

2006 P085

95 PERCENT

SPECIAL PROVISIONS

FOR

ARIZONA PROJECT

060 MA 148 H6690 01C

060-B(200)A

WICKENBURG – PHOENIX HIGHWAY (US 60)

(99th Avenue – 83rd Avenue)

WIDEN ROADWAY AND NEW RIVER BRIDGE (EB, WB)

The proposed project is located within the City of Peoria on US 60 in Maricopa County. The project begins at Milepost 148.5 and extends to Milepost 150.3 for a total distance of approximately 1.8 miles. The work consists of widening Grand Avenue and the New River bridges (EB, WB) to accommodate an additional through-lane in each direction. The work also includes milling AC pavement; placing AB, AC and AR-ACFC; new sidewalk, curb and gutter; new concrete barrier, new guardrail, drainage features, retaining wall and other related work.

SPECIFICATIONS:

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

Arizona Department of Transportation, Standard Specifications for Road and Bridge Construction, Edition of 2000 (Pub. # 31-066),

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

Arizona Department of Transportation, Traffic Group, Manual of Approved Signs, available on the Department's website, through the Traffic Group,

Arizona Department of Transportation, Traffic Group, Traffic Control Design Guidelines (Pub. # 31-088),

Manual on Uniform Traffic Control Devices for Streets and Highways, 2003 edition and Arizona Supplement to the 2003 edition, September 1, 2004 (Pub. # 31-010),

The Proposal Pamphlet and Non-bid Pamphlet which include the following documents:

These Special Provisions,

List of Subcontractors, Suppliers, Service Providers and Manufacturers Bidding ADOT Contracts,

Required Contract Provisions All Federal-Aid Construction Contracts (Form FHWA 1273 Revised March, 1994),

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,

Equal Employment Opportunity Compliance Reports, Federal-Aid Projects, February 1, 1977, Revised July 1, 1978, Revised November 3, 1980, Revised April 15, 1981, Revised September 7, 1983, Revised October 15, 1998, Revised January 1, 2005, and Revised August 2005,

Federal-Aid Proposal (Notices to Prospective Federal-Aid Construction Contractors), September 29, 1975,

Wage Determination Decision,

Attachment A, Subgrade Acceptance Chart,

Attachment B, Burlington Northern and Sante Fe Railway Company (BN & SF RY),
Attachment C, Flood Control District of Maricopa County Permit Application,
Bidding Schedule,

Included in the Proposal Pamphlet only:

Proposal,

Surety (Bid) Bond, 12-1303,

Certification With Regard to the Performance of Previous Contracts or Subcontracts
Subject to the Equal Opportunity Clause and the Filing of Required Reports, Federal
Aid Projects, April, 1969, Rev. July, 2003,

Certification With Respect to the Receipt of Addenda,

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

BID SUBMISSION:

In submitting a bid, the holder of a Bid Proposal Pamphlet shall completely execute the following documents:

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 and the Filing of Required Reports, Federal
Aid Projects, April, 1969, Rev. July, 2003,

Certification With Respect to the Receipt of Addenda, and

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

PROPOSAL GUARANTY:

Each bidder is advised to satisfy itself 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 the 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 itself 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, September, 1992

Statutory Payment Bond, 12-1302, September, 1992

Contract Agreement, 12-0912, August, 2000

Certificate of Insurance, 12-0100, June, 1998

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

REQUIRED CONTRACT PROVISIONS:

The statement of materials and labor, Form PR-47, required on Federal-Aid projects will not be required when the contract amount is under \$1,000,000.00.

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 through 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 Materials Engineer, ADOT Materials Group, 1221 N. 21st Avenue, Phoenix, Arizona 85009-3740. This information will not be attached to the contract documents. Copies of available information may be purchased by prospective bidders.

(EPRISE, 2/23/06)

DISADVANTAGