic concrete pavement; construction of a two span underpass bridge; construction of a four barrel concrete box culvert; furnishing and installing highway lighting; pavement markings; signing; and other related work.

Removal of Asphaltic Concrete Pavement	Sq. Yd.	20,925
Borrow	Cu. Yd.	165,040
Aggregate Base, Class 2	Cy. Yd.	7,082
Asphaltic Concrete (1/2" Mix)(End Product)	Ton	2,960
Asphaltic Concrete (3/4" Mix)(End Product)	Ton	7,895
Pipe, Corrugated Metal, 24"	L. Ft.	1,131
Structural Concrete (Class S)(f'c=3000)	Cu. Yd.	1,559
Structural Concrete (Class S)(f'c=3500)	Cu. Yd.	413
Structural Concrete (Class S)(f'c=4500)	Cu. Yd.	1,063
Precast, Prestressed Concrete Bridge Members (I-Beam, VI, 131 Ft. 3")	Each	34
Drilled Shaft Foundation (30")	L. Ft.	2,637
Signing and Pavement Striping	-	-
Lighting	-	-
Concrete Curb and Gutter	L. Ft.	4,511

Bidders are advised that the Department will not take samples for quality control and will in no manner assist in any degree or in any aspect of the contractor's operation in the production of the asphaltic concrete, beginning from the production of aggregate through the compaction of the asphaltic concrete.

Because of the very limited degree of participation by the Department, it is understood that the contractor will provide personnel capable of performing the production sampling, testing, placing and compacting of aggregates and asphaltic concrete, and for all areas of quality control so that the acceptance of all materials, as hereinafter specified, is free of penalties.

The number of working days specified for the completion of the work is 253.

Project plans, specifications, and proposal pamphlets may be obtained from Contracts and Specifications Services (602) 255-7221. Plans and Bidding documents should be available for sale to bidders approximately one week following notice of advertisement for bids. The cost is $29.00. No refund will be made for plans and specifications returned.

The lowest qualified bidder shall be duly licenced as a contractor in the State of Arizona prior to the execution of the contract by the Arizona Department of Transportation.

No contracting firm will be issued a proposal pamphlet until it has become prequalifed. The Application for Contractor Prequalification shall be filed at least 15 calendar days prior to the bid opening date. The Application may be obtained from Contracts and Specifications Services.

The Arizona Department of Transportation hereby notifies all bidders that pursuant to this advertisement for bids, Disadvantaged Business Enterprises will be afforded full opportunity to submit bids in response to this solicitation and will not be discriminated against on the grounds of race, color, sex, or national origin in consideration for an award.

A proposal guaranty in the form of either a certified or a cashier's check made payable to the State Treasurer of Arizona for not less than five percent of the amount of the bid or in the form of a surety (bid) bond for five percent of the amount of the bid shall accompany the proposal.

Surety (bid) bonds will be accepted only on the form provided by the Department and only from corporate sureties authorized to do business in Arizona.

Proposal pamphlets shall be submitted only in the envelope provided by the Department to:

Arizona Department of Transportation
Highways Division
Contracts and Specifications Services
1651 West Jackson Street, Room 121-F
Phoenix, Arizona 85007-3276

Sealed bids will be received until the hour indicated and then publicly opened and read. No bids will be received after the time specified.

Engineering Specialist:	David Eberhart	(602) 231-0931
Construction Supervisor:	John Laverty	(602) 782-2511

DALLIS B. SAXTON, Engineer-Manager
Contracts & Specifications Services

SPECIAL PROVISIONS
ARIZONA PROJECT I-10-2-507

EHRENBERG-PHOENIX HIGHWAY
(Palo Verde Road T.I.)

Grade, Drain, Structures, Pavement

Proposed Work

The proposed work is located in Maricopa County, on Palo Verde Road at the Interstate Route 10 Traffic Interchange Milepost 109.7, beginning at Station 5770+00 and extends easterly to Station 5800+00 for a distance of 0.57 miles and consists of grading and draining the roadway; furnishing and placing asphaltic concrete pavement; construction of one two-span underpass bridge; construction of a four barrel concrete box culvert; furnishing and installing highway lighting; pavement markings; signing; and other related work.

(SPC85, 6, 04/24/87)

SPECIFICATIONS:

The work embraced herein shall be performed in accordance with the requirements of the following separate documents:

Arizona Department of Transportation, Highways Division, Standard Specifications for Road and Bridge Construction, Edition of 1982,

Arizona Department of Transportation, Highways Division, Supplemental Specifications to Standard Specifications for Road and Bridge Construction, October 1985.

Arizona Department of Transportation, Highways Division, Standard Drawings, listed in the project plans and defined hereinafter,

Arizona Department of Transportation, Traffic Control Manual for Highway Construction and Maintenance, August, 1981,

Manual on Uniform Traffic Control Devices for Streets and Highways, 1978, and Amendments, and

The Proposal Pamphlet which includes the following documents:

These Special Provisions,

Standard Federal Equal Employment Opportunity Construction Contract Specifications (Executive Order 11246), July 1, 1978, Revised November 3, 1980 and Revised April 15, 1981.

Notice of Requirement for Affirmative Action to Ensure Equal Employment Opportunity (Executive Order 11246), July 1, 1978, Revised November 3, 1980 and Revised April 15, 1981,

Executive Order 75-5, April 28, 1975, Revised November 25, 1980,

Compliance Reports, Non-Federal Aid Projects, July 1, 1975, Revised May 20, 1981,

Proposal,

Bidding Schedule,

Surety (Bid) Bond, 12-1303,

Certification With Regard to the Performance of Previous Contracts or Subcontracts, Subject to the Equal Opportunity Clause of Executive Order No. 75-5 and the Filing of Required Reports, Non-Federal Aid Projects, July 1, 1975,

Certification With Respect to the Receipt of Addendums,

Affidavit by contractor certifying that there was no collusion in bidding for contract

BID SUBMISSION:

In the submission of a bid, the contractor shall completely execute the following documents:

Proposal,

Bidding Schedule,

Surety (Bid) Bond, 12-1303,

Certification With Regard to the Performance of Previous Contracts or Subcontractors, Subject to the Equal Opportunity Clause of Executive Order No. 75-5 and the Filing of Required Reports, Non-Federal Aid Projects, July 1, 1975,

Certification With Respect to the Receipt of Addendums, and

Affidavit by contractor certifying that there was no collusion in bidding for contract.

PROPOSAL GUARANTY:

Each bidder is advised to satisfy himself as to the character and the amount of the proposal guaranty required in the Advertisement for Bids.

CONTRACT DOCUMENTS:

The bidder to whom an award is made will be required to execute a Performance Bond and a Payment Bond, each in 100 percent of the amount of his bid, an Insurance Certificate and the Contract Agreement.

A copy of these documents is not included in the Proposal Pamphlet which is furnished to prospective bidders; however, each bidder shall satisfy himself as to the requirements of each document.

The documents, approved by the Department of Transportation, Highways Division, are identified as follows:

Statutory Performance Bond, 12-1301, December, 1975
Statutory Payment Bond, 12-1302, December, 1975
Contract Agreement, 12-0912,
Certificate of Insurance, 12-0100, June, 1985

A copy of each document may be obtained by making a request to Contracts and Specifications Services.

COPIES OF PROJECT DOCUMENTS:

Distribution of a limited number of plans and Special Provisions will be made to the successful low bidder, at no charge, following confirmation of bid prices and DBE submittal, if applicable. The distribution will be made on the following basis:

CONTRACT SIZE (DOLLARS)	FULL SIZE PLANS	1/2 SIZE PLANS	BOUND BID BOOKS	UNBOUND BID BOOKS
$0 - $10,000,000	2	25	5	25
over $10,000,000	5	50	5	50

These plans and Special Provisions will be set aside and designated for use by the low bidder along with an equal number held in reserve for the responsible District Office. In the event that excess documents remain following bid opening, the additional documents will be evenly split between the low bidder and the A.D.O.T. District Office.

Any additional plans or Special Provisions that the low bidder may require beyond the above distribution will be available at the invoice cost of printing by ordering thru the Engineer.

MATERIAL AND SITE INFORMATION:

Projects requiring materials, excavation, or site investigation may have additional information available concerning the material investigations of the project site and adjacent projects. This information, when available and applicable, may be examined in the Office of the Assistant State Engineer, Materials Section, 206 S. 17th Avenue, Phoenix, Arizona 85007. This information will not be attached to the contract documents. Copies of available information may be purchased by prospective bidders.

(NOGOAL, 6, 04/24/87)

DISADVANTAGED BUSINESS ENTERPRISES:

Policy:

It is the policy of the Arizona Department of Transportation (Department) that Socially and Economically Disadvantaged Business Enterprises (DBE's) shall have maximum opportunity to participate as contractors, subcontractors, suppliers, or vendors in the performance of contracts.

GENERAL REQUIREMENTS:

The contractor shall schedule his operations to comply with the construction phasing and traffic control diagrams shown in the plans. The contractor's attention is directed to the fact that the mainline I-10 traffic must be diverted to the reconstructed ramps during demolition of the existing bridge. The contractor shall schedule said demolition for a time of low traffic volumes, and complete the work of demolition and debris removal in an expeditious manner, so that the I-10 mainline roadways may be reopened in a timely manner.

The contractor shall be advised that a permit is required to perform work in the right-of-way of the Buckeye Watershed Dyke, immediately north of the interchange. The contractor shall contact the Sun Valley Owners Association regarding this permit.

Name	Phone Number
Bob Mitchell	(602) 264-9599

The contractor shall be advised that a permit is required to perform work in the right-of-way of Maricopa County. The contractor shall contact the Maricopa County Highway Department, Permits Department, 233-8633, and obtain said permit prior to commencing any construction within said right-of-way.

The contractor shall be advised that the Maricopa County Highway Department (MCHD) will have the roadway improvement project, No. 68247, Yuma Road from Johnson Road to Palo Verde Road, under construction during this project. This MCHD project will be constructed adjacent to and/or within the limits of this project, beginning at approximately Station 32+00 on Palo Verde Road, and proceeding south.

The anticipated bid opening for this MCHD project is April 1, 1988, with construction planned for the summer of 1988. The contractor shall contact the MCHD for details of their construction, and shall coordinate his work in this area with the MCHD and their contractor.

The contractor must submit in writing plans for dewatering and for removal of surface water, to the Arizona Department of Water Resources for review and approval. The plans must be submitted at least three (3) working days prior to the start of dewatering or removal of surface water at the site.

No foundations or abutments shall be covered by the material of the dam until the Arizona Department of Water Resources and the Soil Conservation Service has been given an opportunity to inspect and approve the same. This condition will apply to all excavations in the areas at the dam proper and/or in the vicinity of the up and downstream toes of the dam.

The contractor shall be advised that the Plans have been prepared based on the Maricopa County Highway Department Datum, which is 2.12' higher than ADOT Datum. Construction shall be performed in accordance with the plans, using the MCHD Datum and benchmark elevations shown therein.

ADDITIONS AND REVISIONS TO THE STANDARD AND SUPPLEMENTAL SPECIFICATIONS:

(ERATA100, 6, 12/30/86)

SUPPLEMENTAL SPECIFICATIONS ERRATA:

The following changes shall be made to cover errors in the text of the Supplemental Specifications:

Page 15: The first sentence of the fifth paragraph under Subsection 105.06 shall read:

Compensation for idle time of labor will be determined in accordance with the provisions of Subsection 109.04 (B)(1) - Labor, . . .

The sixth paragraph under Subsection 105.06 shall read:

Compensation for idle time of equipment will be determined in accordance with the provisions of Subsection 109.04(B)(3) - Equipment, . . .

Page 47: The last sentence of the first paragraph under Subsection 203-5.03 (B) (1) shall read:

Tests for pH and resistivity shall be in accordance with the requirements of Arizona Test Method 236.

Page 73: The first sentence of the first paragraph following Table 305-2 shall read:

*Material represented by cores deficient by more than 0.75 inches in thickness and/or represented by lots attaining seven day compressive strengths with the mean value . . .

Page 146: The last sentence of the last paragraph under Subsection 604-3.05 shall read:

The weight of the coating . . .

Page 159: The first paragraph under Subsection 701-3.06 shall read:

Pavement marking obliteration shall be accomplished by the contractor as indicated on the plans or as directed by the Engineer.

Page 161: The first line following the fourth paragraph shall read:

701-5.02 Maintenance and Protection of Traffic: is modified to add:

Page 323: The third sentence of the fifth paragraph under Subsection 925-5 shall read:

Should such extra work require the contractor to pay mobilization or travel costs for the party or parties, . . .

Page 343: The second sentence of the first paragraph under Subsection 1013 (D) shall read:

The certification shall be supported by Certificates of Compliance . . .

(CNSLT101, 6, 10/21/85)

SECTION 101 - DEFINITIONS AND TERMS:

101.18 Engineer: of the Standard Specifications is modified to add:

It is the intent of the Department to utilize a consultant engineering firm as its agent to administer this contract.

Except as may be otherwise specified in the agreement between the consultant engineering firm and the Department, the ". . . assistant or other representative duly authorized by the State Engineer to act for him who is responsible for engineering supervision of the construction," as defined under Subsection 101.18 of the Standard Specifications, shall also mean the duly authorized consultant engineering firm.

(PLANS101, 6, 04/07/87)

101.31 Plans: of the Supplemental Specifications is revised to read:

The standard drawings approved by the Arizona Department of Transportation are bound together in four separate sets:

The construction ("C") Standard drawings are bound together with a light blue cover dated 1986.

The structure (bridge) standard drawings are bound together with a yellow cover dated 1987.

The signing and marking standard drawings are bound together with a gray cover dated 1986.

The traffic signals and lighting standard drawings are bound together with a light blue cover dated 1985.

All standard drawings approved by the Arizona Department of Transportation contained in the four bound sets plus subsequent revisions and additions are listed on the project plans along with the latest (current) revision dates.

Prospective bidders, contractors, subcontractors, material suppliers, and others are hereby advised to see that they have copies of and are familiar with the standard drawings appropriate to their particular operations.

Standard Drawings are available from:

Records Administration Section
Engineering Records
Arizona Department of Transportation
1655 West Jackson, Room 112F
Phoenix, Arizona 85007 (602) 255-7498

The cost of each set of Standard Drawings is $4.50. Single copies of each drawing are also available at $0.15 each. The above costs include postage. The minimum mail order is $1.00.

(EARTH102, 6, 03/20/87)

SECTION 102 - BIDDING REQUIREMENTS AND CONDITIONS:

102.07 Examination of Plans, Specifications and Site of Work: of the Standard Specifications is modified to add:

A set of plans and earthwork quantity sheets will be available at Highway Plans Services, 205 South 17th Avenue, Room 108E, Phoenix, for contractors to review in the process of preparing bids for projects containing earthwork.

(NOCLU102, 6, 08/12/86)

102.09 Noncollusion Affidavit: of the Standard Specifications is revised to read:

Each bidder shall file a sworn statement executed by, or on behalf of the person, firm, association, or corporation submitting the bid, certifying that such person, firm, association, or corporation has not, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action, in restraint of free competitive bidding in connection with the submitted bid. This sworn statement shall be in the form of an affidavit executed and sworn to by the bidder before a person who is authorized by the laws of the State to administer oaths. The required form for the affidavit is included in the proposal pamphlet.

Failure to submit the sworn statement as part of the bid proposal package will make the bid nonresponsive and not eligible for award consideration.

SECTION 104 - SCOPE OF WORK:

104-04 Maintenance of Traffic: of the Standard Specifications is modified to add:

Traffic Control and Safety Requirements:

The contractor shall perform all work in accordance with the Construction Staging, Sequencing and Traffic Control diagrams shown in the plans. The Concrete Box Culvert at Station 9+20 on Palo Verde Road shall be constructed in the phases shown for the Palo Verde Road reconstruction. The contractor shall maintain positive drainage under Palo Verde Road at this location at all time.

Access (Fire Station):

All roadway access restrictions shall be coordinated by the contractor with the Chief of the Buckeye Volunteer Fire Department a minimum of 72 hours in advance of the roadway restrictions.

Contact	Phone Number
Dan Keck, Fire Chief	386-3439 (Home) 386-6861 (Work)

Police Officer Requirement:

Off-duty police officers will be required when traffic conditions warrant or as directed by the Engineer. These shall be requested using the appropriate forms.

The contractor shall coordinate the type (civilian or uniformed officer) and number of flagging personnel to be used at least 48 hours in advance with the Engineer.

When an official law enforcement vehicle is used in conjunction with the uniformed off-duty law enforcement officer, it shall be a fully marked vehicle with top mounted emergency lights.

SECTION 105 - CONTROL OF WORK:

105.07 Cooperation Between Contractors: of the Standard Specifications is modified to add:

The contractor is hereby alerted to the fact that construction will be concurrently occurring immediately north of this project. The contractor shall make every effort to coordinate his activities that conflict with this contractor.

The contractor shall be advised that the Maricopa County Highway Department (MCHD) will have the roadway improvement project, No. 68247, Yuma Road from Johnson Road to Palo Verde Road, under construction during this project. This MCHD project will be constructed adjacent to and/or within the limits of this project, beginning at approximately Station 32+00 on Palo Verde Road, and proceeding south.

The anticipated bid opening for this MCHD Project is April 1, 1988, with construction planned for the summer of 1988. The contractor shall contact the MCHD for details of their construction, and shall coordinate his work in this area with the MCHD and their contractor.

(INS107, 6, 09/09/86)

SECTION 107 - LEGAL RELATIONS AND RESPONSIBILITY TO PUBLIC:

107.02 Permits, Licenses and Taxes: of the Standard Specifications is modified to add:

A permit is required to perform work in the right-of-way of the Buckeye Watershed Dyke, immediately north of the interchange. The contractor shall contact the Sun Valley Owner's Association regarding this permit.

Name	Phone Number
Bob Mitchell	(602) 264-9599

The contractor shall be advised that a permit is required to perform work in the right-of-way of Maricopa County. The contractor shall contact the Maricopa County Highway Department, Permits Department, 233-8633, and obtain said permit prior to commencing any construction within said right-of-way.

107.17 Insurance: of the Supplemental Specifications is revised to read:

Prior to the execution of the contract, the contractor shall file with the Department a certificate or certificates of insurance executed by an insurance company doing business in the State of Arizona and acceptable to the Department. The certificate of insurance shall be on the form provided by the Department and shall state that with respect to the contract awarded the contractor, the contractor carries insurance in accordance with the requirements of this Subsection.

Without limiting any liabilities or any other obligations of the contractor, the contractor shall provide and maintain, and cause its subcontractors to provide and maintain, the minimum insurance coverage listed below until all obligations under this contract are satisfied:

1. General Liability insurance with a minimum combined single limit of $10,000,000.00 each occurrence applicable to all premises and operations. The policy shall include coverage for bodily injury, broad form property damage (including completed operations), personal injury (including coverage for contractual and employee acts), blanket contractual, independent contractors, products and completed operations. Further, the policy shall include coverage for the hazards commonly referred to as XCU (explosion, collapse and underground). The products and completed operations coverage shall extend for one year past acceptance, cancellation or termination of the work. The policy shall contain a severability of interests provision.

2. Comprehensive Automobile Liability insurance with a combined single limit for bodily injury and property damage of not less than $10,000,000.00 each occurrence with respect to contractor's owned,

hired, or non-owned vehicles, assigned to or used in performance of the work.

3. Workers' Compensation insurance to cover obligations imposed by Federal and State statutes having jurisdiction of its employees engaged in the performance of the work, and Employers' Liability insurance with a minimum limit of $100,000.00. Evidence of qualified self-insured status will suffice for this section.

The policies required by 1 and 2 above shall be endorsed to include the Department, the construction manager, the Adams Group Inc., the Sun Valley Owner's Association, Heron Financial Corporation and Security Pacific National Bank, their agents, officials, employees and the State of Arizona as additional insureds and shall stipulate that the insurance afforded the contractor shall be primary insurance and that any insurance carried by the Department, its agents, officials, employees or the State of Arizona shall be excess and not contributory insurance to that provided by the contractor as provided by A.R.S. 41-621C.

All insurance policies or certificates shall include a requirement providing for 30 days prior written notice to the Department, the construction manager, the Adams Group Inc., the Sun Valley Owner's Association, Heron Financial Corporation and Security Pacific National Bank, of any cancellation or reduction of coverage. The contractor shall cease operations on the occurrence of any such cancellation or reduction and shall not resume operations until the required insurance is in force and new certificates of insurance have been filed with the Department.

The certificate(s) of insurance shall be issued to the Department by the contractor's insurer as evidence that policies providing the required coverages, conditions and limits are in full force and effect. Certificates of insurance should be addressed as follows:

Arizona Department of Transportation
Contracts and Specifications Services
1651 West Jackson Street, Room 121F
Phoenix, Arizona 85007

Failure on the part of the contractor to produce or maintain required insurance shall constitute a material breach of contract upon which the Department may immediately terminate the contract or, at its discretion, produce or renew such insurance and pay any and all premiums in connection therewith, and all monies so paid by the Department shall be repaid by the contractor to the Department upon demand, or the Department may offset the cost of the premiums against any monies due to the contractor from the State.

Costs for coverage maintained by the contractor in excess of those required shall not be charged to the Department without prior approval of the Department.

The Department reserves the right to request and receive certified copies of any or all of the above policies and/or endorsements.

The contractor and its insurers providing the required coverages shall waive all rights of recovery against the Department, the construction manager, the Adams Group Inc., the Sun Valley Owner's Association, Heron Financial Corporation and Security Pacific National Bank, and its agents officials and employees.

107.19 Contractor's Responsibility for Utility Property and Services: of the Standard Specifications is modified to add:

The contractor's attention is directed to the requirements of A.R.S. 40-360.21 through .29 requiring all parties excavating in public streets, alleys or utility easements to first secure the location of all underground facilities in the vicinity of the excavation.

At least 48 hours prior to commencing excavation, the contractor shall call Blue Stake Center, between the hours of 7:00 A.M. and 4:30 P.M., Monday through Friday for information relative to the location of buried utilities in the following project locations:

Buckeye	371-2086 & 386-4471
Maricopa County	263-1100
Garcia Water Co. (Dan McKinney)	936-4656

Conflicts are not anticipated with utilities, however it shall be the contractor's responsibility to first secure the exact location of all facilities prior to commencing construction operations.

107.24 Contractor and Subcontractor Records: is hereby added to the Supplemental Specifications:

The contractor, subcontractors and all material suppliers shall keep and maintain all books, papers, records, files, accounts, reports, bid documents with backup data, and all other material relating to the contract and project for five years following completion and acceptance of the work.

All of the above material shall be made available to the Department for auditing, inspection and copying and shall be produced, upon request, at the Department offices located at 206 South 17th Avenue, Room 172A

The contractor shall insert the above requirement in each subcontract, purchase order and lease agreement and shall also include in all subcontracts a clause requiring subcontractors to include the above requirement in any lower-tier subcontract, purchase order or lease agreement.

SPIT108, 6, 10/21/85)

SECTION 108 - PROSECUTION AND PROGRESS:

108.01 Subletting of Contract: of the Standard Specifications is modified to add:

The following items are hereby designated as Specialty Items:

4040101,	4040111,	4040116,	4040131,	4040136
6012929,	6060054,	6060080,	6070002,	6070022
6070041,	6070042,	6070046,	6070047,	6080001
6080011,	6080021,	6080031,	7040001,	7040002
7050023,	7050024,	7050026,	7060015,	7060018
7310071,	7310261,	7310521,	7310531,	7310551
7320040,	7320050,	7320130,	7320150,	7320400
7320420,	7320500,	7320520,	7320530,	7320570
7360020,	7360221			

(FORCE109, 6, 02/20/87)

SECTION 109 - MEASUREMENT AND PAYMENT:

109.04 (B)(1)Labor: of the Standard Specifications is modified to add:

(e) A percentage of the actual amount of wages, determined by the Department to be necessary to cover the contractor's costs incurred for Public Liability and Property Damage Insurance and Umbrella coverage insurance.

109.04 (B)(3)Equipment: of the Standard Specifications is revised to read:

Equipment which the Engineer considers necessary for the performance of work will be eligible for payment at the established rates only during the hours that it is operated except as otherwise allowed elsewhere in these specifications. Equipment hours will be recorded to the nearest one-half hour. The equipment rental rates established herein include allowance for overhead and profit except where otherwise specified. For the use of equipment approved by the Engineer, the contractor will be paid the rental rates, as modified herein, set forth in the Rental Rate Blue Book for Construction Equipment which is published by the Equipment Guide-Book Company, a division of Nielson-Dataquest, 1290 Ridder Park Drive, San Jose, California 95131, Phone (800) 227-8444. All rate determinations will be based on the Blue Book rental rate chapter revisions that are applicable at the time the equipment is being used.

a) Rental Rates (Without Operators):

The rental rate for each item of equipment will be the sum of the base machine rate, attachment rate and operating rate(s). All rates will be rounded to the nearest five cents.

The base rate for the machine and attachments represents the major cost of equipment ownership, such as depreciation, interest, taxes, insurance, storage and major repairs.

The hourly operating rate represents the major costs of equipment operation, such as fuel and oil, lubrication, field repairs, tires, expendable parts and supplies.

For all equipment utilized on Force Account Work, the hourly rate for each piece of equipment and attachments will be paid at the Blue Book monthly rate for the make and model multiplied by the appropriate rate adjustment factor, divided by one hundred and seventy-six, plus the hourly operating costs. Rate adjustment factors will be furnished in the special provisions.

The rate adjustment factor assigned to any attachment will be the yearly factor as determined for the base equipment.

The contractor will furnish to the Engineer, serial numbers and year of manufacture for all pieces of equipment used on force account work.

When multiple attachments are included with the rental equipment, only the attachment having the higher rental rate will be eligible for payment, provided the attachment has been approved by the Engineer as being necessary to the force account work.

The Blue Book regional adjustment factors will not apply in determining the rental rates.

Rental charges will not be allowed for small tools that show a daily rate less than five dollars or for unlisted equipment that has a value of less than four hundred dollars.

The above provisions apply to approved equipment of modern design and in good working condition. The equipment shall be handled and used to provide normal output or production. Equipment that is not in good working condition or is not of proper size for efficient performance of the work may be rejected by the Engineer. Equipment ordered for force account work will be paid for until such time as the Engineer directs that the use of such equipment be discontinued or until completion of the work.

For any equipment not listed in the Blue Book, rental rates shall be agreed to in writing prior to the use of such equipment on force account work or paid for by invoices in the case of outside rented equipment.

b) Stand-By Time:

Equipment that is in operational condition and is standing by with the Engineer's approval for participation in force account work will be paid for at fifty percent of the appropriate hourly rate as determined by the provisions set forth in Subsection 109.04 (B) (3) (a) less operating costs. Payment for such "stand-by" will be limited to not more than eight hours in a twenty-four hour day or forty hours in a normal work week.

No compensation will be allowed for equipment that is inoperable due to breakdown.

No payment will be allowed for equipment that is not operating because the work has been suspended in accordance with the specifications or because the work has been suspended by the contractor for his own reasons.

c) Outside Rented Equipment:

In cases where a piece of equipment to be used is rented or leased by the contractor from a third party exclusively for force account work, the actual invoiced amount will be paid when such rates are reasonably in line with established rental rates for the equipment in

question and approved by the Engineer. A ten percent markup will be allowed for overhead and profit for all rented equipment paid for by invoices. To this amount, the hourly operating cost will be added.

In no case will equipment be considered for rental which exceeds the hourly rate for the first eight hours and the daily rate divided by eight for all additional hours as compared with similar equipment listed in the Blue Book.

d) Owner-Operated Equipment:

Payment for rental of equipment owned and operated by persons other than the prime contractor's or subcontractor's will be based on the actual paid invoice. An amount equal to ten percent of the total rental of the equipment, including the owner-operator, will be added for overhead, profit and all other costs incidental to furnishing and operating the equipment. The Engineer shall approve the rental rates prior to commencement of the work.

e) Moving of Equipment:

Rental time will also be allowed for the time required to move needed equipment to the location of the force account work and to return it to its original location. Loading and transportation costs will be allowed in lieu of moving times when equipment is moved by means other than its own power. Moving time back to the original location or loading and transportation costs will not be allowed if the equipment is used at the site of the force account work on contract items or related work.

For use of equipment moved on the work exclusively for force account work, the actual cost of transferring the equipment to the site of the work and returning it to the original location will be allowed as specified herein as an additional item of expense.

The original location of the equipment to be hauled to the site of the work shall be agreed to by the Engineer in advance.

Where the move of the equipment is made by common carrier, the allowance will be the invoiced amount paid for the freight plus fifteen percent. If the contractor hauls the equipment with his own forces, rental will be allowed for the hauling unit plus the driver's wages and the cost of loading and unloading the equipment.

The maximum rental period for the day that the equipment is moved on the work and the day that the use of the equipment is discontinued shall be the actual time that the equipment is in operation on force account work. When the contract includes line items of force account work, no payment will be allowed for loading, unloading and transportation costs of such equipment since the contractor is deemed to know what the work consists of and the type of equipment that is required to adequately perform the work.

RATE ADJUSTMENT FACTOR TABLE

Year of Manufacture	Factor
1986 and later	.907
1985	.903
1984	.896
1983	.892
1982	.885
1981	.865
1980	.835
1979	.816
1978	.787
1977 or earlier	.770

109.10 Lump Sum Payment for Structures: of the Supplemental Specifications is modified to add:

The Department will compensate the contractor for construction of each of the following structures or groups of structures on the basis of a lump sum amount:

(A) Palo Verde Road Underpass
(B) 2-10' x 10' C.B.C. Palo Verde Station 9+00

Measurement and payment for the work will be made in accordance with the requirements of LUMP SUM PAYMENT FOR STRUCTURES under SECTION 109 - MEASUREMENT AND PAYMENT.

SECTION 202 - REMOVAL OF STRUCTURES AND OBSTRUCTIONS:

202-3.01 General: of the Standard Specifications is modified to add:

The existing pull boxes and PVC pipe located at Station 15+64 and designated for removal are located within the top of the M.C.F.C.D. Flood Retarding Structure embankment. Holes, cavities, trenches and depressions resulting from the removal of said pull boxes and PVC pipe shall be backfilled with materials with a minimum of 15% fines and compacted in six-inch lifts to a density of not less than 95% of the maximum density with moisture within ±2% of optimum. Maximum rock size allowable is six inches. Dry density determination shall be made in accordance with ASTM Designation D-698, method A. → INSPECTION BY SCS?

202-3.03B Bituminous Pavement: of the Standard and Supplemental Specifications is modified to add:

Upon removal, the existing asphaltic concrete material may become the property of the contractor with the stipulation that it shall be salvaged for future use as recycled asphaltic concrete.

If the contractor does not elect to retain the material, it shall be hauled to the Arizona Department of Transportation disposal site located at 35th Avenue and the Salt River, Phoenix. The material shall be placed in the area designated for stockpiling asphaltic concrete as specified and directed by the Engineer. The contractor shall provide at the disposal site equipment capable of handling and placing the salvaged material in stockpiles as directed by and to the satisfaction of the Engineer.

202-3.08 Removal of Fence: of the Supplemental Specifications is modified to add:

The existing gates designated on the project plans to be removed shall be carefully salvaged and stockpiled for reuse at the locations shown in the plans.

202-3.09 Removal of Guardrail: of the Supplemental Specifications is modified to add:

The existing guardrail designated on the project plans to be removed and salvaged shall be delivered and stockpiled by the contractor to the ADOT Tonopah Maintenance Yard.

202-3.10 Removal of Cattle Guard: is hereby added to the Supplemental Specifications:

The existing cattle guards designated for removal on the project plans shall be removed in accordance with the applicable provisions of Section 202 of the Standard and Supplemental Specifications.

The existing grills shall be carefully removed and salvaged by the contractor, and delivered and stockpiled by the contractor to the ADOT Tonopah Maintenance Yard.

202-5 Basis of Payment: of the Standard Specifications is modified to add:

No direct payment will be made for the salvaging, delivering and stockpiling of those items designated for stockpile at the ADOT Tonopah Maintenance Yard, said work being considered incidental to and included in the cost of those items for which direct payment is made.

No direct payment will be made for the hauling and stockpiling of any salvaged asphaltic concrete material, said work being considered incidental to and included in the cost of ITEM 2020029 REMOVAL OF ASPHALTIC CONCRETE PAVEMENT.

(SBKFL203, 6, 02/02/87)

SECTION 203 - EARTHWORK:

203-2 General: of the Supplemental Specifications is modified to add:

The contractor must submit in writing plans for dewatering and for removal of surface water, to the Arizona Department of Water Resources for review and approval. The plans must be submitted at least three (3) working days prior to the start of dewatering or removal of surface water at the site.

No foundations or abutments shall be covered by the material of the dam until the Arizona Department of Water Resources and the Soil Conservation Service has been given an opportunity to inspect and approve the same. This condition will apply to all excavations in the areas at the dam proper and/or in the vicinity of the up and downstream toes of the dam.

203-5.01 Description: the second paragraph of the Supplemental Specifications is revised to read:

Structure backfill shall consist of furnishing, placing and compacting backfill material around structures to the lines designated on the plans, specified in the special provisions, directed by the Engineer and as specified herein.

203-5.03(B)(2) Use of Slurry: of the Supplemental Specifications is revised to read:

As an alternate to the material requirements of Structure Backfill, the Engineer may allow material conforming to the following requirements to be used in a slurry mixture in situations where the slurry will be confined by free-draining soils:

Sieve Size	Percent Passing
1 1/2 inch	100
1 inch	90-100
No. 8	35-80
No. 200	0-8

The plasticity index shall not exceed 8 when tested in accordance with the requirements of AASHTO T 90.

203-9.03 Construction Requirements: of the Supplemental Specifications is revised to read:

Borrow material shall be placed in accordance with the requirements of Subsection 203-10 except that the top three inches (3") of subgrade shall be free of cobbles.

203-10.03 Embankment Construction Requirements:

(A) Placement: paragraph six of the Supplemental Specifications is revised to read:

Embankment material containing broken concrete, rock or other solid materials which are larger than three inches in greatest dimension shall be placed at a depth of not less than three feet below the finished subgrade elevation and slope lines and not within three feet horizontally of any piling or structures.

Placement: of the Supplemental Specifications is modified to add:

Embankment material containing broken concrete, rock or other solid materials which are larger than six inches in greatest dimension shall be placed at a depth of not less than five feet below the finished subgrade elevation and slope lines and not within five feet horizontally of any piling or structures.

Concrete with any dimension greater than two feet shall be removed and wasted or reduced to a maximum of 24 inches before placing in embankment.

ITEM 2030515 - SPECIAL FOUNDATION BACKFILL (CEMENT TREATED)

Description:

This work shall consist of furnishing materials and the construction of soil-cement backfill at the locations and in accordance with the details shown on the project plans and the requirements of these special provisions, including excavating, dewatering and backfilling to the lines and grades shown on the project plans or established by the Engineer; furnishing and mixing aggregate, cement and water; spreading and compacting the mixture and trimming the soil-cement to a smooth surface.

The soil-cement backfill shall attain a minimum compressive strength of 300 pounds per square inch at seven days when tested in accordance with the requirements of Arizona Test Method 241.

Materials:

Aggregate shall conform to the following requirements when tested in accordance with the requirements of Arizona Test Method 201.

Sieve Size	Percent Passing
1-1/2 inch	98-100
No. 4	60-90
No. 200	5-15

Plasticity index shall be between 0 and 3 when tested in accordance with the requirements of AASHTO T 90.

Clay lumps larger than one (1) inch shall be screened out of the raw soil prior to mixing.

Hydraulic Cement, Flyash and Water:

Hydraulic Cement, Flyash and Water shall conform to the requirements of Subsection 1006-2.

Bituminous Material for Curing Seal:

Bituminous material for curing seal shall be liquid asphalt, Grade MC-250 or MC-800, conforming to the requirements of Section 1005-5.

Mix Design:

The contractor shall determine the mix proportions of the soil aggregate, flyash, cement and moisture, and shall furnish soil cement conforming to the requirements specified herein. The job-mix design with the supporting test results shall be submitted to the Engineer for approval, prior to incorporating any of the material into the work. The "base" amount of cement shall be determined by laboratory testing by the contractor and shall continue to be monitored throughout the duration of the project with modification as required to meet existing field conditions.

The percent of cement to be used in the mix shall be calculated to be the weight of cement divided by the total weight of the dry compacted soil-cement.

Included in the job-mix design data shall be the grade of cement, brand of flyash, and the source of aggregate. A new mix design shall be submitted for approval any time the contractor requests a change in materials, or proportioning of the materials, from that given in the approved mix designs.

Preparation:

Before soil-cement placement begins, the area to be protected shall be graded and shaped to lines and grades as shown on the project plans or as directed by the Engineer. The subgrade shall be compacted to a minimum of 95 percent of the maximum density, as determined by Arizona Test Methods 225 and 226. Immediately prior to placement of the soil-cement mixture, the subgrade shall be moistened if necessary. Soft or yielding subgrade shall be corrected and made stable before construction proceeds.

Mixing:

General Requirements:

Aggregate, flyash and cement for soil-cement backfill shall be proportioned and mixed in a central mixing plant, unless otherwise permitted by the Engineer. The plant shall be either of the batch-mixing type using revolving blade, rotary drum mixers, or of the continuous mixing type, at the option of the contractor. The aggregate, flyash and cement may be proportioned either by weight or by volume.

Flyash may be used at the option of the contractor. A maximum of fifteen (15) percent of the total weight of cement may be replaced with flyash, in accordance with the requirements specified in Section 1006 of the Standard Specifications.

The water shall be proportioned by weight or volume and there shall be means by which the Engineer may readily verify the amount of water required per batch or the rate of water flow required for continuous mixing. The time of the addition of water or the points at which it is introduced into the mixer shall be as approved by the Engineer.

The moisture content of the completed mixture shall be uniform and within two percentage points of the optimum at the point of delivery to the work. The optimum moisture content will be determined in accordance with the requirements of Arizona Test Methods 221 and 222. The flyash and cement shall be added in such a manner that it is uniformly distributed throughout the aggregate during the mixing operation. There shall be safe, convenient facilities for sampling the cement and flyash in the supply line to the weight hopper or pugmill. The charge in the batch mixer or the rate of feed to the continuous mixer shall not exceed that which will permit complete mixing of all of the mix material.

Batch Mixing:

The mixer shall be equipped with a sufficient number of paddles of a type and arrangement to produce a uniformly mixed batch. The mixer shall be equipped with a timing device which will indicate, by a definite audible or visual signal, the expiration of the mixing period. The device shall be accurate to within two seconds.

The time of mixing a batch shall begin after all ingredients are in the mixer and shall end when the mixer is half emptied. Mixing shall continue until a homogeneous mixture of unchanging appearance is produced. The time of the mixing shall not be less than 30 seconds.

The batch-mixing plant shall provide sampling facilities which are satisfactory to the Engineer and which will allow representative samples of the soil-cement mixture to be obtained easily and safely.

Continuous Mixing:

Aggregate shall be drawn from the storage facility by a feeder or feeders which will continuously supply the correct amount of aggregate in proportion to the cement.

A control system shall be provided that will automatically close down the plant when the material in any storage facility approaches the strike-off capacity of the feed gate. The plant will not be permitted to operate unless this automatic control system is in good working condition.

The feeder for the aggregate shall be mechanically or electrically driven.

Continuous mix plants shall provide sampling facilities which are satisfactory to the Engineer, and which will allow representative samples of the aggregate and the soil-cement mixture to be obtained easily and safely.

The cement feeder and the aggregate feeders shall be equipped with devices by which the rate of feed can be accurately determined while the plant is in full operation.

Spreading:

Mixed materials shall be transported from the plant to the construction site in approved vehicles and spread on the moistened subgrade or previously completed soil-cement with spreading equipment that will produce layers of such widths and thicknesses as are necessary for compaction to the required dimensions of the completed soil-cement layers. Spreading shall be accomplished by the use of approved spreader boxes or finishing machines. The compacted layers of soil-cement shall not exceed eight (8) inches in thickness, nor be less than four (4) inches in thickness. Each successive layer shall be placed as soon as practicable after the preceding layer is completed, and certified.

All soil-cement surfaces that will be in contact with succeeding layers of soil-cement shall be kept continuously moist by fog spraying until

placement of the subsequent layer, provided that the contractor will not be required to keep such surfaces continuously moist for a period longer than seven (7) days. Mixing and placing shall not proceed when the soil-aggregate or the area on which the soil-cement is to be placed is frozen. Soil-cement shall not be mixed or placed when the air temperature is below forty (40) degrees F., unless the air temperature is at least forty (40) degrees F. and rising, or when the temperature is expected to drop below 40 degrees F. in the next 24 hours.

Compaction:

Soil-cement shall be uniformly compacted to a minimum of 100 percent of its maximum dry density as monitored by field density tests for a standard proctor compactive effort. Wheel rolling with only hauling equipment will not be an acceptable method of compaction.

At the start of compaction, the mixture shall be in a uniform, loose condition throughout its full depth. Its moisture content shall be as previously specified herein. No section shall be left undisturbed for longer than thirty (30) minutes during compaction operations. Compaction of each layer shall be accomplished in such a manner as to produce a dense surface free of compaction planes and shall be completed within one (1) hour from the time water is added to the mixture. Whenever the contractor's operation is interrupted for more than two (2) hours, the top surface of the completed layer, if smooth, shall be scarified to a depth of at least one (1) inch with a spike-tooth instrument prior to placement of the next lift. The surface, after scarifying, shall be swept using a power broom or other method approved by the Engineer, to completely free the surface of all loose material prior to actual placement of the soil-cement mixture for the next lift.

Finishing:

After compaction, the soil-cement shall be further shaped, if necessary, to the required lines, grades, and cross-sections and rolled to a reasonably smooth surface.

Curing:

Temporarily exposed surfaces shall be kept moist as previously set forth. Care must be exercised to ensure that no curing material other than water is applied to the surface that will be in contact with succeeding layers.

When necessary, the soil-cement shall be protected from freezing for seven (7) days after its construction by a covering of loose earth, straw, or other suitable material approved by the Engineer.

Maintenance:

The contractor shall be required, within the limits of his contracts, to maintain the soil-cement and curing seal in good condition until all work is completed and accepted. Maintenance shall include immediate repairs of any defects that may occur. This work shall be done by the contractor at his own expense and repeated as often as necessary. Faulty work shall be replaced for the full depth of the layer.

Method of Measurement:

The work will be measured by the cubic yard of completed soil-cement backfill as constructed to the lines and grades shown on the project plans.

Basis of Payment:

The accepted quantities of soil-cement backfill will be paid for at the contract unit price per cubic yard of Special Foundation Backfill (Cement Treated) under ITEM 2030515.

Such payment shall constitute full reimbursement for all work necessary to construct the soil-cement backfill including excavating, dewatering and backfilling to the lines and grades shown on the plans or established by the Engineer; furnishing and mixing aggregate, cement and water; spreading and compacting the mixture; trimming the soil-cement to a smooth surface; and furnishing and applying curing seal as specified herein.

No payment will be made for any soil-cement wasted by the contractor during handling, mixing and placing operations.

(BITR404, 6, 06/20/86)

SECTION 404 - BITUMINOUS TREATMENTS:

404-3.02(A) Distributor Truck: of the Standard Specifications is modified to add:

Equipment which fails to provide a satisfactory application of bituminous material shall be removed from the project.

404-3.05 Application of Bituminous Material: the third paragraph of the Standard Specifications is modified to add:

The variation from the specified rate of application shall not exceed ten percent.

404-3.11 Prime Coat: of the Standard Specifications is modified to add:

The type of bituminous material shall be MC-250 and shall be applied at the approximate rate of 0.5 gallon per square yard.

404-3.12 Tack Coat: of the Supplemental Specifications is revised to read:

The type, grade or designation, and the rate of application for the specific usage will be specified by the Engineer. The following table shows the various types of material and the approximate application rates from which the Engineer may select the tack coat:

Type, Grade or Designation	Approximate Application Rates, Gal. per Sq.Yd. Prior to Placing ACFC	All Other Tack Coats	Payment Factor
Emulsified Asphalt (Special Type)		0.12	0.6
Emulsified Asphalt (Other than Spec. Type)		0.08	1.0
Asphalt Cement (Grade Spec. by Engr.)	0.06 to 0.08	0.06	1.2

404-4 Method of Measurement: the sixth paragraph of the Supplemental Specifications is revised to read:

The time which is required to apply tack coat will be measured to the nearest hour for the actual number of hours required in any one work shift; however, when the time required is less than four hours in any workday, the time will be measured as four hours.

404-4 Method of Measurement: the eighth paragraph of the Supplemental Specifications is revised to read:

The time which is required to apply provisional seal coat will be measured to the nearest hour for the actual number of hours required in any one work shift; however, when the time required is less than four hours in any workday, the time will be measured as four hours.

(ACF407, 6, 10/21/85)

SECTION 407 - ASPHALTIC CONCRETE FRICTION COURSE:

407-3.03 Bituminous Material: of the Standard Specifications is modified to add:

The type of bituminous material shall be AC-20. Approximately 5.5 percent will be required; however, the exact amount will be specified by the Engineer.

ACEX416, 6, 03/26/87)

SECTION 416 - ASPHALTIC CONCRETE - END PRODUCT:

416-1 Description:

The work under this section shall consist of furnishing all materials, mixing at a plant, hauling and placing a mixture of aggregate materials, mineral admixture if required, and an asphalt cement to form a pavement course or to be used for other specified purposes, in accordance with the details shown on the project plans and the requirements of these specifications.

It is the intent of this specification that the contractor acquire and make all arrangements for a source or sources of material; that he furnish Certificates of Compliance as hereinafter specified; that he furnish a mix design which will meet the design criteria specified hereinafter; and that he provide all the equipment, materials, and labor necessary to furnish and place the asphaltic concrete in accordance with the requirements specified herein.

The contractor is advised that the Department will not take samples for quality control and will in no manner assist in any degree or in any aspect of the contractor's operation in the production of asphaltic concrete, beginning from the production of aggregate through the compaction of the asphaltic concrete.

Because of the very limited degree of participation by the Department, it is understood that the contractor will provide personnel capable of producing, placing, and compacting of aggregates and asphaltic concrete, and for all areas of quality control so that the acceptance of all materials, as hereinafter specified, will be free of penalties.

416-2 Asphaltic Concrete Mix Design Criteria:

Mix designs shall be developed by the contractor on the basis of the following criteria and tested in accordance with the requirements of the following test methods:

	Criteria	Requirements 1/2" Mix	Requirements 3/4" Mix	Arizona Test Method
1.	Voids in Mineral, Aggregate, Percent, Range	15.5-18.5	15.5-18.5	815
2.	Effective Voids, Percent, Range	6.0±1.0	6.0±1.0	815
3.	Absorbed Asphalt, Percent, Range	0-1.0	0-1.0	815
4.	Index of Retained Strength, Percent, Min.	50	50	802
5.	Wet Strength, psi, Minimum	150	150	802
6.	Stability, Pounds, Min.	2000	2000	815
7.	Flow, 0.01 Inch, Range	8-16	8-16	815
8.	Mineral Aggregate Grading Limits	Percent	Passing	201

Sieve Size	No. Admix.	Incl. Admix.	No Admix.	Incl. Admix.
1 inch	---	---	100	100
3/4 inch	100	100	90-100	90-100
1/2 inch	90-100	90-100	---	---
3/8 inch	70-85	70-85	70-85	70-85
No. 8	43-51	44-52	40-51	41-52
No. 40	12-22	13-23	12-20	13-21
No. 200	2.0-6.0	3.0-7.5	2.0-5.0	3.0-0.5

416-3 Materials:

.01 Mineral Aggregate:

The contractor shall provide a source of material in conformance with the requirements of Section 1001 of the Standard Specifications and any modifications thereto as set forth elsewhere in these special provisions. Sub-paragraph (3) regarding sampling and testing under Subsection 1001-4 is hereby deleted.

Coarse mineral aggregate shall consist of crushed gravel, crushed rock, or other approved inert material with similar characteristics, or a combination thereof, conforming to the requirements of these specifications.

Fine mineral aggregate shall consist of natural sand or of sand prepared from rock, or other approved inert materials, or a combination thereof, conforming to the requirements of these specifications.

Aggregates shall be free of deleterious materials, clay balls, and adhering films or other material that prevent the thorough coating with the asphalt cement.

Mineral aggregate shall conform to the following requirements when tested in accordance with the applicable test methods.

MINERAL AGGREGATE CHARACTERISTICS

Characteristic	Test Method	Requirement
Combined Bulk Specific Gravity	AASHTO T 85, Arizona Test Method 211	2.35-2.85
Combined Water Absorption	AASHTO T 85, Arizona Test Method 211	0-2.50
Sand Equivalent	AASHTO T 176	Minimum 45
Crushed Faces	Arizona Test Method 212	Minimum 30%
Abrasion	AASHTO T 96	100 Rev., Max 9% 500 Rev., Max 40%

Tests on aggregates outlined above shall be performed on materials furnished for mix design purposes and composited to the mix design gradation.

Mineral aggregate from a source or combination of sources which does not meet the requirements, according to the contractor's mix design proposal, for combined bulk specific gravity and/or combined water absorption but meet the other requirements above will be further considered for acceptance by the Engineer if: a) the total estimated cost of all asphaltic concrete components, using the mix design unit weight, asphalt cement content and mineral admixture percentage, does not exceed the total amount bid for

these items by more than 5.0 percent; or b) a supplemental agreement is executed adjusting the unit prices of asphaltic concrete components such that the total estimated cost does not exceed the total amount bid by more than 5.0 percent.

For comparative purposes, quantities shown in the bidding schedule have been calculated based on the following data:

	3/4" Mix	1/2" Mix
Unit Weight, Pounds per Cubic Foot	147	147
Percent, Asphalt Cement	5.0	5.0
Percent, Mineral Admixture	2.0	2.0

.02 Mineral Admixture:

When the mix design includes a mineral admixture, the amount used shall be 1.0 to 2.0 percent, by weight, of the mineral aggregate, with the exact amount to be specified in the mix design. Mineral admixture shall be either portland cement, blended hydraulic cement or lime conforming to the following requirements:

Material	Requirement
Portland Cement, Type I or II	ASTM C 150
Blended Hydraulic Cement, Type IP	ASTM C 595
Lime, Type N or S	ASTM C 207

.03 Bituminous Material:

Bituminous material shall be asphalt cement conforming to the requirements of Section 1005 of the Standard Specifications. The grade to be used shall be AC-40.

.04 Certification and Testing:

A Certificate of Compliance conforming to the requirements of Subsection 106.05 of the Standard Specifications shall be furnished before asphaltic concrete production commences for all material characteristics listed hereinbefore where a test requirement is specified. Tests on aggregates shall be performed on materials furnished for mix design purposes and composited to the mix design gradation and shall be representative of materials used in subsequent production.

416-4 Mix Design:

Utilizing mineral aggregate which has been crushed, processed, separated and stockpiled, a mix design shall be formulated and submitted by the contractor to the Engineer.

The mix design shall be based on the mix design criteria and other requirements hereinbefore specified, utilizing asphalt cement and mineral admixture of the type and from the sources proposed for use in the production of asphaltic concrete.

The mix design shall be prepared under the direct supervision of a professional engineer experienced in the development of mix designs and mix design testing.

The mix design shall contain as a minimum:

(1) The name and address of the testing organization and the person responsible for the mix design testing.

(2) The specific location(s) of the source(s) of mineral aggregate.

(3) The supplier, refinery, and type of asphalt cement, and the source and type of mineral admixture, and the percentage of each to be used.

(4) The anticipated mineral aggregate gradation in each stockpile.

(5) Mix design gradation.

(6) The results of all testing, determinations, etc., such as: specific gravity of each component, water absorption, sand equivalent, loss on abrasion, crushed faces, immersion compression results (Index of Retained Strength, wet and dry strengths), Marshall stability and flow, asphalt absorption, percent air voids, voids in mineral aggregate, and bulk density. Historical abrasion values may be supplied on existing sources.

The mix design shall be submitted on a laboratory bituminous mixture design form in ADOT format and signed by a person authorized by the contractor to act in such matters on his behalf.

The Engineer will review the mix design to assure that it contains all required information. If it does not, it will be returned within one working day for further action and resubmission by the contractor.

If the contractor elects to change his source of material, the contractor shall furnish the Engineer with a new mix design which meets the requirements specified hereinbefore.

Should a mix design prove unsatisfactory to the contractor during production, the contractor shall furnish the Engineer with a revised mix design. The revision shall be supported with all the necessary laboratory data used to modify the mix design. For acceptance purposes, the revised mix design will not be retroactive.

Samples of the mineral aggregate used for the mix design shall be submitted to the Engineer for determination of a coating index and sand equivalent. The coating index will be determined in accordance with the requirements of Tentative Arizona Test Method 239 and the sand equivalent will be determined in accordance with the requirements of AASHTO T-176.

416-5 Contractor Quality Control:

(A) MINERAL AGGREGATES:

During production of mineral aggregate for use in asphaltic concrete, production quality control of these aggregates shall be performed by the contractor or supplier. Such quality control shall consist of a systematic program of sampling, testing, and adjustments to production and/or reprocessing as necessary. Quality control shall also consist of sampling and testing of combined cold-feed or hot bins and adjusting as indicated. Records shall be maintained of all test results and of any adjustments or reprocessing accomplished.

At the preconstruction conference, the contractor shall submit to the Engineer a Quality Control Plan. Such Plan shall outline the tests to be performed, test methods to be utilized, sampling and testing frequency, and the parameters to be utilized in assessing potential acceptability of materials or the need for adjustments or reprocessing. Effects of segregation, degradation, etc., anticipated during future operations shall be considered in setting parameters.

Test methods, where applicable, shall conform to the test methods utilized in acceptance testing. Test equipment shall conform to the requirements of the appropriate test methods. Testing personnel must be trained in the operations of the test methods to be performed and shall work under the direct supervision of a technician with a minimum of two years experience in supervising testing of the nature to be performed.

The Department will not take samples or perform any testing to assist in the Quality Control Plan; however, the Department reserves the right to sample and test material at any point in the operations for informational purposes.

(B) ASPHALT CONTENT:

Prior to commencing production of asphaltic concrete, the contractor or supplier shall calibrate the asphalt delivery system with the aggregate delivery or batching system. Systematic checks, and adjustments, when necessary, of asphalt content from produced asphaltic concrete through sampling and testing shall be routinely accomplished. Records shall be maintained of all tests and adjustments.

(C) COMPACTION:

Except when the method for compaction of asphaltic concrete is designated by the Engineer, the contractor shall monitor his compaction compliance through testing of density and comparison to laboratory compacted specimens. Records of density testing, comparisons and necessary adjustments to compaction operations shall be maintained.

This requirement shall in no way relieve the contractor of the responsibility to provide an acceptable product as set forth elsewhere in the specifications.

416-6 Construction Requirements:

The contractor shall be responsible for the proportioning of all materials, for the hauling, placing, loading, spreading and finishing of asphaltic concrete and for the applying of bituminous material, such as tack coats, prime coats and provisional seals, all in accordance with the appropriate portions of the Standard Specifications. Documentation of the aforementioned items shall be in conformity to the requirements of the Arizona Department of Transportation Construction Manual, except that weigh sheets shall also conform to the requirements of Subsection 106.05(B) of the Standard Specifications.

Mixing plants shall conform to the requirements of AASHTO M 156 except as modified herein.

The temperature of asphaltic concrete upon discharge from the mixer shall not exceed 325 degrees F. A recording pyrometer or other approved thermometric instrument sensitive to a rate of temperature change not less than ten degrees F. per minute shall be placed at the discharge chute of the drier so as to automatically record the temperature of the asphaltic concrete or mineral aggregate. A copy of the recording shall be delivered to the Engineer at the end of each shift of production.

If a mineral admixture is necessary to produce asphaltic concrete that meets the design criteria, the mineral admixture shall be thoroughly mixed either with the mineral aggregate or with the asphalt cement prior to combining the mineral aggregate and asphalt cement.

If the mineral admixture is mixed with the mineral aggregate, it may be necessary to apply a light spray of water to control the loss of the mineral admixture. If a drum mix plant is used, the mineral admixture shall be added and thoroughly mixed by means of a mechanical mixing device prior to the mixture entering the drum drier. If a batch plant is used, the mineral admixture shall be added and thoroughly mixed in the pugmill prior to adding asphalt cement.

If the mineral admixture is mixed with the asphalt cement, it shall be added and thoroughly mixed by means of an approved mixing device that produces a homogeneous mixture prior to the mixture being combined with the mineral aggregate.

Regardless of where the mineral admixture is added, the contractor shall furnish documentation on forms provided by the Engineer on a daily basis to the Engineer that the required amount has been incorporated into the mixture.

If a mineral admixture is used, a positive signal system and a limit switch device shall be installed in the plant at the point of introduction of the admixture. The positive signal system shall be placed between the metering device and the drum dryer, and utilized during production whereby the mixing shall automatically be stopped if the admixture is not being introduced into the mixture.

All courses of asphaltic concrete shall be placed and finished by means of self-propelled paving machines except under certain conditions or at certain locations where the Engineer deems the use of self-propelled paving machines impracticable.

Pavers shall be equipped with an activated screed for the full width being paved, heated if necessary, and capable of spreading and finishing all courses of asphaltic concrete.

Pavers shall be equipped with automatic screed controls with sensors for either or both sides of the paver, capable of sensing grade from an outside reference line, sensing the transverse slope of the screed, and providing the automatic signals which operate the screed to maintain the desired grade and transverse slope.

Failure of the control system to function properly shall be cause for the suspension of the placing of asphaltic concrete.

The base or subgrade upon which asphaltic concrete is to be placed shall be prepared and maintained in a firm condition until asphaltic concrete is placed. It shall not be frozen or excessively wet.

At any time the Engineer may require the work to cease or that the work day be reduced in the event of weather conditions, either existing or expected, which would have an adverse effect upon the asphaltic concrete.

Before asphaltic concrete is placed, the surface to be paved shall be cleaned of objectionable material.

Longitudinal joints of each course shall be staggered a minimum of one foot with relation to the longitudinal joint of any immediate underlying course.

Longitudinal joints shall be located within one foot of the center of a lane or within one foot of the centerline between two adjacent lanes. Joints shall be formed by a slope shoe or hot-lapped, and shall result in an even, uniform surface.

All outside edges shall be rolled while the mixture is still hot.

All holes where samples and cores are taken shall be repaired by the contractor utilizing hot asphaltic concrete.

416-7 Acceptance:

.01 General:

In addition to the random acceptance samples taken from each lot, the Engineer may sample and reject material which appears to be defective. Such rejected material shall not be used in the work. The results of tests run on rejected material will not be included with the lot acceptance tests.

Acceptance will be on the basis of the following:

Sand Equivalent
Coating of Mineral Aggregate
Material Spread
Grading
Asphalt Cement Content
Effective Voids
Stability
Compaction
Smoothness

.02 Sand Equivalent and Coating of Mineral Aggregate:

At any time during the production of mineral aggregate, the Engineer may request samples of the mineral aggregate for determination of the coating index and sand equivalent. The coating index will be determined by the Engineer in accordance with the requirements of Tentative Arizona Test Method 239 and the sand equivalent will be determined by the Engineer in accordance with the requirements of AASHTO T 176. Mineral aggregate will be accepted when the coating index is equal to or greater than 70 percent of the coating index determined in Subsection 416-4 and the sand equivalent is equal to or greater than 80 percent of the sand equivalent determined in Subsection 416-4. The contractor has the option of submitting a revised mix design conforming to the requirements of Subsection 416-4, if the mineral aggregate fails to meet the requirements hereinbefore specified.

.03 Material Spread:

A spread lot shall be considered to be one-half shift of production. Lots encompassing more than one project shall be separated in accordance with Subsection 416-9(C)(1). Information pertaining to each lot shall be recorded by the contractor on forms provided by the Engineer.

Information recorded shall include the project number, date each spread lot was placed, the spread lot number, beginning and ending station, the plans thickness and tons placed in each lot. The form shall be signed by the contractor and given to the Engineer at the end of each produced lot. The Engineer will calculate the quantity required in the area represented by the lot using the mix design weight per cubic foot. This calculation will be compared to the actual quantity placed.

A lot will be considered to be acceptable, with a zero pay factor, if the actual spread quantity varies by no more than -2.0 to +5.0 percent from the required quantity.

If the quantity in a lot is found to vary between -2.0 percent and -12.0 percent, pay factors will be determined in accordance with Table 416-2. These pay factors will be utilized in the pay adjustment as outlined in Subsection 416-9.

.04 Grading, Asphalt Cement Content, Effective Voids and Stability:

A lot shall be considered to be one shift's production however, production consisting of less than one shift, such as at the beginning or at the completion of production will also be considered to be a lot. If changes are made in the mix design, new lots will be established.

Four samples shall be taken for each lot by the contractor, under the observation of the Engineer, at random locations designated by the Engineer. Samples shall be taken in accordance with the requirements of Section 2 or 3 of Arizona Test Method 104 and delivered to the Engineer not later than two working days after lot placement. The minimum weight of the sample shall be 50 pounds. The Engineer will split the sample and save one-half for 30 days.

The material will be tested for acceptance by the Engineer in accordance with the requirements of Arizona Test Method 416. Voids will be determined in accordance with the requirements of Section 9 of Arizona Test Method 416. Acceptance testing results will be furnished to the contractor within five working days of receipt of samples by the Engineer.

In the event the contractor elects to question the test results obtained for a particular lot, he may make a written request for additional testing of that lot. The samples previously saved will be tested in an independent testing laboratory designated by the Engineer in accordance with the requirements of Arizona Test Method 416. New PT's, the total percentage of lot within UL and LL, for all characteristics will be determined and the results of these determinations will be binding on both the contractor and the Engineer. The contractor will pay for this testing; however, if the pay factors of the lot are improved, the Engineer will reimburse the contractor for these costs.

The Upper Limits (UL) and Lower Limits (LL) of acceptable production of each measured characteristics are as follows:

Measured Characteristic	LL	UL
Gradation		
3/8-inch sieve	TV-9.0	TV+9.0
No. 8 sieve	TV-6.0	TV+6.0
No. 40 sieve	TV-4.0	TV+4.0
No. 200 sieve	TV-2.2	TV+2.2
Asphalt Cement Content	TV-0.60	TV+0.60
Effective Voids	TV-2.3	TV+2.3
Stability	TV-1000	None

Note: The limits are used in the statistical calculations for Quality Index. Acceptance is controlled by the variability of the produced material and every effort should be made to strive for the center of the tolerance range.

The Engineer will determine the PT of each measured characteristic using the procedure defined under "Definitions, Abbreviations and Formulas for Acceptance". The PT value for Gradation shall be the lowest PT value determined from comparison of PT values for all specified sieves. Utilizing Table 416-2, the Engineer will then determine pay factors for Gradation, Asphalt Cement Content, Effective Voids and Stability.

.05 Compaction:

(A) Courses One and One-Half Inches or Less in Nominal Thickness:

(1) General Requirements:

Asphaltic concrete shall be placed only when the temperature of the surface on which the asphaltic concrete is to be placed is at least 65 degrees F. Asphaltic concrete immediately behind the laydown machine shall be a minimum of 250 degrees F.

(2) Equipment:

Compacting and smoothing shall be accomplished by the use of self-propelled equipment. Compactors shall be pneumatic tired and/or steel wheel.

Compactors shall be operated in accordance with the manufacturer's recommendations. Compactors shall be designed and properly maintained so that they are capable of accomplishing the required compaction.

Steel wheel compactors shall weigh not less than eight tons.

Pneumatic tired compactors shall be the oscillating type with at least seven pneumatic tires of equal size and diameter. Wobble-wheel compactors will not be permitted. The tires shall be spaced so that the gaps between adjacent tires will be covered by the following tires. The tires shall be capable of being inflated to 90 pounds per square inch and maintained so that the air pressure will not vary more than five pounds per square inch from the designated pressure. Pneumatic tired compactors shall be constructed so that the total weight of the compactor will be varied to produce an operating weight per tire of not less than 5,000 pounds. Pneumatic tired compactors shall be equipped with skirt-type devices mounted around the tires so that the temperature of the tires will be maintained during the compaction process.

(3) Rolling Method Procedure:

Compaction shall consist of an established sequence of coverage using specified types of compactors. A pass shall be defined as one movement of a compactor in either direction. Coverage shall be the number of passes as are necessary to cover the entire width being paved.

The rolling sequence, the type of compactor to be used and the number of coverages required shall be as follows:

Rolling Sequence	Type of Compactor		No. of Coverages	
	Option No. 1	Option No. 2	Option No. 1	Option No. 2
Initial	Static Steel	Vibrating Steel	1	1
Intermediate	Pneumatic Tired	Vibrating Steel	4	2-4*
Finish	Static Steel	Static Steel	1-3	1-3

*Based on the roller pattern which exhibits the best performance.

The Engineer shall select the option for compaction and, when pneumatic tired compactors are used, will designate the tire pressure.

Steel wheel compactors shall not be used in the vibratory mode for courses of one inch or less in nominal thickness nor when the temperature of the asphaltic concrete falls below 180 degrees F.

All edges shall be rolled by a method approved by the Engineer while the mixture is still hot.

Initial and intermediate compaction shall be accomplished before the temperature of the asphaltic concrete falls below 200 degrees F.

Compaction will be deemed to be acceptable on the condition that the asphaltic concrete is compacted using the type of compactors specified, ballasted and operated as specified, and with the number of coverages of the compactors as specified.

(B) Courses Greater than One and One-Half Inches in Nominal Thickness:

Compaction control shall be the responsibility of the contractor. The number and types of rollers shall be the contractors responsibility and shall be sufficient to meet these requirements.

A lot for compaction purposes shall be identical to the lot described in Subsection 416-7.04. Lots encompassing more than one project shall be separated in accordance with Subsection 416-9(C)(3). Each lot shall be tested for acceptance.

Ten samples shall be taken for each lot by the contractor, under the observation of the Engineer, at random locations designated by the Engineer. Randomly selected locations will be determined to the nearest one-half foot in the transverse direction and to the nearest foot in the longitudinal direction of the pavement course; however, the outside one (1) foot unconfined pavement course will be excluded from testing. When a previously unconfined pavement course is confined by a subsequent pavement course the compacted joint will not be excluded from the testing. Samples shall be taken utilizing mechanical coring equipment in accordance with the requirements of Arizona Test Method 104, Section 3. Cores shall be a minimum of four inches in diameter and shall be taken and delivered to the Engineer not later than two working days after the lot placement. The material will be tested for acceptance by the Engineer

in accordance with the requirements of Arizona Test Method 415. Acceptance testing results will be furnished to the contractor within five working days of receipt of samples by the Engineer.

The target value shall be 98.0 percent of laboratory density. The laboratory density will be the average of the four laboratory densities determined in Subsection 416-7.04.

The Upper Limit (UL) is the Target Value (TV) plus 4.5 pounds per cubic foot and the Lower Limit (LL) is the Target Value (TV) minus 4.5 pounds per cubic foot. The Engineer will determine the PT for compaction using the procedure defined under "Definitions, Abbreviations and Formulas for Acceptance", and, utilizing Table 416-2, will determine the compaction pay factor.

.06 Smoothness:

The final asphaltic concrete surface will be tested by the Engineer. The finished surface shall not vary more than 1/8 inch from the lower edge of a ten foot straightedge when the straightedge is placed longitudinal direction. All deviations exceeding the specified tolerance shall be corrected by the contractor.

416-8 Method of Measurement:

Asphaltic concrete will be measured by the ton for the asphaltic concrete actually used, which will include the weight of mineral aggregate, asphalt cement and mineral admixture. Measurement will include any tonnage used in construction of intersections, turnouts, or other miscellaneous items or surfaces.

Asphalt cement will be measured by the ton on the basis of the asphalt cement content determined in accordance with Subsection 416-7.04 for each lot of asphaltic concrete accepted. The average asphalt cement content will be multiplied by the number of tons of asphaltic concrete in that lot to determine the amount of asphalt cement. If the contractor has requested referee testing, the average asphalt cement content will come from the independent testing laboratory results.

Mineral admixture will be measured by the ton for the mineral admixture actually used in accordance with Subsection 416-6.

416-9 Basis of Payment:

The accepted quantities of asphaltic concrete, measured as provided above, will be paid for at the contract unit price adjusted by the appropriate total pay factor as hereinafter provided.

For the purpose of determining acceptability and appropriate total pay factors, each unit of asphaltic concrete will be included in two separate lots, a "spread lot" and a "quality lot". The total unit price for any unit of accepted asphaltic concrete will be the contract unit price, adjusted by the applicable spread lot pay factor and the applicable quality lot pay factor.

The Engineer may exclude asphaltic concrete utilized in turnouts or miscellaneous items or surfaces from spread lots and/or from selection as locations for random samples utilized in determining quality pay lot factors.

(A) Spread Lot Pay Factor:

The spread lot pay factor will be determined in accordance with Subsection 416-7.03. If the quantity in a spread lot is found to vary by more than +5.0 percent, no payment will be made for the material which exceeds the +5.0 percent, including asphalt cement and mineral admixture. If the quantity is found to vary by more than -12.0 percent, the spread lot will be rejected.

(B) Quality Lot Pay Factor:

The quality lot pay factor shall be determined in accordance with the following procedure:

(1) The PT values and pay factors for Gradation, Asphalt Cement, Content, Effective Voids, Stability, and Compacting when appropriate, will be determined as set forth in Subsections 416-7.04 and 416-7.05(B).

(2) If any individual pay factor determined in (1) above, is negative, all negative pay factors will be totaled. This negative total will then become the quality lot pay factor, with the further stipulation that the maximum negative pay factor shall not exceed $5.00.

(3) If no individual pay factor determined in (1) above, is negative, all pay factors will be totaled and this total will then become the quality lot pay factor, with the further stipulation that any earnings generated by a positive quality lot pay factor shall be limited to that amount required to offset reduced earnings caused by negative pay factors of preceding quality lots. Earnings generated by any positive quality lot pay factor shall not be utilized to offset reduced earnings caused by negative spread lot pay factors or negative quality lot pay factors of subsequent lots.

(C) Determination of lot pay factors on contracts involving multiple projects:

When more than one project is included in a single contract, placement during a shift or half shift of production may encompass more than one project. In such case, the applicable spread lot pay factor and quality lot pay factor for each project shall be determined as follows:

(1) Spread lot pay factors will be determined separately for each project utilizing the procedure set forth in Subsection 416-7.03.

(2) The PT values and pay factors for Gradation, Asphalt Cement Content, Effective Voids, and Stability will be determined from the results from the random samples taken and tested in accordance with Subsection 416-7.04, regardless of which project(s) the samples fall within.

(3) PT values and pay factors for compaction, for those areas subject to Subsection 416-7.05(B), shall be determined separately for each project utilizing the procedure set forth in that Subsection.

(4) Quality lot pay factors for each project shall be determined in accordance with Subsection 416-9(B)(1), (2), and (3), utilizing the individual pay factors determined in (2) and (3), above.

(D) Acceptability:

Asphaltic concrete included in any quality lot possessing a PT value for Gradation, Asphalt Cement Content, Effective Voids, or Stability lower than 40 or a Compaction PT of lower than 20 will be rejected.

Within ten working days after receiving notice that a spread lot or a quality lot of asphaltic concrete has been rejected by the Engineer, the contractor may submit a written proposal to accept the material in place at the maximum negative pay factor adjustment. The proposal shall contain an engineering analysis of the anticipated performance of the asphaltic concrete if left in-place, and it shall detail any proposed corrective action and the anticipated effect of such corrective action on the performance.

Within two working days, the Engineer will determine whether or not to accept the contractor's proposal. If the proposal is not accepted, the asphaltic concrete shall be removed at the contractor's expense and replaced with asphaltic concrete meeting the requirements of these specifications. If the proposal is accepted, the asphaltic concrete shall remain in place at the maximum negative pay factor adjustment, and any necessary corrective action shall be performed at the contractor's expense. The decision of the Engineer will be final. Reduced earnings generated by lot accepted under this provision shall not be eligible to be offset by positive quality lot pay factors of subsequent lots. The decision of the Engineer will be final.

(E) Asphalt Cement:

Payment for asphalt cement will be made by the ton. If it is determined by testing that asphalt cement utilized in asphaltic concrete production fails to meet the requirements of Section 1005 of the Standard Specifications, the asphaltic concrete represented by the half shift or half shifts in which such failing material was utilized, shall be evaluated as to acceptance. When such failure involves a deviation from the allowable asphalt property range, the contract unit price will be adjusted by the percentage shown in Table 404-1 of the Standard Specifications, when allowed to remain in place. When the failure or failures is (are) due to deviations from other requirements, the Engineer will determine if the material can be left in place, and, if so allowed, the appropriate unit price adjustment will be made. Asphaltic concrete not allowed to remain in place will be rejected and removed at the contractor's expense and replaced with asphaltic concrete meeting the requirements of these specifications.

(F) Mineral Admixture:

Payment for mineral admixture will be made by the ton.

DEFINITIONS, ABBREVIATIONS AND FORMULAS FOR ACCEPTANCE

Target Value (TV):

The target values for gradation, asphalt cement content, voids and stability are given in the contractor's mix design.

Average (AVE):

The sum of the lot's test results for a measured characteristic divided by the number of test results; the arithmetic mean. The average will be determined to one decimal place, except for asphalt cement content, which will be determined to two decimal places and for stability, which will be determined to the nearest whole number.

Standard Deviation (s):

The square root of the value formed by summing the squared difference between the individual test results of a measured characteristic and AVE, divided by the number of test results minus one. This statement does not limit the methods of calculations of s; other methods which obtain the same value may be used. The standard deviation will be determined to two decimal places.

Upper Limit (UL):

The value above the TV of each measured characteristic which defines the upper limit of acceptable production.

Lower Limit (LL):

The value below the TV of each measured characteristic which defines the lower limit of acceptable production.

Upper Quality Index (QU):

$$QU = \frac{UL - AVE}{s}$$

The QU will be calculated to three decimal places.

Lower Quality Index (QL):

$$QL = \frac{AVE - LL}{s}$$

The QL will be calculated to three decimal places.

Percentage of Lot Within UL (PU):

Determined by entering Table 416-1 with QU. The PU for stability is equal to 100.

Percentage of Lot Within LL (PL):

Determined by entering Table 416-1 with QL.

Total Percentage of Lot Within UL and LL (PT):

PT = (PU + PL) - 100

Pay Factor(PF):

Determined by entering Table 416-2 with PT.

TABLE 416-1
DETERMINATION OF PU or PL

QU or QL > 0	N= 4	N=10	QU or QL < 0
100.	1.485 or More	2.176 or More	0.
99.	1.455 - 1.484	1.940 - 2.175	1.
98.	1.425 - 1.454	1.798 - 1.939	2.
97.	1.395 - 1.424	1.691 - 1.797	3.
96.	1.365 - 1.394	1.603 - 1.690	4.
95.	1.335 - 1.364	1.526 - 1.602	5.
94.	1.305 - 1.334	1.458 - 1.525	6.
93.	1.275 - 1.304	1.396 - 1.457	7.
92.	1.245 - 1.274	1.339 - 1.395	8.
91.	1.215 - 1.244	1.286 - 1.338	9.
90.	1.185 - 1.214	1.236 - 1.285	10.
89.	1.155 - 1.184	1.188 - 1.235	11.
88.	1.125 - 1.154	1.143 - 1.187	12.
87.	1.095 - 1.124	1.100 - 1.142	13.
86.	1.065 - 1.094	1.058 - 1.099	14.
85.	1.035 - 1.064	1.018 - 1.057	15.
84.	1.005 - 1.034	0.980 - 1.017	16.
83.	0.975 - 1.004	0.942 - 0.979	17.
82.	0.945 - 0.974	0.906 - 0.941	18.
81.	0.915 - 0.944	0.871 - 0.905	19.
80.	0.885 - 0.914	0.836 - 0.870	20.
79.	0.855 - 0.884	0.802 - 0.835	21.
78.	0.825 - 0.854	0.769 - 0.801	22.
77.	0.795 - 0.824	0.737 - 0.768	23.
76.	0.765 - 0.794	0.705 - 0.736	24.
75.	0.735 - 0.764	0.674 - 0.704	25.
74.	0.705 - 0.734	0.643 - 0.673	26.
73.	0.675 - 0.704	0.613 - 0.642	27.
72.	0.645 - 0.674	0.583 - 0.612	28.
71.	0.615 - 0.644	0.554 - 0.582	29.
70.	0.585 - 0.614	0.525 - 0.553	30.
69.	0.555 - 0.584	0.496 - 0.524	31.
68.	0.525 - 0.554	0.468 - 0.495	32.
67.	0.495 - 0.524	0.440 - 0.467	33.
66.	0.465 - 0.494	0.412 - 0.439	34.
65.	0.435 - 0.464	0.384 - 0.411	35.

TABLE 416-1 (continued)
DETERMINATION OF PU or PL

QU or QL > 0	N= 4	N=10	QU or
64.	0.405 - 0.434	0.357 - 0.383	36.
63.	0.375 - 0.404	0.330 - 0.356	37.
62.	0.345 - 0.374	0.303 - 0.329	38.
61.	0.315 - 0.344	0.276 - 0.302	39.
60.	0.285 - 0.314	0.249 - 0.275	40.
59.	0.255 - 0.284	0.223 - 0.248	41.
58.	0.225 - 0.254	0.196 - 0.222	42.
57.	0.195 - 0.224	0.170 - 0.195	43.
56.	0.165 - 0.194	0.143 - 0.169	44.
55.	0.135 - 0.164	0.117 - 0.142	45.
54.	0.105 - 0.134	0.091 - 0.116	46.
53.	0.075 - 0.104	0.065 - 0.090	47.
52.	0.045 - 0.074	0.039 - 0.064	48.
51.	0.015 - 0.044	0.013 - 0.038	49.
50.	0.000 - 0.014	0.000 - 0.012	50.

N = NUMBER OF TESTS PER LOT
BODY OF TABLE IS POSITIVE OR NEGATIVE VALUES OF QU OR QL

TABLE 416-2

PAY FACTORS

Material Spread		Grading, Asphalt Cement Content, Voids and Stability		Compaction	
Negative Variance, %	Pay Factor (Dollars/Ton)	PT	Pay Factor (Dollars/Ton)	PT	Pay Factor (Dollars/Ton)
2.1 - 3.0	-0.10	> 99	+1.50	> 99	+1.00
3.1 - 4.0	-0.20	95-99	+1.00	95-99	+0.75
4.1 - 5.0	-0.30	90-94	+0.60	90-94	+0.50
5.1 - 6.0	-0.40	85-89	+0.30	85-89	+0.25
6.1 - 7.0	-0.50	80-84	0.00	80-84	0.00
7.1 - 8.0	-0.60	75-79	-0.30	75-79	-0.25
8.1 - 9.0	-0.70	70-74	-0.60	70-74	-0.50
9.1 -10.0	-0.80	65-69	-1.00	65-69	-0.75
10.1 -11.0	-0.90	60-64	-1.50	60-64	-1.00
11.1 -12.0	-1.00	55-59	-2.00	55-59	-1.25
		50-54	-2.50	50-54	-1.50
		45-49	-3.00	45-49	-1.75
		40-44	-3.50	40-44	-2.00
				35-39	-2.25
				30-34	-2.50
				25-29	-2.75
				20-24	-3.00

(BEDNG501, 6, 12/26/85)

SECTION 501 - PIPE:

501-3.02 (A) Bedding Material: of the Supplemental Specifications is revised to read:

Bedding material shall conform to the following gradation:

Sieve Size	Percent Passing
1 1/2 inch	100
1 inch	90-100
No. 8	35-80
No. 200	0-8

Bedding material shall have a value of resistivity not less than 2000 ohm-cm or the value shown on the project plans, whichever is less. When resistivity is not shown on the plans, the bedding material shall have a value of resistivity not less than that of the existing in-place material or 2000 ohm-cm, whichever is less. Bedding material shall have a pH value between 5.0 and 9.0, inclusive, for all installations except where galvanized pipe is used. Bedding material for galvanized pipe shall have a pH value between 6.0 and 9.0, inclusive. Tests for pH and resistivity shall be in accordance with the requirements of Arizona Test Method 236.

The plasticity index shall not exceed 8 when tested in accordance with the requirements of AASHTO T 90.

(SMLP501, 6, 12/30/86)

501-3.03(F) Smooth Metal Lined Corrugated Steel Pipe: is hereby added to the Supplemental Specifications:

Smooth metal lined corrugated steel pipe shall be constructed in accordance with the requirements specified in Subsection 501-3.03(B) for full circle corrugated metal pipe.

(PRCST601, 6, 06/20/86)

SECTION 601 - CONCRETE STRUCTURES:

601-1 Description: of the Standard Specifications is modified to add:

The following have been approved as alternates to cast-in-place minor structures:

Utility Vault Company Drawing HD-101A, dated 4-05-78, revised 5-07-80, has been approved as an alternate to Standard Drawing C-11.10 for H-20 Loading. The use of this unit shall be limited to a roadway locations with maximum longitudinal grades of six percent.

Utility Vault Company Drawing HD-101B, dated 4-24-78, revised 5-07-80, has been approved as an alternate to Standard Drawing C-11.10 for H-10 Loading. The use of this unit shall be limited to a roadway locations with maximum longitudinal grades of six percent.

Highway Products Company Drawing HPC No. 1, dated 02-02-81 has been approved as an alternate to Standard Drawing C- 11.10.

Pre-Cast Mfg. Co. Drawing CGF C-11.01 Cattle Guard Foundation, as revised 1-27-84 has been approved as an alternate to Standard Drawing C-11.10.

Utility Vault Company Drawing HD-102, revised 5-12-78, has been approved as an alternate to Standard Drawing C-15.90.

Utility Vault Company Drawing HD-103, revised 5-12-78, has been approved as an alternate to Standard Drawing C-15.80.

O'Malley Pipe Company Drawing dated 8/15/79 has been approved as an alternate to Standard Drawing C-15.80.

Utility Vault Company Drawing HD-121, revised 5-12-78, has been approved as an alternate to Standard Drawing C-15.10 or C-15.30.

Pre-Cast Mfg. Co. Drawing SMH-4, revised 07-02-82, has been approved as an alternate to Standard Drawing C-18.10.

Cattle guard grilles, conforming to W.M. Harter Mfg., Inc., Drawing 82-100, revised July 15, 1982, have been approved as alternates to the grilles specified on Standard Drawing C-11.11.

Pre-Cast Mfg. Co. Drawing CB-103, dated September 19, 1980, Revised 5/27/86, has been approved as an alternate to Standard Drawing C-15.90.

The "H" dimension for catch basins shall be determined in the field prior to casting.

The contractor is advised to acquaint himself with conditions peculiar to the project which might limit the use of precast items.

To obtain approval of drawings for precast minor structures, the drawings must be submitted to the Engineer at least six weeks in advance of their need. Eight sets of clear, legible drawings, not exceeding 36 inches by 22 inches in size, must be submitted by the manufacturer. If corrections are required, one set of drawings will be returned with the required revisions noted thereon. After corrections have been made, two sets of corrected drawings must be re-submitted. Upon approval, the manufacturer will be notified in writing and the precast item will be listed as an approved alternate.

Drawings of proposed precast minor structures should be submitted to:

Arizona Department of Transportation
Assistant State Engineer, Construction
206 South 17th Avenue, Room 172A
Phoenix, Arizona 85007

SECTION 605 - STEEL REINFORCEMENT:

605-3 Construction Requirements: of the Standard Specifications is modified to add:

The DYWIDAG couplers shall develop 125% of the guaranteed yield strength of the threadbar. Slippage is controlled by torquing opposing threadbars together. The magnitude of the torque varies with the application, the allowable slip and threadbar diameter. When it is not possible to torque opposing threadbars together such as splicing bent bars, using a partially completed splice as a form saver or other special applications, hex nuts or lock nuts must be used to control slippage in accordance with the following table:

Splice	Tension Capacity	Compression Capacity
Coupler only	75 ksi	90 ksi
Coupler and lock nuts	75 ksi	37.5 ksi
Coupler and hex nuts	75 ksi	75 ksi

Properly sawed or sheared, DYWIDAG threadbars do not require end preparation except where the coupler is utilized without nuts as a compression splice.

(GALV606, 6, 03/20/87)

SECTION 606 - OVERHEAD SIGN STRUCTURES:

606-3.04 Painting: of the Standard and Supplemental Specifications is revised to read:

All steel surfaces of sign structures shall be galvanized after fabrication. Galvanizing shall conform to the requirements of ASTM A 123 and ASTM A 153.

(PAINT610, 6, 03/20/87)

SECTION 610 - PAINTING: of the Supplemental Specifications is revised to read:

610-1 Description:

The work under this section shall consist of furnishing paint and other materials and painting metal structures or other surfaces where shown on the plans in accordance with the requirements of these specifications. The work shall include preparation of the surfaces to be painted, the protection and drying of the paint coatings and the protection of pedestrian, vehicular or other traffic near or under the work from paint spatter and disfigurement.

610-2 Materials:

Paint shall conform to the requirements of Section 1002, unless otherwise specified.

610-3 Construction Requirements:

610-3.01 Weather Conditions:

Paint shall be applied only on thoroughly dry surfaces and only when the atmospheric temperature is at or above 40 degrees F. at the site of the work. Paint shall not be applied when the air is misty or when weather conditions exist which might damage the work. If fresh paint is damaged by the elements, it shall be replaced or repaired by the contractor at his expense.

The contractor may provide suitable enclosures to permit painting during inclement weather. Provisions shall be made by the contractor to artificially control atmospheric conditions inside the enclosures within limits suitable for painting throughout the painting operation.

610-3.02 Surface Cleaning:

(A) General:

All surfaces of structural steel or other metals, except galvanized surfaces, shall be cleaned prior to painting.

All surfaces of new structural steel or other metals which are to be painted shall be blast cleaned, unless otherwise specified or approved in writing by the Engineer.

When repainting existing steel structures, the method of cleaning will be specified in the special provisions. Areas not designated for repainting which are damaged as a result of the contractor's operations shall be repaired by the contractor, at his expense, and as approved by the Engineer.

(B) Blast Cleaning:

Abrasives used for blast cleaning shall be clean dry sand, mineral grit, steel shot, or steel grit and shall be graded to produce satisfactory results. The use of other abrasives will not be permitted unless approved in writing by the Engineer.

All dirt, rust, old paint, mill scale and other foreign material shall be removed from steel or other metal surfaces with an approved blast cleaning apparatus. Blast cleaning shall be sufficient to give the surface the appearance of unpolished sand- cast aluminum and shall leave all surfaces with a dense, uniform anchor pattern of not less than one mil, as measured with an approved surface profile comparator.

When blast cleaning is being performed near machinery, all journals, bearings, motors and moving parts shall be sealed against entry of abrasive dust.

Blast cleaned surfaces shall be primed or treated the same day blast cleaning is done, unless otherwise authorized by the Engineer. If cleaned surfaces rust or are contaminated with foreign material before painting is accomplished, they shall be recleaned by the contractor at his expense.

(C) Steam Cleaning:

All dirt, grease, loose chalky paint or other foreign material which has accumulated on previously painted surfaces shall be removed with a steam cleaning apparatus prior to all other phases of cleaning. It is not intended that sound paint be removed by this process. After steam cleaning, any paint which has become loose, curled, lifted or loses its bond to the preceding coat or coats shall be removed to sound paint or metal surface by the contractor at his expense.

A detergent shall be added to the feed water of the steam generator or applied to the surface to be cleaned. The detergent shall be of such composition and shall be added in such quantity that the specified cleaning is accomplished.

Any residue, detergent or other foreign material which may accumulate on cleaned surfaces shall be removed by flushing with fresh water.

Steam cleaning shall not be performed more than two weeks prior to starting painting operations or other phases of cleaning.

Subsequent painting shall not be performed until the cleaned surfaces are thoroughly dry and in no case in less than 24 hours after cleaning.

(D) Hand Cleaning:

Manual or powered wire brushes, hand scraping tools, power grinders or sandpaper shall be used to remove all dirt, loose rust, mill scale, or paint which is not firmly bonded to the surfaces.

610-3.03 Application:

The contractor shall notify the Engineer, in writing, at least one week prior to beginning cleaning and painting operations including shop painting.

Painting shall be accomplished in a neat and workmanlike manner. Paint shall be applied with hand brushes, by spray, or roller or by a combination thereof except that Paint No. 3, Aluminum, shall be applied by spraying.

Each application of paint shall be smoothly and uniformly spread so that no excess paint will collect at any point. Any skips, holidays, thin areas or other deficiencies shall be corrected before the succeeding paint application. The surface of the paint being covered shall be free of moisture, dust, grease or any other deleterious materials which would prevent the bond of the succeeding applications.

When paint brushes are used, they shall have a sufficient body and length of bristle to spread the paint in a uniform film.

Surfaces which are inaccessible shall be painted with daubers or by other means approved by the Engineer.

When rollers are used, they shall be of a type which will not leave a stippled texture in the paint film.

When sprayers are used, a water trap, approved by the Engineer, shall be furnished and installed at each spray pot.

Prior to application, paint shall be mixed with mechanical mixers for a sufficient length of time to thoroughly mix the pigment and the vehicle together and it shall be kept thoroughly agitated during its application.

The handling and the application of paints shall be done in accordance with all applicable occupational, safety and health standards, rules and regulations.

610-3.04 Protection Against Damage:

The contractor shall provide protective devices as necessary to prevent damage to the work and to other property or persons from all cleaning and painting operations.

Paint or paint stains which result in an unsightly appearance on surfaces not designated to be painted shall be removed or obliterated as approved by the Engineer.

All painted surfaces that are marred or damaged as a result of the contractor's operations shall be repaired with materials and to a condition equal to that of the paint coating specified herein.

Upon completion of all painting operations and of any other work that would cause dust, grease or other foreign materials to be deposited upon the painted surfaces, the painted surfaces shall be thoroughly cleaned.

610-3.05 Painting Structural Steel:

(A) Paint Coats:

(1) General:

All surfaces of new structural steel and other metals shall be painted with one shop coat (prime coat) and two field coats (first field coat and finish coat), unless otherwise specified.

The dry film thickness of the paint will be measured in place with a calibrated magnetic film thickness gauge.

If the minimum dry film thickness is exceeded, it shall be limited to that which will result in uniform drying throughout the paint film.

(2) Pre-Treatment:

When specified in the special provisions, a wash primer conforming to the requirements of Subsection 1002-3.05 shall be applied to freshly blast cleaned steel surfaces prior to the application of the first undercoat of paint. All blast cleaned surfaces shall be coated with pre-treatment wash within 4 hours of cleaning. Treatment shall be applied sooner if, in the opinion of the Engineer, atmospheric conditions are such that corrosive products form on freshly blast cleaned surfaces in less than 4 hours.

Pre-treatment washes shall be applied by spraying to produce a uniform wet film on the surface.

During the application of the pre-treatment wash no blast cleaning will be permitted adjacent to the areas being treated.

No paint shall be applied until after the treated surfaces have thoroughly dried.

The first coat of paint shall be applied to the treated surfaces the same day that cleaning and pre-treatment have been done.

(3) Prime Coat:

The prime coat shall conform to the requirements of Subsection 1002-3 and when applied the dry film thickness of the paint shall be not less than 2 mils.

(4) First Field Coat:

The first field coat shall be appropriately tinted to contrast with the prime coat and shall conform to the requirements of Subsection 1002-3. When applied, the dry film thickness shall be not less than 1.5 mils.

(5) Finish Coat:

The finish coat shall be an aluminum pigmented paint unless specified otherwise on the plans or in the special provision. This paint shall conform to the requirements of Subsection 1002-3. When applied, the dry film thickness shall be not less than 1.0 mil.

(B) Shop Painting:

After structural steel has been fabricated, blast cleaned and accepted by the Engineer, all surfaces, except metal surfaces which are to be embedded in concrete, shall be painted with a prime coat.

Structural steel which is to be welded shall not be painted before welding is complete. If it is to be welded only in the fabricating shop and subsequently erected by bolting, it shall receive one prime coat after the shop welding is completed. Areas of structural steel to be field welded shall be masked and the remainder of the steel shall be given one prime coat.

As soon as practicable after being accepted by the Engineer and prior to removal from the shop, machine-finished surfaces shall be prime coated with a rust inhibitor which can easily be removed.

Erection marks for field identification of steel members and weight marks shall be painted upon surface areas previously painted with the shop coat.

Surfaces of milled or finished iron and steel castings shall be given one shop coat of paint.

(C) Field Painting:

After erection of steel structures has been completed, including all riveting, welding, bolting and any straightening of bent metal, all adhering rust, scale, dirt, grease and other foreign material shall be removed as specified under Subsection 610-3.02. All areas where the prime coat is damaged or deteriorated shall be thoroughly cleaned and spot painted with the same type of paint used for the shop coat and to the specified dry film thickness.

When the spot painting coat is thoroughly dry, the first field coat and the finish coat shall be applied. In no case shall a succeeding coat be applied until the previous coat has dried throughout the full thickness of the paint film.

All small cracks and cavities which have not become sealed in a watertight manner by the first field coat shall be filled before the finish coat is applied.

At the option of the contractor, the two field coats may be applied in the shop. When finished coats are applied in the shop, the contractor shall repaint all damaged or deteriorated areas in the field as directed by the Engineer.

610-3.06 Painting Damaged Galvanized Coating:

Areas of galvanized coating damaged due to welding after fabrication or due to handling, shall be roughened by sanding or acid and the roughened areas shall be painted with at least one full coat of Paint Number 4 - Zinc, conforming to the requirements of Subsection 1002-3.

610-3.07 Painting of Miscellaneous Steel Items:

All miscellaneous steel items that are not elements of bridges, cantilever sign supports, or bridge truss sign structures, may be hand cleaned and have the required field paint coats applied in the shop.

610-4 Blank

610-5 Basis of Payment:

No measurement or direct payment will be made for painting as described and specified herein and on the plans, the cost being considered as included in the prices paid for the various contract items of work involving painting.

(PDMPT701, 6, 02/26/87)

SECTION 701 - MAINTENANCE AND PROTECTION OF TRAFFIC: of the Standard and Supplemental Specifications is revised to read:

701-1 Description:

The work under this section shall consist of providing flagging services and pilot trucks, and furnishing, installing, maintaining, moving and removing barricades, warning signs, lights, signals, cones, and other traffic control devices, flagging services and pilot trucks, to provide safe and efficient passage through and/or around the work and to protect workmen in or adjacent to the work zone. The work shall be done in accordance with the requirements of the Arizona Department of Transportation's Traffic Control Manual for Highway Construction and Maintenance, hereinafter the "Traffic Control Manual", and the design details included in the project plans where applicable.

The requirements of the Traffic Control Manual shall be considered as the minimum standards for the protection of workmen and the traveling public.

When a traffic control plan is included in the project plans, this plan shall govern unless an alternate plan acceptable to the Engineer is submitted by the contractor. If no traffic control plan is provided or if the contractor desires to deviate from the provisions for maintaining traffic as described in this section, he shall submit to the Engineer for approval a proposed sequence of operations and a compatible method of maintaining traffic. The proposal shall be submitted early enough to allow at least two weeks for review and approval.

The traffic control and safety plan of the contractor, along with his work schedule and actual operations, shall be such that no condition that is considered to be unsafe shall exist within 30 feet of the edge of the traveled way unless the motorist and workmen are adequately protected and, as a result of effective planning and efficient scheduling of the work, the duration, degree, length, amount, size, etc., of any potentially unsafe condition is minimized.

701-2 Materials (Equipment, Workmen, Devices and Facilities):

701.2.01 General:

Except as specified herein, all equipment, procedures used by workmen, devices and facilities shall conform to the requirements of the Traffic Control Manual.

701-2.02 Flashing Arrow Panels:

Flashing arrow panels shall conform to the requirements of Section 6E-9 of the Traffic Control Manual with the following additions:

Each arrow panel shall have its own independent power source. The power source shall be capable of supplying adequate continuous power for the

sign operation over extended periods of time. Fuel capacity shall be such as to provide for at least 12 hours of continuous operation without refueling.

701-2.03 Temporary Concrete Barrier:

Temporary concrete barrier shall conform to the requirements of Subsections 910-2 and 910-3 for precast sections.

701-2.04 Temporary Impact Attenuation Devices:

Temporary impact attenuation devices shall conform to the requirements of Subsections 702-2 and 702-3 for the type of device shown on the project plans or as approved by the Engineer.

701-2.05 Temporary Pavement Markings:

(A) Raised Pavement Markers:

(1) Raised Pavement Markers (Permanent) (Used As Temporary):

Raised pavement markers shall conform to the requirements of Subsections 706-2 and 706-3.

Adhesive for temporary pavement markers shall be an approved bituminous adhesive.

(2) Temporary Raised Pavement Markers:

Temporary raised pavement markers shall be of the following type:

BW-One directional-White -Reflectorized
BY-One directional-Yellow-Reflectorized
CW-Two directional-White -Reflectorized
CY-Two directional-Yellow-Reflectorized

Markers shall consist of an acrylic plastic shell containing one or two hermetically sealed prismatic air cell reflective lenses as required to reflect incidental light from a single direction or from opposite directions. The markers shall be in the shape of a shallow round-cornered square with a spherical dome for enhancing the daytime signal.

The dimensions of the plastic shell shall be 4"x4"x.75", with a Reflecting Lens Face Slope of 45 degrees and the area of each reflecting surface shall be .38 square inches. The outer surface of the shell shall be smooth except for purposes of identification and grating. The shell shall be molded of methyl methacrylate conforming to Federal Specification L-P-380C, Type 1, Class 3.

Horizontal entrance angle shall mean the angle in the horizontal plane between the direction of incident light and the normal to the leading edge of the marker. Observation angle shall mean the angle

at the reflector between observer's line of sight and the direction of the light incident on the reflector. Specific Intensity (SI) shall mean the candlepower of the returned light at the chosen observation and entrance angles for each foot of illumination at the reflector on a plane perpendicular to the incident light. The shape, finish and color of the marker shall be designed to provide a diffused specular daytime signal. The specific intensity of each white reflecting surface at 0.2 degrees observation angle shall be not less than the following when the incident light is parallel to the base of the marker:

HORIZONTAL ENTRANCE ANGLE	S.I.
0 degrees	1.0
20 degrees	0.4

For yellow reflectors the specific intensity shall be 60 percent of the value for white. For red reflectors, the specific intensity shall be 25 percent of the value for white.

A random lot of markers will be tested. The markers to be tested shall be located with the center of the reflecting face at a distance of 5 feet from a uniformly bright light source having an effective diameter of 0.2 inches. The photocell width shall be 0.05 inches. It shall be shielded to eliminate stray light. The distance from light source center to the photocell center shall be 0.21 inches. If a test distance of other than 5 feet is used, the source and receiver dimensions and the distance between source and receiver shall be modified in the same proportion as the test distance. Failure of more than 4 percent of the reflecting faces shall be cause for rejection of the lot.

Markers shall support a load of 10,000 lbs. as applied in the following manner:

A random sample of three markers shall be selected for test purposes. A marker shall be centered between the flat parallel platens of a compression testing machine. A flat piece of 65 durometer rubber 6"x6"x.375" shall be centered on top of the marker. The load shall be slowly applied through the rubber to the top of the marker. Failure shall constitute either cracking or significant deformation of the marker at any load less than 10,000 lbs..

Certificates of compliance conforming to the requirements of Subsection 106.05 of the Specifications shall be submitted.

Temporary raised pavement markers shall be installed utilizing an approved raised pavement marker bituminous adhesive.

(B) Pavement Marking Paint:

Paint for temporary striping shall be white or yellow and shall conform to the requirements of Subsection 708-2.

Glass beads for use with pavement marking paint shall conform to the requirements of Subsection 708-2.

(C) Preformed Pavement Markings:

Preformed pavement markings for temporary applications shall meet the requirements of Subsection 705-2 for Type II - removable and Type III-nonremovable.

701-2.06 Sign Posts:

Sign posts may be wood, steel or aluminum, at the option of the contractor and shall be approved by the Engineer prior to installation. Wood posts shall be Southern Pine, Douglas Fir or other soft wood. Wood posts need not be treated.

Angle braces will not be allowed.

701-2.07 Delineators:

Delineators (Std. Dwg. 4-M-4.01) shall be as shown on the plans and shall conform to the requirements of Subsection 703-2.

701-2.08 Chip Seal Pavement Marker:

Type Y markers shall have a yellow body and cover with yellow reflective tape on both sides.

Type W markers shall have a white body and cover with white reflective tape on one side.

The temporary pavement marker body and cover shall be manufactured from a polyurethane material conforming to the following requirements:

	Requirement	ASTM Test Method
Specific Gravity (Min.)	1.19	D- 792
Hardness (Min.)	80A	D-2240
Tensile Strength (Min. PSI)	4600	D- 412
Ultimate Elongation (Min. %)	330	D- 412
Modulus @ 300% PSI	1000	D- 412
Stiffness @		
-20 deg. F. (Min. PSI)	17000	D-1053
70 deg. F. (Min. PSI)	900	D-1053
Compression Set		
22 hrs. @ 70 deg. C	65	D- 395
Taber Abrasion		
CS17 wheel		
Wt. loss mg/1000 cycles	3	-----

Temporary pavement markers and covers shall be manufactured in accordance with the details shown on the project plans. A pavement marker sample shall be submitted to the Engineer for approval, prior to placement of markers.

Reflective tape shall be metalized polycarbonate microprism retroreflective material with acrylic backing or equal. The tape shall have a minimum reflectance equal to or greater than 1800 candle power per foot-candle per square foot at 1/10 degree observation and 0 degree entrance angles.

Pressure sensitive adhesive tape shall be butyl rubber pad.

Covers shall be attached to the vertical part of the marker so that they will not come off under traffic, but so that they can be easily removed manually.

701-3 Construction Requirements:

701-3.01 General:

The contractor shall provide for the adequate protection of all vehicular and pedestrian traffic and workmen, through any portion of the work where construction operations interfere with, obstruct, or create a hazard to the normal movement of traffic.

The name of the contractor's employee who is responsible for implementing, monitoring, and altering, as necessary, the traffic control plan shall be made known to the local law enforcement agency of jurisdiction. Furthermore, the name of the Department employee who will be responsible to see that the traffic control plan, and any alteration thereto, is implemented and monitored such that the traffic is carried through the work in an effective manner and that the motorists, pedestrians, and workmen are protected from potential hazards and accidents shall also be made known to the local law enforcement agency of jurisdiction. The contractor's designee shall also be available at anytime to respond to calls involving damage to barricades, lights, signs and other devices resulting from vandalism, traffic accident or other causes.

If at any time the Engineer determines that proper provisions for safe traffic control are not being provided or maintained, he may order suspension of the work until the proper level of traffic control is achieved. In cases of serious or willful disregard for safety of the public or his employees by the contractor, the Engineer may proceed forthwith to place the traffic control measures in proper condition and deduct the cost thereof from monies due or becoming due the contractor.

All contractor's personnel, equipment, machinery, tools and supplies shall be kept clear of active traffic lanes, except as necessary for the prosecution of the work. The contractor shall promptly remove any material or debris that is spilled or tracked onto the traveled roadway as a result of the prosecution of the work. Materials, vehicles and parked equipment shall be kept as far from the traveled way as practical. The contractor shall not park equipment or store materials within 30 feet of the edge of a traveled way. Equipment may be parked and materials may be stored in the right-of-way only at locations approved by the Engineer, and may require protection.

Any devices provided under this section which are lost, stolen, destroyed or are deemed unacceptable by the Engineer, while their use is required on the project, shall be replaced by the contractor and, except as hereinafter specified for temporary impact attenuators, at no additional cost to the Department.

701-3.02 Maintenance and Protection of Traffic:

All traffic control devices necessary for the first stage of construction shall be properly placed and in operation before any construction is allowed to start. When work of a progressive nature is involved, such as resurfacing a road under traffic, the necessary devices shall be moved concurrently with the advancing operation.

All traffic control devices shall be kept clean, free from dirt, mud, and roadway grime. Scratches, rips and tears in reflective sheeting shall be promptly corrected by the contractor, as approved by the Engineer.

When the contract requires the placement of temporary pavement markings by the contractor, he shall apply them as directed in conjunction with changes in the traffic pattern. Placement of new pavement markings and removal of old lines and markers shall be done immediately when the need for each arises. Roadway marking shall be completed and ready for traffic within 24 hours unless otherwise specified by the Engineer. The area from which a marking is removed shall be reasonably close to the same color and texture as the adjoining pavement. Pavement markings shall be removed from the pavement to the fullest extent possible by any method that does not materially damage the surface or texture of the useable pavement. Sandblasting, using air or water is an acceptable method for removing pavement markings, however, other methods may be approved by the Engineer. The method used shall meet all state and local air, water pollution and safety codes and/or policies. Overpainting of markings with paint or asphalt will not be permitted. No scars which may misdirect traffic shall be left on the pavement at any time.

Types of barricade supports or devices not specifically described in the Traffic Control Manual, but which would cause a hazard to traffic if used by the contractor, will not be permitted in the work. The methods used by a contractor to control traffic for lane changes or other diversion, when details regarding same are not included in the contract, shall produce a safe condition for travel to the maximum extent possible at all times.

An off-duty law enforcement officer shall not work more than 12 consecutive hours unless an emergency situation exists which, in the opinion of the Engineer, requires that the officer remain in the capacity of a flagger.

In the event an off-duty officer fails to report to the project site as scheduled, the Engineer may approve a written plan from the contractor to proceed with the work without the officer.

701-3.03 Temporary Concrete Barriers:

Barriers shall be installed in accordance with the details and at the locations shown on the project plans or where directed by the Engineer. The

barrier shall meet the quality standards of Section 910. Sections of temporary barrier shall be fastened together as shown on the plans to form a continuous chain. After placement, each unit shall be moved longitudinally to remove slack in the joints between the units. Where shown on the project plans or directed by the Engineer, the ends of the barrier run shall be flared back or fitted with an impact attenuation device. Attenuation devices shall be installed in accordance with the requirements of Subsection 701-3.04.

Barrier Markers shall be installed as shown on the plans, or standard drawings.

Any unit which has been excessively damaged, as determined by the Engineer, shall not be used. Any unit damaged during or after installation shall be replaced with an undamaged unit, at no additional cost to the Department.

701-3.04 Temporary Impact Attenuation Devices:

Energy absorbing terminals conforming to the requirements of Subsection 702-2.02 shall be installed at the locations and in accordance with the details shown on the project plans and the manufacturer's instructions.

Devices that are damaged by the traveling public shall be repaired by the contractor utilizing a replacement parts package, which shall be on the job site whenever this system is in use. The replacement parts package supplied by the contractor shall be the one recommended by the manufacturer of the attenuation device.

Sand barrel crash cushions conforming to the requirements of Subsection 702-2.03 shall be placed in accordance with the details shown on the project plans and filled with the designated weight of sand (fine aggregate) having a dry weight of 90 to 100 pounds per cubic foot and a moisture content not greater than five percent, by weight.

Crash cushions damaged by the traveling public shall be removed and disposed of by the contractor. New devices shall be furnished and installed by the contractor. The contractor shall have available, on the job site, a sufficient number of spare crash cushions to completely replace a minimum of two (2) installations.

Upon completion of the work for which temporary impact attenuation devices are required, all devices and replacement parts packages shall be carefully removed and stockpiled by the contractor within the limits of the project at a location specified by the Engineer. Upon approval of the Engineer, undamaged attenuation devices may be used for permanent installation in accordance with the requirements of Subsections 702-2 and 702-3.

701-3.05 Temporary Pavement Markings (Application and Removal):

(A) General:

Application and removal of temporary pavement markings shall conform to the requirements of Subsection 708-3, the Traffic Control Manual

and these specifications as applicable. Placement of new and removal of old markings shall be done immediately when the need for each arises, in conjunction with changes in the traffic pattern.

On overlay projects, pavement marking for temporary center line striping shall be four inch wide by one foot length strips of either temporary pavement marking tape or paint placed at 40 foot intervals. Temporary marking shall be placed on each subsequent pavement course.

(B) Raised Pavement Markers:

The adhesive shall be applied uniformly to the cleaned pavement surface and the pavement marker shall be placed in the correct position on the adhesive area with the application of pressure as specified by the manufacturer.

(C) Preformed Pavement Markings:

Preformed pavement markings for temporary applications shall be Type II (Temporary -Removable) and Type III (Temporary-Nonremovable) and shall conform to the requirements of Subsection 705-3.

Type II Preformed Pavement Markings shall be used where removal of markings is required by the Traffic Control Plan or as specified in Subsection 705-3.

Type III Preformed Pavement Markings shall be used where removal of markings is not required due to obliteration, abandonment or overlaying the pavement surface. Temporary pavement marking paint may also be used where removal of markings is not required unless otherwise shown on the project plans or in the special provisions.

701-3.06 Obliteration of Existing Pavement Markings:

Pavement marking obliteration shall be accomplished by the contractor as indicated on the plans or as directed by the Engineer.

Pavement markings shall be removed to the fullest extent possible from the pavement by any method that does not materially damage the surface or texture of the useable pavement. Sandblasting, using air or water, is an acceptable method for removing pavement markings, however, other methods may be approved by the Engineer. Overpainting of markings with paint or asphalt will not be permitted.

Sand or other material deposited on the pavement as a result of removing pavement markings shall be removed as the work progresses. Accumulations of sand or other material, which might interfere with drainage or might constitute adverse safety conditions to traffic, will not be permitted.

Where blast cleaning is used for the removal of pavement markings or for removal of objectional material, the residue including dust shall be removed immediately after contact between the sand and the surface being treated. Such removal shall be by a vacuum attachment operating concurrently

with the blast cleaning operation, or by other methods approved by the Engineer. Blasting shall not be used within 12 feet of a lane occupied by public traffic.

Any damage to the pavement caused by pavement marking removal shall be repaired by methods acceptable to the Engineer. When asphalt slurry is used to repair damage to the pavement caused by pavement marking removal or the obliteration of the marks remaining after the markings have been removed, the asphalt slurry shall be placed parallel to the new direction of travel and shall be not less than two feet in width.

701-3.07 Truck Mounted Attenuator:

Trucks and truck mounted attenuators shall be furnished by the contractor at the locations shown on the project plans and/or as directed by the Engineer.

Trucks shall be highway maintenance service trucks weighing between 10,000 and 24,000 lbs. These trucks shall be equipped with truck-mounted impact attenuators. The attenuators shall consist of three basic components:

A back-up support structure for attaching the back-up to the truck.

A back-up.

A crushable cartridge containing an energy absorbing material.

The dimensions of the attenuator shall be approximately 7 ft. long, 2 ft. high and 8 ft. wide and the total weight of the attenuator shall be approximately 1,000 pounds.

Attenuators shall have rear-mounted black and high intensity yellow chevron stripes and a standard trailer lighting system, including brake lights, turn signals, and ICC bar lights. When in position, roadway clearance shall be between 10 and 12 inches. The attenuator shall be designed to provide for quick and simple connection to the truck.

When impacted head-on at 45 mph, the truck-mounted attenuator shall perform as follows:

For vehicles weighing up to 4,500 lbs. the average over-all longitudinal deceleration shall be less than 9 g's; the 2 ft. flail space velocity shall be less than 40 ft./sec; the roll-ahead distance of the truck, with wheels locked and parking brake set, on clean, dry pavement, shall be less than 15 feet.

For vehicles weighing 1,800 lbs., the average over-all longitudinal deceleration shall be less than 12 g's; the 2 ft. flail space velocity shall be less than 40 ft./sec; the roll-ahead distance of the truck, with wheels locked and parking brake set, on clean, dry pavement, shall be less than 10 feet.

It shall be the contractor's responsibility to keep the attenuator bright and clean for maximum visibility.

701-3.08 Changeable Message Board:

Changeable message boards, when required on a project, will be furnished by the Department and maintained by the contractor. The board consists of a portable, trailer mounted, lamp matrix, changeable message sign. The contractor shall transport the board to, from, and within the work site as directed by the Engineer.

The contractor shall provide routine maintenance of the changeable message sign. Such maintenance shall include, but not be limited to, furnishing and installing oil, fuel, filters, and light bulbs and keeping the sign clean and in good operating conditions. The engine oil and oil filter shall be changed after each 50 hours of running time.

The contractor shall furnish a vehicle and driver to tow the message sign to and from the project site and to move the sign within the project site as directed by the Engineer.

The contractor shall provide safe storage for the sign when it is not being used during construction.

Upon completion of the work, the sign shall be cleaned and returned to the Department in good working condition.

The contractor will not be responsible for any damage to the sign which may occur as a result of incidents beyond the control of the contractor while the sign is in use during construction operations.

701-3.09 Chip Seal Pavement Marker:

Temporary pavement markers and covers shall be located and placed on the asphaltic concrete prior to any work being started on the chip seal coat, all in a manner as approved by the Engineer.

Immediately after application of the chip seal coat to the roadway pavement, the plastic covers shall be removed, exposing the reflective tape surfaces.

Temporary Pavement Markers that are damaged by the contractor shall be replaced by the contractor at his own expense.

701-4 REIMBURSEMENT:

701-4.01 General:

The Department will reimburse the contractor for the work of maintaining and protecting traffic on the basis of the predetermined reimbursement rates hereinafter specified under Subsection 701-4.02 for the various elements of work.

Except as hereinafter specified for Temporary Concrete Barrier and Temporary Impact Attenuation Devices, no additional reimbursement will be made to the contractor for any elements of work other than those listed under Subsection 701-4.02, unless approved in writing by the Engineer prior to use, as may be required for acceptably maintaining and protecting traffic. The cost for elements of work required for traffic control and not listed under Subsection 701-4.02 will be negotiated with the Engineer prior to approval.

Elements of work specified under this subsection which are lost, stolen, destroyed, or are deemed unacceptable by the Engineer, while in use on a project shall be replaced by the contractor and, except as hereinafter specified for temporary impact attenuation devices, at no additional cost to the Department.

701-4.02 Predetermined Reimbursement Rates:

(A) General:

Item 7010001 - MAINTENANCE AND PROTECTION OF TRAFFIC is included in the Bidding Schedule for the purpose of establishing an account from which the contractor will be reimbursed for the work of maintaining and protecting traffic on the basis of the predetermined reimbursement rates hereinafter specified under Subsections 701-4.02(B) and 701-4.02(C) for the various elements of work.

The methods of measurement and basis of payments will be as specified under Subsections 701-5 and 701-6.

(B) Elements of Work (Complete-in-Place):

The elements of work listed under this subsection will be measured for payment upon the satisfactory completion of the initial installation or obliteration. Except as hereinafter specified under Basis of Payment, no subsequent measurements will be made.

Element of Work	Unit	Rate($)
Preformed Pavement Marking (Type II)	L.Ft.	1.60
Preformed Pavement Marking (Type III)	L.Ft.	1.30
Temporary Pavement Marking (Painted Line)	L.Ft.	0.12
Obliterate Pavement Marking	L.Ft.	0.50
Delineator (Std. Dwg. 4-M-4.01)	Each	25.00
Raised Pavement Marker (Temporary)	Each	4.00
Raised Pavement Marker (Permanent) (Used As Temporary)	Each	4.50
Chip Seal Pavement Marker	Each	2.00

(C) Elements of Work (In Use):

The elements of work listed under this subsection will be measured from the point at which the element is put into active use on the project and

accepted by the Engineer until such times that the Engineer determines that the element is no longer required.

Element of Work	Unit	Rate($)
Temporary Concrete Barrier(In Use)	L.Ft./Day	0.04
Impact Attenuation Device (Sand Barrel) (In Use)	Ea./Day	0.05
Impact Attenuation Device (Energy Absorbing Terminal) (In Use)	Ea./Day	1.00
Impact Attenuation Device (Truck Mounted)	Hour	27.00
Flashing Arrow Panel	Hour	5.00
Pilot Truck	Hour	11.90
Relocation Service, Truck	Hour	13.50
Flagger	Hour	18.78
Flagger (Uniformed Police Officer)	Hour	21.42
Official Police Vehicle	Mile	0.20
Operator (Pilot Truck, Relocation Service, and Truck Mounted Attenuation Device)	Hour	22.70
Relocation Service, Barricade Setter	Hour	10.49
Maintain Changeable Message Board	Hour	1.45
Vertical Panels	Ea./Day	0.45
Barricade (Type II)	Ea./Day	0.45
Barricade (Type III)	Ea./Day	0.85
Flashing Warning Light (Type A)	Ea./Day	0.25
Flashing Warning Light (Type B)	Ea./Day	2.00
Steady-Burning Warning Light, (Type C)	Ea./Day	0.85
High Intensity Reflective Sheeting, Small Sign (Less than 10 Sq.Ft.)	Ea./Day	1.00
High Intensity Reflective Sheeting, Medium Sign (10 Sq.Ft. to 16 Sq.Ft.)	Ea./Day	1.25
High Intensity Reflective Sheeting, Large Sign (More than 16 Sq.Ft.)	Ea./Day	1.50
Standard Intensity Reflective Sheeting, Small Sign (Less than 10 Sq.Ft.)	Ea./Day	0.50
Standard Intensity Reflective Sheeting, Medium Sign (10 Sq.Ft. to 16 Sq.Ft.)	Ea./Day	0.75
Standard Intensity Reflective Sheeting, Large Sign (More than 16 Sq.Ft.)	Ea./Day	1.00
Sign Stand (Large, 9 Sq.Ft. or Larger)	Ea./Day	0.90
Sign Stand (Small, Less than 9 Sq.Ft.)	Ea./Day	0.60
Traffic Cones, 28 inch	Ea./Day	0.71
Drum (18" x 36")	Ea./Day	1.20

701-4.03 Relocation Services:

Following the initial installation of the elements of work described in Subsection 701-4.02, the Engineer may direct the contractor to move any element of work from one location and re-erect it at another location. Except as hereinafter specified for Temporary Concrete Barrier (New Installation), measurement for reimbursement of the work associated with such relocations will be made as specified for the Relocation Service elements of work.

When work of a progressive nature is involved, such as resurfacing a road under traffic, or closing a lane or lanes for work to be accomplished during a shift, no measurement for reimbursement will be made for relocating the necessary traffic control equipment, workmen, devices, facilities, signs (except semi-permanent signs on embedded posts), etc., that are moved concurrently with the advancing operation, or at the end of a shift.

701-4.04 Reimbursement Exceptions:

(A) Deficient Elements of Work:

Any deficiencies in the traffic control plan, devices, equipment, services, or other elements of work listed under Subsection 701-4.02 will be brought to the attention of the contractor by the Engineer and all deficiencies shall be corrected before the close of that work day or work shift.

Reimbursement will not be withheld from the contractor for those elements of work that are restored to full usefulness prior to the close of the work day or work shift in which notice of the defect is given.

No reimbursement will be made to the contractor for those deficient elements of work listed under Subsection 701-4.02(C) that are not restored to full usefulness prior to the close of the work day or work shift in which notice of the defect is given. Measurement for reimbursement will not resume until the beginning of the work day or work shift following that work day or work shift in which those elements are restored to usefulness.

(B) Substantial Deficiencies:

For each work day or work shift during which there are, as determined by the Engineer, substantial deficiencies in the contractor's traffic control plan, devices, and/or services, no reimbursement will be made to the contractor for any element of work listed under Subsection 701-4.02(C).

Measurement for reimbursement will not resume for any element of work until the beginning of the work day or work shift following that work day or work shift in which all corrective measures have been performed by the contractor and approved by the Engineer.

In cases of serious or willful disregard for the safety of the public or his employees by the contractor, the Engineer may proceed forthwith to place the traffic control measures in proper condition and deduct the cost thereof from monies due or becoming due the contractor.

(C) Nondiligent Prosecution of Work:

In the event that the Engineer determines that the contractor's construction operations are not resulting in the diligent prosecution of the work under contract, no reimbursement will be made to the contractor for the elements of work listed under Subsection 701-4.02 until such time as the Engineer determines that the contractor is devoting appropriate efforts toward completion of the work. Payment will be suspended effective with the end of the work day or work shift in which written notice is issued to the contractor by the Engineer notifying the contractor of his failure to prosecute the work. Payment will resume with the beginning of the work day or work shift following that work day or work shift in which the Engineer determines that satisfactory efforts are being made by the contractor toward completion of the work. In any case, the contractor shall continue to be responsible for maintaining all barriers, attenuators, signs, lights and other traffic control devices in proper functioning condition at all times.

(D) Non-Working Periods:

Measurement for reimbursement of the elements of work listed under Subsection 701-4.02(C) will begin on the day they are installed in place for traffic control and direction. When the elements are not needed for traffic control, they shall be removed or covered and will not be measured. During non-working periods such as holidays, Sunday, etc. the elements in place and in satisfactory condition will be measured for reimbursement on the day following such downtime. During these non-working periods the contractor shall conduct a minimum of one check per day to see that the elements are in place and in satisfactory condition.

No reimbursement will be made to the contractor for the elements of work listed under Subsection 701-4.02(C) for non-working periods resulting from a suspension of work that, in the opinion of the Engineer, is due to the fault of the contractor. In any case, the contractor shall continue to be responsible for maintaining all barriers, attenuators, signs, lights and other traffic control devices in proper functioning condition at all times.

(E) Limitation of Measurement:

Elements of work listed under 701-4.02(C) that are measured on a unit per day basis will be measured for reimbursement once and only once for each full work day or work shift. Measurement will be based on the maximum number of units of the specific element of work that are in simultaneous use during any given period regardless of the length of time that the elements are in use and regardless of the number of times the elements are relocated.

(F) Expiration of Contract Time:

No reimbursement will be made to the contractor for the elements of work listed under Subsection 701-4.02(C) when they are required in association with construction work being performed after the expiration of the contract time and all approved extensions.

In any case, the contractor shall continue to be responsible for maintaining all barriers, attenuators, signs, lights and other traffic control devices in proper functioning condition at all times.

701-5 Method of Measurement:

Maintenance and Protection of Traffic will be measured by the approved elements of work that are both (1) utilized by the contractor during the course of approved construction operations and (2) included as an item in the bidding schedule or listed as an element of work under Subsection 701-4. Measurement will be made as follows:

Temporary Concrete Barrier will be measured by the linear foot along the center line of the uppermost surface.

Temporary Impact Attenuation Devices (Sand Barrel and Energy Absorbing Terminal) will be measured by the unit for each complete device.

Truck mounted attenuators will be measured by the hour for each hour that a truck mounted attenuator is used to protect the work site.

Flashing Arrow Panels will be measured by the hour for each hour that each panel is in place and operating.

Pilot Trucks and Relocation Service Trucks will be measured by the hour for each approved hour of operation.

Flagging Services will be measured by the hour for each hour that a civilian flagger is provided and for each hour that a uniformed, off-duty law enforcement officer is employed directly by the contractor as a flagger, when authorized in advanced by the Engineer. Overtime hours will be converted into straight time hours for measurement. In the event an off-duty officer reports to the project site and the work shift is cancelled within the first two hours, the contractor will be reimbursed for two hours at the appropriate rate. Flaggers used for the contractor's convenience, such as ingress and egress of construction equipment along the project traveled way, will not be measured for payment.

Use of Official Police Vehicles will be measured by the mile of operation within the project limits and to and from the project site as approved by the Engineer.

Operator (Pilot Truck, Relocation Service Truck, and Truck Mounted Attenuation Device) will be measured by the hour for each hour that the operator operates the vehicle. Overtime hours will be converted to straight time hours for measurement.

Relocation Service Barricade Setters will be measured by the hour for each man hour of the approved relocation operation. Overtime hours will be converted to straight time hours for measurement.

Preformed Pavement Markings, Type II and Type III, will be measured in accordance with the requirements of Subsection 705-4.

Temporary Pavement Marking, Painted Line, will be measured in accordance with the requirements of Subsection 708-4.

Obliterate Pavement Marking will be measured by the linear foot of existing marking obliterated, regardless of width or type of material.

Maintenance of the Changeable Message Board will be measured by the hour for each hour that the board is utilized to maintain and control traffic.

Delineators (Std. Dwg. 4-M-4.01) and pavement markers will be measured as a unit for each delineator and marker furnished and subsequently utilized at the project site. No measurement will be made for delineators and markers that are furnished to replace damaged units as specified under Subsection 701-4.01.

Vertical Panels, Barricades, Warning Lights, Signs, Sign Stands, Traffic Cones, and Drums will be measured as a unit for each device furnished and subsequently utilized at the project site.

701-6 Basis of Payment:

The contractor will be compensated for accepted quantities of Maintenance and Protection of Traffic at the predetermined reimbursement rates and in accordance with the procedures of Subsection 701-4 of these Special Provisions.

701-6.01 Elements of Work (Bid Items):

(A) Temporary Concrete Barrier (New Installation):

Temporary concrete barrier, measured as provided above, will be paid for at the contract unit price, which price shall be full compensation for the work, complete, as specified herein and as shown on the plans, including, but not limited to, furnishing, placing, dismantling, and removal. The price bid shall also include any required connection devices and barrier markers. Should it be necessary to dismantle, pick up and relocate the entire barrier installation or portion thereof during construction, the removed and relocated barrier will be considered a new installation and measured for payment at the contract unit price. No additional payment will be made for the realigning or adjusting of barrier installations, for lateral movement of 12 feet or less.

The Engineer will be the sole judge as to whether barriers are to be dismantled, picked up and relocated and paid for as a new installation or are to be adjusted or realigned and paid for as specified for Temporary Concrete Barrier (In Use).

Fifty percent of the unit price bid will be paid upon satisfactory installation. The remaining 50 percent will be paid upon removal.

(B) Temporary Impact Attenuation Devices (Sand Barrel and Energy Absorbing Terminal):

Temporary Impact Attenuation Devices (Sand Barrel and Energy Absorbing Terminal), measured as provided above, will be paid for at the contract unit price, which price shall be full compensation for the work complete-in-place, as specified herein and as shown on the plans, including but not limited to furnishing the devices with replacement parts, and installing, dismantling, realigning and adjusting, removing and stockpiling the devices.

Should it be necessary to dismantle, pick up and relocate attenuation device installations during construction, the work of removing and relocating the devices will be measured for reimbursement as herein specified for Relocation Services.

The Engineer will be the sole judge as to whether devices are to be dismantled, picked up and relocated or are to be adjusted or realigned.

Fifty percent of the unit price bid will be paid upon satisfactory installation. The remaining 50 percent will be paid upon final removal.

Measurement and payment for furnishing materials, equipment and labor and repairing attenuation devices that are damaged by the traveling public will be made in accordance with the requirements of Subsection 109.04.

No measurement or direct payment will be made for furnishing replacement parts and repairing devices damaged by other than the traveling public.

701-6.02 Elements of Work (Complete-in-Place):

(A) Preformed Pavement Markings:

The accepted quantities of preformed pavement markings, measured as provided above, will be paid for at the predetermined reimbursement rate for the type specified, which rate shall be full compensation for the work, complete in place, including necessary pavement cleaning, removal of type II temporary markings, and maintaining Type II and Type III temporary markings in construction work zones. Installation for accepted quantities shall be considered satisfactory when the markings are installed within one inch (1") of the true alignment.

Additional reimbursement will be made for replacement of temporary markings when the contractor is required by the Engineer to install marking materials on distressed pavements or during adverse weather conditions and subsequent failure occurs. Distressed pavement conditions are defined as alligator cracking, bleeding, or spalling of bituminous pavements and spalling of PCC pavements. Adverse weather conditions are defined as any occurrence where application is required at pavement temperatures less than 60 degrees F. or when precipitation occurs within 24 hours before or after application. The Department will pay for the replacement, where failures occur, at the reimbursement rate for the initial occurrence.

In the event a second failure occurs when markings have been reapplied on distressed pavements or under weather conditions described above, the Engineer shall determine if conditions require primer, alternate methods of marking or reapplication of preformed markings. Preformed markings will be paid for at the reimbursement rate. Primers or other methods of markings deemed necessary by the Engineer will be paid for in accordance with the provisions of Subsection 109.04 - Extra and Force Account Work.

(B) Temporary Pavement Marking (Painted Line):

The accepted quantities of Temporary Pavement Marking (Painted Line), measured as provided above, will be paid for at the predetermined reimbursement rate per linear foot, which rate shall be full compensation for the work, complete in place, as specified herein.

(C) Obliterate Pavement Marking:

Obliterate Pavement Marking, measured as provided above, will be paid for at the predetermined reimbursement rate per linear foot which rate shall be full compensation for the work, complete, including furnishing all labor and equipment required and restoring the pavement surface to a condition deemed suitable by the Engineer.

(D) Delineators (Std. Dwg. 4-M-4.01) and Pavement Markers:

The accepted quantities of delineators, and pavement markers, measured as provided above, will be paid for at the predetermined reimbursement rate each, which rate shall be full compensation for the work, complete in-place, as specified herein and as shown on the plans. If it is necessary to remove and relocate delineators, measurement for reimbursement of the work associated with such relocations will be made as specified for the Relocation Service element of work.

701-6.03 Elements of Work (In Use):

(A) Temporary Concrete Barrier (In Use):

The accepted linear foot quantities of temporary concrete barrier, measured as provided above on a daily basis, will be paid for at the predetermined reimbursement rate, which rate shall be full compensation for the use of the barrier installation(s) and for the work of furnishing all material, equipment and labor and maintaining, realigning and adjusting the barrier installation(s) as specified herein and as shown on the plans. No reimbursement will be made for barrier not in service, such as, barrier in stockpiled configuration awaiting phase construction change.

There will be no reimbursement for each day that the Engineer determines the barrier traffic reflectors are not in good reflective condition, or for each day that the Engineer determines the barrier is out of alignment.

(B) Temporary Attenuation Device (Sand Barrel and Energy Absorbing Terminal)(In Use):

The accepted unit quantities of temporary attenuation devices, measured as provided above on a daily basis, will be paid for at the predetermined reimbursement rate, which rate shall be full compensation for the use of the devices and for the work of realigning and adjusting the devices as specified herein and as shown on the plans.

There will be no measurement and payment for temporary impact attenuation devices in a stockpiled configuration.

(C) Truck Mounted Attenuators:

The accepted quantities of truck mounted attenuators, measured as provided above, will be paid for at the predetermined reimbursement rate per hour of work site protection, which rate shall be full compensation for the work, complete, including, but not limited to, furnishing all materials, equipment and labor (exclusive of the operator) and maintaining and repairing the truck and truck mounted attenuator as specified herein and on the project plans. It shall be the contractor's responsibility to replace any damaged or destroyed parts of the attenuator at no additional expense to the Department.

(D) Flashing Arrow Panels:

The accepted quantity of flashing arrow panels, measured as provided above, will be paid for at the predetermined reimbursement rate, which rate shall be full compensation for the work, complete, including, but not limited to, operation, maintenance and movement on the job site.

(E) Pilot Trucks and Relocation Service Trucks:

The accepted quantities of pilot and relocation service trucks, measured as provided above, will be paid for at the predetermined hourly reimbursement rate, which rate shall be full compensation for the work, complete, including, but not limited to, furnishing and maintaining the vehicle.

(F) Flagging Services:

The accepted quantities of flagging services, measured as provided above, will be paid for at the predetermined hourly rate, which rate shall be full compensation for the work, complete, including, but not limited to, all overhead costs and fringe benefits. No additional compensation will be made to the contractor if the rate he is required to pay exceeds the predetermined reimbursement rate.

(G) Official Police Vehicle:

The accepted quantities of official police vehicles, measured as provided above, will be paid for at the predetermined reimbursement rate per mile, complete, including, but not limited to, furnishing and maintaining the vehicle.

(H) Operators (Pilot Truck, Relocation Service, and Truck Mounted Attenuation Device):

The accepted quantities of operators, measured as provided above, will be paid for at the predetermined reimbursement rate per hour, which rate shall be full compensation for the work, complete, including, but not limited to, all overhead costs and fringe benefits. No additional payment will be made to the contractor if the rate he is required to pay exceeds the predetermined reimbursement rate.

(I) Relocation Service, Barricade Setter:

The accepted quantities of relocation service barricade setters, measured as provided above, will be reimbursed at the predetermined reimbursement rate per hour, which rate shall be full compensation for the work, complete, including, but not limited to, all overhead costs and fringe benefits. No additional payment will be made to the contractor if the rate he is required to pay exceeds the predetermined reimbursement rate.

(J) Maintain Changeable Message Board:

The accepted quantities of maintaining changeable message boards, measured as provided above, will be paid for at the predetermined reimbursement rate per hour, which rate shall be full compensation for the work, complete, including, but not limited to, furnishing, moving, and maintaining the board as specified herein.

(K) Vertical Panels, Barricades, Warning Lights, Signs, Sign Stands, Traffic Cones, and Drums:

The accepted unit quantities of vertical panels, barricades, warning lights, signs, signs stands, traffic cones, and drums, measured as provided above on a daily basis, will be paid for at the predetermined reimbursement rate, which rate shall be full compensation for the work, complete, including, but not limited to, furnishing all materials, labor and equipment necessary for the initial installation, maintenance, and removal of each device furnished.

Relocation of vertical panels, barricades, warning light, signs, sign stands, traffic cones, and drums will be made as specified for the Relocation Service elements of work, with the following exception.

When work of a progressive nature is involved, such as resurfacing a road or closing a lane or lanes for work to be accomplished during a shift, no measurement for reimbursement will be made for the relocation of the elements of work moved concurrently with the advancing operation, or at the end of a shift.

The work of removing and reinstalling signs on embedded posts will be reimbursed at the relocation service rates regardless of the type of work or operation.

The predetermined reimbursement rate for signs includes the cost of flags and ballasting.

The predetermined reimbursement rate for barricades and vertical panels includes the cost of ballasting.

SNDBL702, 6, 03/03/87)

SECTION 702 - ATTENUATION DEVICES:

702-2 Materials: of the Standard Specifications is modified to add:

A list of approved manufacturers and distributors of components for sand barrel crash cushions is given below:

(1) Manufacturer:

Energy Absorption Systems, Inc.
One IBM Plaza
Chicago, Illinois 60611

Distributor:

Energy Absorption Systems, Inc.
860 South River Road
West Sacramento, California 95691

Components supplied by manufacturers other than those listed above shall be approved by the Department prior to use.

(PPM708, 6, 12/30/86)

SECTION 708 - PERMANENT PAVEMENT MARKINGS:

708-2 Materials:

.01 Pavement Marking Paint:

(A) General:

All material used in the formulation of the pavement marking paint shall meet the requirements herein specified. Any materials not specifically covered shall meet the approval of the Engineer.

(B) Composition Requirements:

The permanent pavement marking paint shall consist of the following components with all percentages specified being by weight:

(1) Pigment Composition: percent by weight of total pigment

	White	Yellow
Titanium Dioxide, Rutile (ASTM D 476, Type II 92% min.)	24.0-26.0	7.0-9.0
Medium Chrome Yellow (ASTM D 211, Type III 87% min.)		15.0-17.0
Zinc Oxide (ASTM D 79 American Process Type)	7.5-9.5	7.0-9.0
Magnesium Silicate (ASTM D 605)	6.0-38.0	35.0-37.0
Calcium Carbonate (ASTM D 1199, Type GC, Grade I or II)	28.0-30.0	31.0-33.0
Antisettling Agency (Bentone 34 or Claytone 40) See Note 1		

(2) Vehicle Composition: percent by weight

	White and Yellow
Alkyd Resin Solution - See Note 2	21.3 min.
Chlorinated Rubber (Parlon S20 or Alloprene X20)	16.4 min.
Chlorinated Paraffin (Fed. Spec. Mil-C 429C, Type I)	11.3 - 13.3
Lead Drier 24% (ASTM D 600 Class B)	0.2 - 0.4
Cobalt Drier 6% (ASTM D 600 Class B)	0.05 - 0.25

	White and Yellow
Antiskinning Agent (Exkin or Equivalent) See Note 3	0.45 - 0.55
Stabilizer (Propylene Oxide) See Note 4	
Toluene (ASTM D 362)	26.1 max.
Heptane (Technical Grade)	6.5 - 8.5
Methyl Ethyl Ketone (ASTM D 740)	14.7 min.
Methanol (ASTM D 1152)	0.2 - 0.4

Note 1. Sufficient dispersing and suspending agent shall be added to prevent excessive settling.

Note 2. Alkyd Resin Solution: The medium oil soya-modified alkyd resin shall be supplied as 59 to 61 percent non-volatile solids in VM & P Naphtha (TT-N-95b, Type I). The resin solids shall contain an oil acid content of 48 to 55 percent, a phthalic anhydride content of 33 to 37 percent and an acid number of 8 maximum. The alkyd resin solution shall have a maximum of 9 (Gardner). The alkyd resin solution, reduced to 45 percent solids with VM & P Naphtha, shall have a viscosity of D to G (Gardner-Holdt). No resin will be permitted. The oil fatty acids shall be of vegetable origin, either alkali refined soya bean oil or the fatty acids of soya bean oil having a minimum iodine number of 115. No recovered oil marine or soya food fatty acid derivatives shall be used. The alkyd resin solution must tolerate a 500 percent by weight dilution with VM & P Naphtha. A solution containing alkyd resin solution, chlorinated rubber, methyl ethyl ketone, toluene and heptane in the proportions given in the vehicle composition shall be clear, transparent and show no separation after storage of 24 hours in a three-quarter full test tube at 26.7 degrees + 2.8 degrees C (80 degrees + 5 degrees F).

Note 3. Sufficient antiskinning agent shall be used to prevent skinning. Material shall be added at the proper time during the manufacturing of the paint so as to minimize losses due to volatilization and maximize retension in the packaged product.

Note 4. Other approved Stabilizers: Styrene Oxide - 3 pounds per 100 gallons of paint; Thermolite 813 - 0.5 pounds per 100 gallons of paint.

(C) Manufacturing Formulations:

The typical formula which may serve as a guide for the paint manufacture is as follows: (Yield is approximately 100 gallons).

	POUNDS	
	White	Yellow
Titanium Dioxide	150	50
Medium Chrome Yellow		100
Zinc Oxide	50	50
Magnesium Silicate	224	224
Calcium Carbonate	175	200
Antisettling Agent (Claytone)	5	5
Methanol	2	2
Alkyd Resin Solution (60% non-volatile)	130	130
Chlorinated Rubber (93% non-volatile)	100	100
Chlorinated Paraffin	75	75
34% Lead Drier	2	2
6% Cobalt Drier	1	1
Antiskinning Agent (Exkin)	3	3
Stabilizer (Propylene Oxide)	3	3
Toluene	160	160
Heptan	45	45
Methyl Ethyl ketone	90	90
	1215	1240

(D) Quantitative Requirements of Mixed Paint:

	White	Yellow
Pigment: percent by weight-See Note 5	48.9-50.6	49.9-51.6
Total Solids: percent by weight	69.4 min.	70.0 min.
Non-volatile Vehicle: percent by weight vehicle	38.9 min.	38.9 min.
Viscosity: K.U. at 77 F	76 ± 8	76 ± 8
Weight per Gallon: pounds	12.2 ± 0.2	12.5 ± 0.2
Fineness of Grind: Hegman gauge, North Standard Scale	3 min.	3 min.
Drying Time: minutes	1 - 4	1 - 4
Directional Reflectance:	80 min.	50 min.
Uncombined Water: percent by weight of paint	1.0 max.	1.0 max.

	White	Yellow
Coarse Particles and Skins: retained on a No. 325 mesh sieve, percent by weight of pigment.	1.0 max.	1.0 max.

Note 5. The extracted pigment upon analysis shall conform to the quantitative compositional requirements.

(E) Qualitative Requirements:

(1) Color of Yellow paint:

The color of the yellow paint shall visually match color chip No. 33538 of Fed. Std. 595 (Note 6). In case of dispute, the color shall be within the green and red tolerance limits when compared with the standard color chips of "Highway Yellow Color Tolerance Chart" U.S. Department of Commerce, Bureau of Public Roads PR Color No. 1, June 1965.

(2) Condition in Container:

The paint shall not show excessive settling in freshly-opened full can and shall be easily redispersed with a paddle to a smooth homogeneous state. The paint shall show no curdling, livering, caking, gelling or thixotropic properties, lumps, skins or color separation.

(3) Skinning:

The paint shall not skin within 48 hours in a three-quarter filled, tightly closed container.

(4) Storage Stability:

The paint shall show a viscosity increase of not more than five (5) Krebs units above the original viscosity and the degree of settling shall have a rating of six (6) or better (Note 7). When stored for twelve (12) months the paint must be usable, the drying time shall be as specified and the consistency range shall be 70 to 85 Krebs units.

(5) Flexibility and Adhesion:

The paint shall show no cracking, flaking or loss of adhesion when tested as specified. Apply a wet film thickness of 0.005 inches with a film applicator to a 3 by 5 inch tin panel weighing 0.39 to 0.51 lbs. per sq.ft., previously cleaned with benzene and lightly buffed with steel wool. Dry the paint film at 70 degrees to 80 degrees F in a horizontal position for 18 hours, then bake in an oven at 122 degrees + 4 degrees F (47.8 degrees C to 52.2 degrees C) for two hours, cool to room temperature for at least 1/2 hour and bend over a 1/2 inch diameter rod and examine, without magnification.

(6) Water Resistance:

The paint shall show no softening, blistering, loss of adhesion or other evidence of deterioration other than a slight loss in gloss when tested as specified. Apply a wet film thickness of 0.015 inches with a film applicator to

a clean glass plate. Let dry in a horizontal position at room temperature (70 degrees to 80 degrees F) for 72 hours. Immerse one-half the painted plate in distilled water at room temperature for 18 hours as specified in method 6011 of Fed. Test Method Std. No. 141, allow to dry for two hours and examine.

(7) Dilution Stability:

The thinned paint shall be uniform and show no separation, curdling or precipitation after reduction in the properties of eight parts by volume of the package material with not more than one part by volume of the appropriate thinner for each type of paint.

(8) Spraying Properties:

The paint as received or diluted no more than specified above shall have satisfactory spraying properties when applied (and held in a horizontal position) to tinplate or aluminum surfaces at a wet film thickness or approximately 0.015 inch. The sprayed film shall dry to a smooth uniform finish, free from roughness, grit, unevenness and other surface imperfections. The paint shall show no streaking or separation when placed on clean glass.

(9) Bleeding:

The bleeding characteristics shall be determined in accordance with ASTM D 969. The test panels shall be evaluated according to ASTM D 868, and the degree of resistance to bleeding shall have a numerical rating of six (6).

Note 6. Apply a wet film of 0.015 inches to a tin panel; let dry for 24 hours and compare color.

Note 7. Storage stability shall be determined in accordance with ASTM D 1309 Settling Properties of Traffic Paints During Storage; ASTM D 869 Evaluating Degree of Settling; and Consistency, Krebs-Standard Method 4281 of Federal Test Method Std. No. 141.

(F) Manufacturing Requirements:

(1) Inspection:

The manufacture shall advise the Engineer when paint is to be manufactured and shall furnish the Engineer free access to all parts of the plant and shall furnish every reasonable facility for sampling both the paint and the raw materials during the process of manufacturing.

All materials used in formulation shall meet the requirements herein specified. Any materials not specifically covered shall meet the approval of the Engineer.

(2) Testing:

All tests will be conducted in accordance with the latest test methods of the American Society for Testing and Materials, Federal Test Method Standard No. 141, and methods in use by Materials Services, Highways

Division, and the Arizona Department of Transportation. Where both an ASTM and Federal Test Method is available for new materials or the finished product, the ASTM test method will prevail.

Evidence of adulteration or improper formulation shall be cause for rejection.

(3) Packaging:

The finished paint shall be homogeneous, free of dirt, water and other foreign matter. The paints shall be strained immediately prior to canning.

All shipping containers must comply with Federal Interstate shipping standards of the Department of Transportation, and be stamped 17-H in accordance with the standards. The containers must be lined so as to prevent attack by the paint. The lining must not come off the container as skins.

All containers of paint shall be labeled with weatherproof markings, showing the color, manufacturer's name, date of manufacture, tare weight, net weight, gross weight and manufacturer's batch number on the side of drum and also on the lid.

.02 Reflective Glass Beads:

(A) General:

The beads shall be manufactured from glass of a composition designated to be highly resistant to traffic wear and to the effects of weathering.

The glass beads shall be moisture-proof, contain less than 1/4 of one percent moisture by weight, and be free of trash, dirt, or other deleterious materials.

Beads shall be essentially free of sharp angular particles showing milkiness or surface scoring or scratching. Beads shall be water white in color.

(B) Physical Requirements:

(1) Gradation:

When tested by the method provided in AASHTO M-247 (by use of US Standard Sieves) the grade sizes of the beads shall be as follows:

Size of Sieve	Percent Passing
No. 20	100
No. 30	75 - 95
No. 50	15 - 35
No. 100	0 - 5

(2) Roundness:

When tested by the method provided in ASTM D-1155-53 (Procedure B except paragraphs (F) and (G) are deleted) beads retained on any screen specified in the gradation requirements shall contain a minimum of 70% true spheres.

(3) Index of Refraction:

When tested by a liquid immersion method at a temperature of 25 degrees C, the beads shall have an index of refraction of 1.50 to 1.57.

(4) Specific Gravity:

The specific gravity of the beads shall be in the range 2.40-2.60 when tested in accordance with the following procedures:

Place 100 grams in an oven at 110 C for 1 hour.

Remove beads and place in a desiccator until the sample is cool.

Remove approximately 60 grams of beads from the desiccator and weigh the sample accurately.

Pour the beads slowly in a clean 100 ml graduated cylinder containing 50 ml of isopropyl alcohol. Make certain that air is not entrapped among the beads.

The total volume, minus 50, will give the volume of the beads.

Calculate the specific gravity as follows:

$$\text{Specific Gravity} = \frac{\text{Weight of sample}}{\text{Volume of the sample}}$$

(5) Chemical Stability:

Beads which show any tendency toward decomposition, including surface etching, when exposed to atmospheric conditions, moisture, dilute acids, or alkalies or paint film constituents, may be required to demonstrate satisfactory reflectance behavior, prior to acceptance, under such tests as may be prescribed.

(C) Moisture Proofing:

All glass beads shall have a moisture-proof overlay consisting of water repellent material applied during the process of bead manufacture. The beads so treated shall not absorb moisture in storage and shall remain free of clusters and lumps and shall flow freely from dispensing and testing equipment.

The beads shall pass the test for water repellency and free flow using the following equipment.

(1) Test bag:

The bag used is approximately 10 1/2" x 17 1/2" after sewing. The material used in the construction of the bag is unbleached cotton sheeting with a thread count of 48 x 48. The material before sewing is approximately 18" x 22". The cloth is folded in half lengthwise and stitched in the shape of an "L" with the short side left open at the top. The material can be obtained from selected manufacturers of cloth and paper packaging. The finished bag may also be obtained from the manufacturer of the glass beads.

Newly fabricated bags must be thoroughly washed with hot water and detergent and rinsed before use to remove the sizing which may be present in the cloth. Subsequent to the initial washing, the bags need only be rinsed clean of beads from previous tests and dried thoroughly before use.

(2) Funnel:

The funnel used is a standard laboratory funnel with a top opening diameter of 125 mm. and 150 mm. stem length. The inside diameter of the stem is between 9 and 10 mm. This funnel is available from most laboratory glassware supply houses. Corning No. 6100 or equal.

(3) Ring Stand and Clamp.

(4) Balance accurate to 0.1 grams.

(5) Distilled water.

MOISTURE TESTING PROCEDURE:

Glass beads shall be tested for compliance to specification requirements. Testing shall be conducted at standard conditions of temperature (25 $\pm$ 1 degrees C) and humidity (50 $\pm$ 5 percent R.H.) and shall consist of the following procedure or an approved alternate:

Weigh 900.0 grams of glass beads into a clean, dry, flat-bottomed pan.

Dry beads at 150 degrees C for two hours.

Cool beads to room temperature (25 + 1 degrees) in a desiccator.

Using the clean, pre-washed bag described under apparatus section, turn the bag inside-out so that the sewn seam and seam-allowance are on the outside.

Quantitatively transfer the beads into the inverted cotton bag.

Grasp the gathered top of the bag with one hand and lower the bag into a container of distilled water until the beads are approximately one inch below the water level. The container shall be of such dimensions that the bag does not contact the bottom or sides during immersion. Each bag shall be immersed individually. Do not allow one bag to contact another if multiple tests are run.

Remove the bag after 30 seconds of immersion time.

Cradle the bottom of the bag uniformly in the palm of one hand and twist the top neck of the bag until the twisted bag is compressed firmly against the beads. Twist until excess water no longer drips from the bag.

After the excess water has been squeezed from the bag, allow the bag to unwind.

Gather the top of the bag and clamp. Suspending the bag on a ring stand or other support such that the bottom or sides of bag do not contact the support.

After a standing time of 2 hours at room temperature 25 degrees $\pm$ 1 degrees C, remove bag from support. Mix sample thoroughly by holding the bottom seam allowance in one hand and gathered neck of the bag in the other, invert bag and shake up and down 5 times.

Transfer the sample into a clean, dry funnel of the type described under apparatus. if consecutive tests are run, be sure the funnel is clean, dry and free of beads from prior tests.

The entire sample shall flow through the funnel without stoppage.

At the start of the test only, it is permissible to lightly tap the stem of the funnel to initiate flow.

Small quantities of beads which have adhered to the side of the funnel or stem shall not be cause for failure.

708-3 Construction Requirements:

.01 Equipment:

The traffic paint and beads shall be placed on the pavement by a spray-type, self-propelled pavement marking machine except that temporary striping during construction may be placed with other equipment designed for application of paint and beads.

The application equipment to be used on roadway installation shall have, as a minimum, the following characteristic and/or apparatus:

The machine shall be capable of applying a clear-cut 4-inch line or lines.

The machines shall be equipped with a mechanical device capable of placing a broken reflectorized line with a 10-foot painted segment and a 30-foot gap.

The machine shall be equipped with an air-operated glass bead drop-in dispenser controlled by the spray gun mechanism.

A glass bead dispenser which is capable of placing the glass beads into the paint line as the paint is applied to the pavement shall be utilized. This dispenser shall provide satisfactory marking and delineation.

.02 Application:

Pavement markings shall be applied when the pavement surface is dry and the weather is not foggy, rainy, or otherwise adverse to the application of markings. The surface shall be free from excess asphalt or other deleterious substances before traffic paint, beads or primer are applied. The contractor shall remove dirt, debris, grease, oil, rocks or chips from the pavement surface before applying markings. The placing of traffic markings shall be done only by personnel who are experienced in this work.

The volume of paint in place shall be determined by measuring the paint tank with a calibrated rod. At the option of the Engineer, if the striping machine is equipped with air-atomized spray units (not airless) and paint gauges, the volume of paint may be determined by utilizing said gauges.

The quantity of glass reflectorizing beads in place shall be determined by measuring the glass reflectorizing bead tank with a calibrated rod.

The contractor shall provide the necessary personnel and equipment to divert traffic from the installation area where the work is in progress and during drying time when, in the opinion of the Engineer, such diversion of traffic is necessary.

Tolerances for Placing Paint, Beads, and Primer:

The length of painted segment and gap shall not vary more than 6 inches in a 40-foot cycle.

The finished line shall be smooth, aesthetically acceptable and free from undue waviness.

Painted lines shall be 4, 8, or 12 inches wide as shown on the plans with a tolerance of plus or minus 1/8 inch and shall be placed at a minimum rate of 16 gallons per mile for a solid 4-inch line and 4 gallons per mile for a broken 4-inch line, based on a 10-foot stripe and a 30-foot gap (40-foot cycle aggregate).

Glass reflectorizing beads shall be applied on the wet paint at a minimum rate of 6 pounds to each gallon of paint.

Wet mil thickness shall not be less than 15 mils.

708-4 Method of Measurement:

Pavement marking paint will be measured by the linear foot along the centerline of the pavement stripe. Skips in dashed lines will not be included in the measurement. Length of pavement markings will be based on four inch wide stripe. Measurement for striping with a plan width greater or less than the basic four inches as shown on the plans or directed by the Engineer will be made by the following method:

$$\frac{\text{Plan Width of Striping (inches)} \times \text{Linear Feet}}{4 \text{ (inches)}}$$

Symbols and legends will be measured by each unit applied. Each legend, regardless of the number of letters, will be considered as a single unit.

SECTION 903 - WIRE FENCE:

903-1 Description: of the Standard Specifications is modified to add:

The work under this section shall also consist of furnishing all materials and reconstructing existing fence gates.

903-3 Construction Requirements: of the Standard Specifications is modified to add:

The existing fence gates designated for salvage shall be reconstructed at the new locations shown on the project plans and shall be reconstructed in accordance with the provisions specified herein for new fence gate.

Any posts, hardware or other materials which are deemed by the Engineer to be unsuitable for use in reconstructing the fence gate shall be removed and disposed of as directed by the Engineer. If any of these materials are required to be replaced in order to complete the reconstruction of the fence gates, the materials shall be furnished new by the contractor, and will be paid for as specified in Section 903-5.

903-4 Method of Measurement: of the Standard Specifications is modified to add:

Reconstruct fence gate from salvage will be measured by the unit each.

903-5 Basis of Payment: of the Supplemental Specifications is modified to add:

Reconstruct fence gate from salvage, measured as provided above, will be paid for at the contract unit price per each, complete in place. No additional payment will be made for the furnishing of replacement materials that may be required, as described in Section 903-3, said cost being considered incidental to and included in the cost of the item, Reconstruct Fence Gate From Salvage.

ITEM 9240010 FORCE ACCOUNT WORK (MISCELLANEOUS):

Description:

The work under this item consists of furnishing all materials and constructing a temporary roadway connection as shown on the project plans. This work shall include furnishing, placing and compacting any necessary borrow, all necessary surface preparation, and the placing, spreading, shaping and finishing of base material and asphaltic concrete as shown on the project plans.

Construction Requirements:

All materials shall be placed, spread, shaped, compacted, and finished in accordance with the construction requirements of the Standard and Supplemental Specifications and these Special Provisions for the specific material.

Method of Measurement:

The work under ITEM 9240010 FORCE ACCOUNT WORK (MISCELLANEOUS) will be measured for payment by the lump sum, as a single complete unit of work.

Basis of Payment:

Payment for the work, as measured above, will be made in accordance with Section 109.04 of the Standard and Supplemental Specifications.

SECTION 908 - CONCRETE CURBS, GUTTERS, SIDEWALKS AND DRIVEWAYS: of the Standard Specifications is modified to add:

908-1 Description:

Concrete wheel chair ramps shall consist of furnishing all labor and materials, and constructing at the locations shown on the project plans and in accordance with the requirements of these specifications.

908-4 Method of Measurement:

No direct measurement will be made for the construction of the concrete wheel chair ramps.

908-5 Basis of Payment:

Concrete wheel chair ramps will be paid for as sidewalk under ITEM 9080201. No direct payment will be made for construction of concrete wheel chair ramps, as they are considered to be incidental to and included in the price of concrete sidewalk.

CONBR910, 6, 06/26/86)

SECTION 910 - CONCRETE BARRIERS:

910-3.01 General: of the Standard Specifications is modified to add:

Concrete barriers and concrete barrier transitions which are constructed on bridge structures with deck joint assemblies shall be constructed by cast-in-place, fixed-form methods. Precast or slip-form methods will not be allowed.

ITEM 9210011 - MEDIAN PAVING:

Description:

The work under this item consists of furnishing materials and constructing the median paving with portland cement concrete at the locations and in accordance with the details shown on the project plans and these special provisions.

Materials:

Aggregate base shall conform to the requirements of Section 303 of the Specifications for Class 1, 2 or 3. In order to meet the grading requirements screening may be utilized in lieu of crushing. Aggregate base shall be compacted to a density of not less than 90 percent of the maximum density. The final surface need not be finished with a leveling device.

Portland cement concrete shall conform to the requirements of Section 601 of the Specifications for Class B concrete. Curing shall be as specified under Subsection 1006-6 of the Specifications, except that any method that will permanently discolor the concrete shall not be used. The concrete shall be scored for a depth of one inch transversely to match the joints in concrete curb and longitudinally when the width of the concrete exceeds 15 feet.

Joint filler shall conform to the requirements of Subsection 1011-6 of the Specifications.

Construction Requirements:

The surfaces upon which the base material is to be placed shall be fine graded and compacted to a density of not less than 90 percent of the maximum density as determined in accordance with the requirements of Arizona test methods 225, 226, 227, 230 or 231 and 232.

Finish on the slab shall be a transverse coarse broom finish.

Method of Measurement:

Measurement of this work will be made by the square yard of concrete placed.

Basis of Payment:

Payment for this work will be made at the contract price per square yard, which price shall be full compensation for the item complete, in place, including the furnishing and placing of aggregate base, as described and specified herein and on the project plans.

(PANT1002, 6, 02/02/87)

SECTION 1002 - PAINT: of the Standard and Supplemental Specifications are revised to read:

1002-1 General Requirements:

All paints furnished shall be ready mixed at the manufacturer's plant, except for Paint No. 3 and Paint No. 4, which shall be mixed at the project site just prior to application.

Ready-mixed paint shall be homogeneous, free of contaminants, and shall be well ground to a consistency suitable for the use for which it is specified. The pigment shall be finely ground and properly dispersed in the vehicle, according to the requirements for the type of paint, and this dispersion shall be such that the pigment does not settle appreciably, does not cake or thicken in the paint container, and does not become granular, jelled or curdled. Any settlement of pigment in the paint shall be easily dispersed with a paddle so as to produce a smooth uniform paint of the proper consistency. The manufacturer shall include in the paints the necessary additives for control of sagging, pigment settling, leveling, drying, drier absorption and skinning.

Paint shall be furnished in new, unopened air-tight containers, clearly labeled with the exact title of the paint, Federal Specification number when applicable, name and address of manufacturer, date of paint manufacture and the lot or batch number. The containers shall meet U.S. Department of Transportation Hazardous Material Shipping Regulations.

Precautions concerning the handling and the application of the paint shall be shown on the label of paint containers.

The vendor shall submit to the Department, three copies of a Certificate of Compliance and Certificate of Analysis, in accordance with Subsection 106.05, prior to the use of any materials for which these specifications or the special provisions require that such a certificate be furnished. Submissions shall be made in accordance with the requirements of the Materials Testing Manual.

The certificates shall have the original signature of a person having legal authority to bind the manufacturer or supplier of the material. A reproduction is not acceptable. The signature shall be notarized.

1002-2 Sampling and Testing:

Paint will be tested in accordance with the requirements of the latest applicable test methods of Federal Test Method Standard Number 141, the American Society for Testing and Materials, and current methods used by the Department.

Paint which is approved by the Department will be identified with a green sticker affixed to it showing project number, lot number and batch number.

Paint will be tested on a lot basis.

At least one sample, not less than one quart in size, will be taken and tested. Random samples may be taken at the discretion of the Department.

All paint vehicles and varnishes, shall conform to the requirements of ASTM D 2621.

1002-3 Paints:

Raw materials used in paint formulas shall conform to the specifications designated by ASTM or by Federal or Military serial number or paint material code number under the various paint classifications hereinafter specified. Subsequent amendments to the specifications quoted shall apply to all raw materials and finished products. No "or equal" substitutions for any specified material shall be made without written consent of the Engineer.

The volatile portion of the vehicle shall conform to the following requirements by volume:

(a) Solvents with an olefinic or cyclo-olefinic type of unsaturation shall not exceed 5 percent,

(b) The total of aromatic compounds with eight or more carbon atoms in the molecule, except ethylbenzene, methyl benzoate, and phenyl acetate, shall not exceed 8 percent,

(c) The total of ethylbenzene, toluene, and branched-chain ketones shall not exceed 20 percent,

(d) A solvent which may be classified into more than one of the above groups shall be considered a member of the group having the lowest allowable concentration,

(e) The total of (a), (b), and (c) shall not exceed 20 percent,

(f) The volatile solvents shall contain no benzene or halogenated compounds,

(g) All paints shall be completely miscible with mineral spirits conforming to Grade II of Federal Specification TT-T-291,

(h) Mineral spirits, conforming to Grade II, of Federal Specification TT-T-291 shall be the preferred thinner for all paints specified in this Subsection. If necessary, other paint thinners conforming to the requirements of (a) through (f) above may be used,

(i) Only alkyd-modified phenolic varnishes that require mineral spirits as the sole solvent shall be used. Unmodified para-phenolic varnishes that require aromatic and polar solvents shall not be used.

Alkyd-phenolic spar varnish shall conform to the following requirements:

Type	- Oleoresinous Alkyd
Solids by Weight (%)	- 49 to 51
Viscosity (G-H)	- D to F
Weight per Gallon (Lbs)	- 7.34 - 7.55
Color (G)	- 12 Maximum
Kauri Reduction	- Passes 120%
Complete, with driers.	
Type of Oil	- Tung, Soya.
Type of Resin	- Phthalic Alkyd-Phenolic
Type of Solvent	- Mineral Spirits
Mineral Spirits Tolerance	- Over 1000%
Solids by Volume	- 42%
Air Drying Time @77 degrees F.	
Set to Touch	- 1 to 1 1/2 Hours
Dry Hard	- 5 to 6 Hours

Lead and lead compounds shall not be used as raw materials in the paint formulas specified under this Section. Lead and lead compounds shall not be added to any paint formulas specified under this Section.

1002-3.01 Paint Number 1 - Primer Coating, Zinc Chromate, Low-moisture-sensitivity:

This paint shall be a zinc chromate primer conforming to the requirements of Federal Specification TT-P-1757 modified to comply with requirements (a) through (i) of Subsection 1002-3. The color shall be a visual match to Federal Standard 595A, tint No. 34151, and shall conform to the following requirements:

Zinc Chromate	27.5-28%
Silica	15%
Barytes	7-7.5%
Varnish	30-31%
Mineral Spirits	19-20%

All percentages are by total weight of primer.

Weight/Gallon:	11.10 to 11.60 Pounds
Viscosity:	70-75 K.U. @ 77 degrees F.
Set to Touch:	1/2 hour minimum
Recoat:	8 hours maximum

1002-3.02 Paint Number 2 - Primer Coating, Zinc Chromate, Low-moisture-sensitivity, Color Modified:

This paint shall conform to the requirements of Subsection 1002-3.01, except that when it is applied over Paint Number 1 it shall be tinted to contrast with Paint Number 1. Tinting shall conform to the requirements of Subsection 1002-3.06.

1002-3.03 Paint Number 3-Aluminum:

This paint shall conform to the requirements of AASHTO M 69, for Type I Aluminum Paint.

The quantity of this paint mixed during any one day shall be limited to the quantity to be used during that day.

1002-3.04 Paint Number 4-Zinc:

This paint shall be a zinc-dust, zinc-oxide primer conforming to the requirements of Federal Specification TT-P-641G and shall be one of the following types:

Type I - Zinc-dust, zinc-oxide linseed oil primer.
Type II - Zinc-dust, zinc-oxide phthalic alkyd resin primer.
Type III - Zinc-dust, zinc-oxide phenolic resin primer modified to conform to requirements (a) through (i) of Subsection 1002-3.

1002-3.05 SSPC Paint No. 27, Basic Zinc Chromate - Vinyl Butyral Wash Primer:

This paint shall be as described in "Systems and Specifications, Steel Structures Painting Manual, Volume 2", Steel Structures Painting Council.

1002-3.06 Tinting:

(a) Paint Number 4 - Zinc

If modified colors are required, non-lead containing pigments shall be used in amounts not exceeding 10 percent of the total pigment weight and replacing an equal weight of zinc oxide.

(b) Paint Number 2 - Primer Coating, Zinc Chromate, Low-moisture-sensitivity, Color Modified:

If modified colors are required, non-lead containing pigments shall be used in amounts not exceeding 10 percent of the total pigment weight and replacing an equal weight of silica.

1002-4 Enamels:

The following enamels shall conform to the requirements of Federal Specification TT-E-489-G (Enamel, Alkyd, Gloss). The color of enamel specified shall be a visual match to the standard color chip in Federal Standard No. 595A, Colors. The color match shall be made with non-lead containing materials. The class and composition of the enamels shall be Class A-Air Drying and Composition G-General Use.

.01	Dull Black Enamel	(Color Chip No. 37038).
.02	Gloss Black Enamel	(Color Chip No. 17038).
.03	White Enamel	(Color Chip No. 17875).
.04	Yellow Enamel	(Color Chip No. 13538).

.05	Dark Olive Green Enamel	(Color Chip No. 14087).
.06	Light Gray Enamel	(Color Chip No. 16187).
.07	Buff Enamel	(Color Chip No. 30257).
.08	Green Enamel	(Color Chip No. 34108).
.09	Tan Enamel	(Color Chip No. 20318).
.10	Dark Gray Enamel	(Color Chip No. 26081).

SECTION 1003 - REINFORCING STEEL:

1003-2 Reinforcing Bars: of the Standard and Supplemental Specifications is modified to add:

DYWIDAG threadbars shall conform to the requirements of ASTM A 615 Grade 60 except in marking. Threadline deformations shall be provided along the entire length of the bar.

(PCC1006, 6, 04/17/86)

SECTION 1006 - PORTLAND CEMENT CONCRETE:

1006-2.04(D) Fly Ash: of the Standard Specifications is revised to read:

Fly ash shall conform to the requirements of ASTM C 618 for Class C or F mineral admixture, except that the loss on ignition shall not exceed 3.0 percent.

Fly ash, when used as a replacement for portland cement, shall have an R factor less than 2.5. The R factor is defined as (C-5%)/F, where C is the calcium oxide content expressed as a percentage and F is the ferric oxide content expressed as a percentage. Calcium and ferric oxide content shall be determined in accordance with the requirements of ASTM C 311.

1006-4.03(B) Mixing in a Stationary Mixer: the last paragraph of the Standard Specifications is revised to read:

Discharge from nonagitating trucks shall be completed within 45 minutes from the time concrete is batched. Concrete hauled in open-top vehicles shall be protected against access of rain, or exposure to the sun for more than 30 minutes when the ambient temperature exceeds 85 degrees F.

1006-7.02 Sampling and Testing for Compressive Strength Cast-in-Place Concrete): of the Supplemental Specifications is modified to add:

Samples of concrete for test specimens will be taken in accordance with requirements of AASHTO T 141. All test cylinders will be fabricated in accordance with the requirements of AASHTO T 23. Testing for compressive strength will be in accordance with the requirements of AASHTO T 22.

A strength test will consist of the average strength of two cylinders or 95 percent of the higher strength cylinder, whichever is greater.

1006-7.03 Sampling and Testing for Compressive Strength (Precast Concrete): the third paragraph of the Standard Specifications is revised to read:

Samples of concrete for test specimens will be taken in accordance with requirements of AASHTO T 141. All test cylinders will be fabricated in accordance with the requirements of AASHTO T 23. Testing for compressive strength will be in accordance with the requirements of AASHTO T 22.

A strength test will consist of the average strength of two cylinders or 95 percent of the higher strength cylinder, whichever is greater.

1006-7.05 Acceptance for Compressive Strength: of the Standard Specifications is revised to read:

Class S and Class B Concrete:

Concrete represented by a strength test of at least 95 percent of the required 28-day compressive strength will be acceptable for cast-in-place and precast concrete. All concrete failing to meet this requirement will be rejected in accordance with the provisions of Subsection 106.11 unless the contractor, at his own expense, can submit evidence that will indicate to the Engineer that the strength and quality of the concrete is such that the concrete should be considered acceptable. If such evidence consists of concrete cores, the contractor shall obtain three cores from the concrete represented by the failing strength test and deliver them to the Engineer in time to allow complete testing of such cores within 42 days after the placement of the concrete. All cores shall be obtained and tested in accordance with the requirements of AASHTO T 24. All cores will be tested in the wet condition unless, based on the service conditions of the structure, the Engineer decides that they should be tested in other than the wet condition. The concrete represented by the cores will be considered acceptable if the numerical average of the compressive strength of the three cores is at least the required 28-day compressive strength. If the average compressive strength does not meet this requirement, all concrete so represented shall be removed at the contractor's expense unless permitted to remain in place by the Engineer. No payment will be made for concrete permitted to remain in place when the average compressive strength of the three cores fails to meet the required 28-day compressive strength.

ARIZONA DEPARTMENT OF TRANSPORTATION

HIGHWAYS DIVISION

CONTRACTS AND SPECIFICATIONS SERVICES

BIDDING SCHEDULE

Project No.	Termini	Location	Fund Code	Item
I-10-2-507	EHRENBERG-PHOENIX HWY.	(Palo Verde Road T.I.)	82513	336

County	Gross Length	Net Length	Prepared By
Maricopa	0.57 Miles	0.57 Miles	GC/km

PROJECT NO.
I-10-2-507

BIDDING SCHEDULE

DATE 7/7/87

	ITEM NO	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
1	2010001	Clearing and Grubbing	L. Sum	1		
2	2020001	Removal of Structures and Obstructions	L. Sum	1		
3	2020029	Removal of Asphaltic Concrete Pavement	Sq. Yd.	20,925		
4	2020037	Remove and Salvage Cattle Guards	Each	5		
5	2020072	Remove and Salvage Guard Rail	L. Ft.	1,040		
6	2020101	Remove Fence	L. Ft.	2,375		
7	2020112	Remove and Salvage Gate	Each	2		
8	2030301	Roadway Excavation	Cu. Yd.	4,345		
9	2030401	Drainage Excavation	Cu. Yd.	2,215		
10	2030901	Borrow	Cu. Yd.	165,040		
11	2060001	Furnish Water Supply	L. Sum	1		
12	2070001	Dust Palliative	M. Gal	50	8.00	
13	3030022	Aggregate Base, Class 2	Cu. Yd.	7,082		
14						
15						
16						
17						

PROJECT NO.
I-10-2-507

BIDDING SCHEDULE

DATE 7/7/87

	ITEM NO	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
1	4040024	Asphalt Cement (AC-40) (For 1/2" mix)	TON	148		
2	4040026	Asphalt Cement (AC-40) (For 3/4" mix)	TON	395		
3	4040029	Asphalt Cement (AC-20) (For ACFC)	TON	20		
4	4040101	Prime Coat	TON	75		
5	4040111	Bituminous Tack Coat	TON	21		
6	4040116	Apply Bituminous Tack Coat	HOUR	120		
7	4040131	Provisional Seal Coat	TON	12		
8	4040136	Apply Provisional Seal Coat	HOUR	8		
9	4040163	Blotter Material	TON	36		
10	4070001	Asphaltic Concrete Friction Course	TON	395		
11	4160001	Asphaltic Concrete (1/2" mix) (End product)	TON	2,960		
12	4160002	Asphaltic Concrete (3/4" mix) (End product)	TON	7,895		
13						
14						
15						
16						
17						

PROJECT NO.

I-10-2-507

BIDDING SCHEDULE

SHEET 4 OF 11

DATE 7/7/87

	ITEM NO	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
1	5010011	Pipe, Corrugated Metal, 24"	L. Ft.	1,131		
2	5010025	Pipe, Corrugated Metal, 36"	L. Ft.	36		
3	5010035	Pipe, Corrugated Metal, 48"	L. Ft.	58		
4	5010107	Pipe, Corrugated Metal, Slotted, 18"	L. Ft.	120		
5	5014036	Flared End Section, 36" (C-13.25)	Each	3		
6	5014048	Flared End Section, 48" (C-13.25)	Each	2		
7	5030070	Concrete Catch Basin (C-15.30) Single, H=8' or less	Each	2		
8	5030072	Concrete Catch Basin (C-15.30) Double, H=8' or less	Each	2		
9	5030091	Concrete Catch Basin (C-15.40) Sump Only, H=8' or				
10		less	Each	10		
11	5030142	Concrete Catch Basin (Median) (C-15.80)	Each	1		
12						
13						
14						
15						
16						
17						

PROJECT NO.
I-10-2-507

SHEET 5 OF 11

BIDDING SCHEDULE

DATE 7/7/87

	ITEM NO	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
1	6060054	Bridge Sign Structure (Tapered Tube, Single Beam				
2		71'-3" - 81'-3")	Each	2		
3	6060080	Foundation for Bridge Sign Structure (3'-0" x 12'0")	Each	4		
4	6070002	Breakaway Sign Post S4 x 7.7	L. Ft.	93		
5	6070006	Breakaway Sign Post W8 x 18	L. Ft.	280		
6	6070022	Foundation for Breakaway Sign Post S4 x 7.7	Each	8		
7	6070026	Foundation for Breakaway Sign Post W8 x 18	Each	6		
8	6070041	Sign Post (P-1) (Perforated) (Single)	L. Ft.	265		
9	6070042	Sign Post (P-2) (Perforated) (Telescoping)	L. Ft.	173		
10	6070046	Foundation for Sign Post (P-1) (Perforated)	Each	24		
11	6070047	Foundation for Sign Post (P-2) (Perforated)	Each	16		
12	6080001	Sign Panel (C Series) (Opaque)	Sq. Ft.	266		
13	6080005	Sign Panel (E Series) (High Reflectivity Sheeting)	Sq. Ft.	985		
14	6080011	Warning Sign Panels	Sq. Ft.	54		
15	6080021	Marker Sign Panels	Sq. Ft.	49		
16	6080031	Regulatory Sign Panels	Sq. Ft.	380		
17	6080105	Relocate Signs	L. Sum	1		

PROJECT NO.
I-10-2-507

BIDDING SCHEDULE

DATE 7/7/87

	ITEM NO	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
1	7010001	Maintenance and Protection of Traffic	L. Sum	1		
2	7040001	Pavement Marking (White Hot-Sprayed Thermoplastic)	L. Ft.	15,280		
3		(0.030")				
4	7040002	Pavement Marking (Yellow Hot-Sprayed Thermoplastic)	L. Ft.	4,420		
5		(0.030")				
6	7050023	Pavement Marking, Preformed, Type I, Single Arrow	Each	18		
7	7050024	Pavement Marking, Preformed, Type I, Double Arrow	Each	6		
8	7050026	Pavement Marking, Preformed, Type I, Legend	Each	6		
9	7060015	Pavement Marker, Raised, Type D	Each	66		
10	7060018	Pavement Marker, Raised, Type G	Each	135		
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PROJECT NO.
I-10-2-507

SHEET 7 OF 11

DATE 7/7/87

BIDDING SCHDULE

	ITEM NO	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
1	7310071	Pole (Type G) (Slip Away Base)	Each	18		
2	7310130	Pole (Type Q)	Each	4		
3	7310261	Pole Foundation (Type G) (Slip Away Base)	Each	18		
4	7310310	Pole Foundation (Type Q)	Each	4		
5	7310521	Mast Arm (12 Ft.) (Tapered)	Each	2		
6	7310531	Mast Arm (15 Ft.) (Tapered)	Each	2		
7	7310551	Mast Arm (20 Ft.) (Tapered)	Each	18		
8	7320040	Electrical Conduit (1 1/2") (PVC)	L.F.	6,155		
9	7320050	Electrical Conduit (2") (PVC)	L.F.	1,330		
10	7320070	Electrical Conduit (3") (PVC)	L.F.	1,400		
11	7320410	Pull Box (No. 5)	Each	26		
12	7320420	Pull Box (No. 7)	Each	16		
13	7320500	Conductor (No. 12)	L.F.	2,000		
14	7320520	Conductor (No. 8)	L.F.	7,900		
15	7320530	Conductor (No. 6)	L.F.	26,740		
16	7320570	Conductor (No. 1)	L.F.	3,175		
17	7350130	Loop Detector for Traffic Signals (6'x70') (QUAD)	Each	18		

PROJECT NO.
I-10-2-507

SHEET 8 OF 11

DATE 7/7/87

BIDDING SCHEDULE

	ITEM NO	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
1	7350140	Loop Detector for Traffic Signals (6'x50') (QUAD)	Each	2		
2	7360020	Luminaire (Horizontal Mount) (HPS 150 Watt)	Each	18		
3	7360030	Luminaire (Horizontal Mount) (HPS 250 Watt)	Each	4		
4	7360221	Load Center Cabinet (Type II) (240/480 Volt)	Each	1		
5	9010001	Mobilization	L. Sum	1		
6	9020251	Reconstruct Fence Gate from Salvage	Each	2		
7	9030012	Barbed Wire Fence, Type 2	L. Ft.	390		
8	9060051	Cattle Guard (5 Unit)	Each	2		
9	9060071	Cattle Guard (7 Unit)	Each	2		
10	9080003	Concrete Curb (C-05.10) (Type A) (h=7")	L. Ft.	3,720		
11	9080092	Concrete Curb and Gutter (C-05.10) (Type A) (h=7")	L. Ft.	4,511		
12	9080201	Concrete Sidewalk (C-05.20)	Sq. Ft.	5,440		
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PROJECT NO.
I-10-2-507

BIDDING SCHEDULE

DATE 7/7/87

	ITEM NO	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
1	9100036	Concrete Barrier (Special Half)	L. Ft.	668		
2	9120003	Shotcrete (3")	Sq. Yd.	1,472		
3	9130007	Riprap (Dumped) (18")	Cu. Yd.	2,750		
4	9170001	Embankment Spillway (C-4.10)	L. Ft.	51		
5	9170011	Embankment Downdrains (C-4.20)	L. Ft.	120		
6	9170021	Inlet (C-4.10) (Single)	Each	4		
7	9170031	Inlet (C-4.20) (Single)	Each	2		
8	9170042	Outlet (C-4.20)	Each	6		
9	9210012	Median Paving (4")	Sq. Yd.	3,504		
10	9240010	Force Account Work (Miscellaneous)	L. Sum	1	5,000.00	
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PROJECT NO.
I-10-2-507

BIDDING SCHEDULE

SHEET 10 OF 11
DATE 7/7/87

	ITEM NO	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
1		A. Palo Verde Road Traffic Interchange Underpass				
2	2030501A	Structural Excavation	Cu. Yd.	3,050		
3	2030506A	Structure Backfill	Cu. Yd.	1,944		
4	2030515A	Special Foundation Backfill (Cement Treated)	Cu. Yd.	300		
5	6010002A	Structural Concrete (Class S) (f'c = 3000)	Cu. Yd.	840		
6	6010003A	Structural Concrete (Class S) (f'c = 3500)	Cu. Yd.	413		
7	6010005A	Structural Concrete (Class S) (f'c = 4500)	Cu. Yd.	1,063		
8	6012931A	Precast, Prestressed Concrete Bridge Member	Each	34		
9		(I-Beam, VI, 131 Ft. 3")				
10	6015101A	Vertical Restrainer	Each	64		
11	6050002A	Reinforcing Steel	LB.	301,960		
12	6050003A	Reinforcing Steel (DYWIDAG)	LB.	8,210		
13	6090030A	Drilled Shaft Foundation (30")	L. Ft.	2,637		
14	6130301A	Deck Joint Assembly (Compression Seal)	L. Ft.	220		
15		(B-24.20 or B-24.21)				
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PROJECT NO.
I-10-2-507

BIDDING SCHEDULE

DATE 7/7/87

	ITEM NO	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
1	7010010A	Temporary Concrete Barrier	L. Ft.	270		
2	7320300A	Conduit in Bridge (3")(1-1/2")	L. Sum	1		
3	9020031A	Chain Link Fence (sidewalk)	L. Ft.	636		
4	921007A	Slope Paving (exposed aggregate)	Sq. Yd.	1,600		
5	9999903A	*Construct Structure (Total)	L. Sum	1		
6		*The Lump Sum amount for this item shall equal the				
7		sum of the amounts for the preceding items.				
8		B. 4-10' x 10' C.B.C. Palo Verde Station 9+20				
9	2030501B	Structural Excavation	Cu. Yd.	1,915		
10	2030506B	Structure Backfill	Cu. Yd.	1,495		
11	6010002B	Structural Concrete (Class S)(f'c = 3000)	Cu. Yd.	719		
12	6050002B	Reinforcing Steel	LB.	104,515		
13	9999903B	*Construct Structure (Total)	L. Sum	1		
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12-2302 R6/77
(Formerly 12-2313)

*The Lump Sum amount for this item shall equal the sum of the amounts for the preceding items.

ARIZONA DEPARTMENT OF TRANSPORTATION

HIGHWAYS DIVISION

206 South Seventeenth Avenue Phoenix, Arizona 85007

EVAN MECHAM
Governor

CHARLES L. MILLER
Director

CONTRACTS & SPECIFICATIONS SERVICES

1651 West Jackson, 121F Phoenix, Arizona 85007

W.O. FORD
State Engineer

OCTOBER 6, 1987

ADDENDUM
(2)

TO ALL CONTRACTORS AND OTHERS INTERESTED IN PROJECT
I-10-2-507 EHRENBERG-PHOENIX HIGHWAY (Palo Verde Road T.I.)
SCHEDULED FOR BID OPENING ON TUESDAY, OCTOBER 13, 1987
AT 11:00 A.M.:

REVISIONS TO ADVERTISEMENT FOR BIDS:

On Page 1, the listing for Approximate Quantities is revised to read:

Removal of Asphaltic Concrete Pavement	Sq.Yd.	20,925
Borrow	Cu.Yd.	144,060
Aggregate Base, Class 2	Cu.Yd.	7,082
Asphaltic Concrete (1/2" Mix) (End Product)	Ton	2,960
Asphaltic Concrete (3/4" Mix) (End Product)	Ton	7,895
Pipe, Corrugated Metal	L.Ft.	1,745
Structural Concrete (Class S) (f'c = 3,000)	Cu.Yd.	1,559
Structural Concrete (Class S) (f'c = 3,500)	Cu.Yd.	413
Structural Concrete (Class S) (f'c = 4,500)	Cu.Yd.	1,063
Precast, Prestressed Concrete Bridge Members (I-Beam, Vi, 131 Ft. 2")	Each	34
Drilled Shaft Foundation (30")	L.Ft.	2,585
Signing and Pavement Striping	---	---
Lighting	---	---
Concrete Curb and Gutter	L.Ft.	4,511
Engineers Field Office	L.Sum	1

REVISIONS TO THE SPECIAL PROVISIONS:

SHEET 5 GENERAL REQUIREMENTS:

The fourth paragraph is revised to read:

"All excavations into the FRS dyke embankment shall not be backfilled until the Arizona Department of Water Resources and the Soil Conservation Service inspect and approve the area for backfilling. An inspection will apply to all excavations in the areas at the dyke."

SHEET 14:

The first and second paragraphs are revised to read:

The policies required by 1 and 2 above shall be endorsed to include the Department, Maricopa County, the Adams Group Inc., the Sun Valley Owner's Association, Heron Financial Corporation and Security Pacific National Bank, their agents, officials, employees and the State of Arizona as additional insureds and shall stipulate that the insurance afforded the contractor shall be primary insurance and that any insurance carried by the Department, its agents, officials, employees or the State of Arizona shall be excess and not contributory insurance to that provided by the contractor as provided by A.R.S. 41-621C.

All insurance policies or certificates shall include a requirement providing for 30 days prior written notice to the Department, Maricopa County, the Adams Group Inc., the Sun Valley Owner's Association, Heron Financial Corporation and Security Pacific National Bank, of any cancellation or reduction of coverage. The contractor shall cease operations on the occurence of any such cancellation or reduction and shall not resume operations until the required insurance is in force and new certificates of insurance have been filed with the Department.

SECTION 203 - EARTHWORK:

The second paragraph of Subsection 203-2 is revised to read:

"All excavations into the FRS dyke embankment shall not be backfilled until the Arizona Department of Water Resources and the Soil Conservation Service inspect and approve the area for backfilling. An inspection will apply to all excavations in the areas at the dyke."

REVISIONS AND ADDITIONS TO THE PROJECT PLANS:

The following sheets are revised:

Sheet 2, 15, 17, 25, 47A, 48, 49 and 50.

Void the original sheets noted above and replace them with the revised sheets.

The following new sheets are added:

Sheets 48A, 48B, 48C, 48D, 49A, 50A and 50B.

REVISIONS TO THE BIDDING SCHEDULE:

Attached are revised sheets 2,3,6,8 and 9 of 12 of the bidding schedule. Please remove the original sheets 2,3,6,8 and 9 from your Proposal Pamphlet, attach the revised sheets and be guided accordingly.

DALLIS SAXTON, Engineer
Contracts & Specification Services

RE:lg
Attachments:
Revised Project Plan Sheets 2,15,17,25,47A,48,49 and 50.
New Project Plan Sheets 48A, 48B, 48C, 48D, 49A, 50A and 50B.
Sheets 2,3,6,8 and 9 of the Bidding Schedule.

PROJECT NO.
I-10-2-507

BIDDING SCHEDULE

SHEET 2 OF 12
DATE 10-6-87

	ITEM NO	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
1	2010001	Clearing and Grubbing	L. Sum	1		
2	2020001	Removal of Structures and Obstructions	L. Sum	1		
3	2020029	Removal of Asphaltic Concrete Pavement	Sq. Yd.	20,925		
4	2020037	Remove and Salvage Cattle Guards	Each	6		
5	2020072	Remove and Salvage Guard Rail	L. Ft.	1,040		
6	2020101	Remove Fence	L. Ft.	2,375		
7	2020112	Remove and Salvage Gate	Each	2		
8	2030301	Roadway Excavation	Cu. Yd.	4,345		
9	2030401	Drainage Excavation	Cu. Yd.	2,215		
10	2030901	Borrow	Cu. Yd.	144,060		
11	2060001	Furnish Water Supply	L. Sum	1		
12	2070001	Dust Palliative	M. Gal	50	8.00	400.00
13	3030022	Aggregate Base, Class 2	Cu. Yd.	7,082		
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PROJECT NO.
I-10-2-507

BIDDING SCHEDULE

DATE 10-6-87

	ITEM NO	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
1	4040024	Asphalt Cement (AC-40) (For 1/2" mix)	TON	148		
2	4040026	Asphalt Cement (AC-40) (For 3/4" mix)	TON	395		
3	4040029	Asphalt Cement (AC-20) (For ACFC)	TON	20		
4	4040101	Prime Coat	TON	75		
5	4040111	Bituminous Tack Coat	TON	21		
6	4040116	Apply Bituminous Tack Coat	HOUR	120		
7	4040131	Provisional Seal Coat	TON	12		
8	4040136	Apply Provisional Seal Coat	HOUR	8		
9	4040163	Blotter Material	TON	36		
10	4060024	Mineral Admixture (For 1/2" mix)	TON	59		
11	4060026	Mineral Admixture (For 3/4" mix)	TON	158		
12	4070001	Asphaltic Concrete Friction Course	TON	395		
13	4160001	Asphaltic Concrete (1/2" mix) (End product)	TON	2,960		
14	4160002	Asphaltic Concrete (3/4" mix) (End product)	TON	7,895		
15	5010004	Pipe, Corrugated Metal, 12"	L. Ft.	120		
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PROJECT NO.
I-10-2-507

BIDDING SCHEDULE

SHEET 6 OF 12

DATE 10-6-87

	ITEM NO	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
1	7010001	Maintenance and Protection of Traffic	L. Sum	1	200,000	200,000
2	7040001	Pavement Marking (White Hot-Sprayed Thermoplastic)	L. Ft.	15,820		
3		(0.030")				
4	7040002	Pavement Marking (Yellow Hot-Sprayed Thermoplastic)	L. Ft.	4,420		
5		(0.030")				
6	7050023	Pavement Marking, Preformed, Type I, Single Arrow	Each	20		
7	7050024	Pavement Marking, Preformed, Type I, Double Arrow	Each	6		
8	7050026	Pavement Marking, Preformed, Type I, Legend	Each	6		
9	7060015	Pavement Marker, Raised, Type D	Each	66		
10	7060018	Pavement Marker, Raised, Type G	Each	151		
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PROJECT NO.
I-10-2-507

SHEET 8 OF 12

DATE 10-6-87

BIDDING SCHEDULE

	ITEM NO	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
1	7350140	Loop Detector for Traffic Signals (6'x50') (QUAD)	Each	2		
2	7360020	Luminaire (Horizontal Mount) (HPS 150 Watt)	Each	18		
3	7360030	Luminaire (Horizontal Mount) (HPS 250 Watt)	Each	4		
4	7360221	Load Center Cabinet (Type II) (240/480 Volt)	Each	1		
5	9010001	Mobilization	L. Sum	1		
6	9020251	Reconstruct Fence Gate from Salvage	Each	2		
7	9030012	Barbed Wire Fence, Type 2	L. Ft.	850		
8	9060051	Cattle Guard (5 Unit)	Each	2		
9	9060071	Cattle Guard (7 Unit)	Each	2		
10	9080003	Concrete Curb (C-05.10) (Type A) (h=7")	L. Ft.	3,720		
11	9080092	Concrete Curb and Gutter (C-05.10) (Type A) (h=7")	L. Ft.	4,511		
12	9080201	Concrete Sidewalk (C-05.20)	Sq. Ft.	5,440		
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PROJECT NO.
I-10-2-507

BIDDING SCHEDULE

DATE 10-6-87

	ITEM NO	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
1	9100036	Concrete Barrier (Special Half)	L. Ft.	668		
2	9120003	Shotcrete (3")	Sq. Yd.	1,472		
3	9130007	Riprap (Dumped) (18")	Cu. Yd.	6,200		
4	9170001	Embankment Spillway (C-4.10)	L. Ft.	51		
5	9170011	Embankment Downdrains (C-4.20)	L. Ft.	120		
6	9170021	Inlet (C-4.10) (Single)	Each	4		
7	9170031	Inlet (C-4.20) (Single)	Each	2		
8	9170042	Outlet (C-4.20)	Each	6		
9	9210012	Median Paving (4")	Sq. Yd.	3,504		
10	9240010	Force Account Work (Miscellaneous)	L. Sum	1	5,000.00	5,000.00
11	9250001	Construction Surveying and Layout	L. Sum	1		
12	9250102	Two-Person Survey Party	Hour	50	65.00	3,250.00
13	9250103	Three-Person Survey Party	Hour	50	75.00	3,750.00
14	9250104	Four-Person Survey Party	Hour	50	85.00	4,250.00
15	9260004	Engineers Field Office	L. Sum	1		
16				ROADWAY TOTAL:		
17						

EVAN MECHAM
Governor
CHARLES L. MILLER
Director

ARIZONA DEPARTMENT OF TRANSPORTATION

HIGHWAYS DIVISION

206 South Seventeenth Avenue Phoenix, Arizona 85007

CONTRACTS & SPECIFICATIONS SERVICES
1651 West Jackson, 121F, Phoenix, AZ 85007 W.O. FORD
State Engineer

September 23, 1987

ADDENDUM

TO ALL CONTRACTORS AND OTHERS INTERESTED IN PROJECTS LISTED BELOW:

PROJECT NO.	LOCATION	BID OPEN DATE	ADDENDUM NO.
M-951-0-903	Pima Mine Rd.-Hughes Access	10/09/87	(1)
I-10-2-507	Palo Verde Road T.I.	10/13/87	(1)
S-987-501	Maricopa-Mobile Unit I	10/13/87	(1)
S-987-502	Maricopa-Mobile Unit II	10/13/87	(1)
F-063-1-506	San Luis-North	10/30/87	(1)

ADDITION TO SECTION 102-BIDDING REQUIREMENTS AND CONDITIONS:

Subsection 102.11 - Delivery of Proposals is modified to add:

No bid will be accepted from any contractor who is not a duly licensed contractor in accordance with Arizona Revised Statutes 32-1101 through 32-1170.03.

DALLIS B. SAXTON, Engineer-Manager
Contracts & Specifications Services

DE:jc

The number of working days specified for the completion of the work is 253 .

Project plans, specifications, and proposal pamphlets may be obtained from Contracts and Specifications Services (602) 255-7221. Plans and bidding documents should be available for sale to bidders approximately one week following notice of advertisement for bids. The cost is $29.00 . No refund will be made for plans and specifications returned.

No contracting firm will be issued a proposal pamphlet until it has become prequalified. The Application for Contractor Prequalification shall be filed at least 15 calendar days prior to the bid opening date. The Application may be obtained from Contracts and Specifications Services.

The lowest qualified bidder shall be duly licensed as a contractor in the State of Arizona prior to the execution of the contract by the Arizona Department of Transportation.

The Arizona Department of Transportation hereby notifies all bidders that pursuant to this advertisement for bids, Disadvantaged Business Enterprises will be afforded full opportunity to submit bids in response to this solicitation and will not be discriminated against on the grounds of race, color, sex, or national origin in consideration for an award.

All labor employed on this project shall be paid in accordance with the minimum wage rates shown in the General Wage Decision No. AZ87-2. These rates have been determined in accordance with the requirements of the law and issued by the Secretary of Labor for this project. The wage scale is on file in Contracts and Specifications Services and copies may be obtained at all reasonable times.

A proposal guaranty in the form of either a certified or a cashier's check made payable to the State Treasurer of Arizona for not less than five percent of the amount of the bid or in the form of a surety (bid) bond for five percent of the amount of the bid shall accompany the proposal.

Surety (bid) bonds will be accepted only on the form provided by the Department and only from corporate sureties authorized to do business in Arizona.

Proposal pamphlets shall be submitted only in the envelope provided by the Department to:

Arizona Department of Transportation
Highways Division
Contracts and Specifications Services
1651 West Jackson Street, Room 121-F
Phoenix, Arizona 85007-3276

ARIZONA DEPARTMENT OF TRANSPORTATION

ADVERTISEMENT FOR BIDS

BID OPENING: Tuesday, October 13, 1987 AT 11:00 A.M.

PROJECT AND LOCATION:

I-10-2-507 EHRENBERG-PHOENIX HIGHWAY
(Palo Verde Road T.I.)

ROUTE NO.	MILEPOST	DISTRICT	ITEM NO.	FUND CODE
I-10	109.7	3	336	82513

The location and description of the proposed work and the representative items and approximate quantities are as follows:

The proposed work is located in Maricopa County, on Palo Verde Road at the Interstate Route 10 Traffic Interchange Milepost 109.7, beginning at Station 5770+00 and extends easterly to Station 5800+00 for a distance of 0.57 miles and consists of grading and draining the roadway; furnishing and placing asphaltic concrete pavement; construction of a two span underpass bridge; construction of a four barrel concrete box culvert; furnishing and installing highway lighting; pavement markings; signing; and other related work.

Removal of Asphaltic Concrete Pavement	Sq.Yd.	20,925
Borrow	Cu.Yd.	165,040
Aggregate Base, Class 2	Cu.Yd.	7,082
Asphaltic Concrete (1/2" Mix) (End Product)	Ton	2,960
Asphaltic Concrete (3/4" Mix) (End Product)	Ton	7,895
Pipe, Corrugated Metal	L.Ft.	1,225
Structural Concrete (Class S)(f'c=3,000)	Cu.Yd.	1,559
Structural Concrete (Class S)(f'c=3,500)	Cu.Yd.	413
Structural Concrete (Class S)(f'c=4,500)	Cu.Yd.	1,063
Precast, Prestressed Concrete Bridge Members - (I-Beam, VI, 131 Ft. 2")	Each	34
Drilled Shaft Foundation (30")	L.Ft.	2,585
Signing and Pavement Striping	L.Ft.	2,585
Lighting	L.Ft.	2,585
Concrete Curb and Gutter	L.Ft.	4,511

Bidders are advised that the Department will not take samples for quality control and will in no manner assist in any degree or in any aspect of the contractor's operation in the production of the asphaltic concrete, beginning from the production of aggregate through the compaction of the asphaltic concrete.

Because of the very limited degree of participation by the Department, it is understood that the contractor will provide personnel capable of performing the production sampling, testing, placing and compacting of aggregates and asphaltic concrete, and for all areas of quality control so that the acceptance of all materials, as hereinafter specified, is free of penalties.

Sealed bids will be received until the hour indicated and then publicly opened and read. No bids will be received after the time specified.

Engineering Specialist:	Lichliter/Jameson & Associates, Inc.	
	David Eberhart	(602) 231-0931
Resident Engineer:	James Shea	(602) 255-7533
Construction Supervisor:	Evan Leander	(602) 255-7533

DALLIS B. SAXTON, Engineer-Manager
Contracts & Specifications Services

I-10-2-507
9/11/87
11/88
PO/jc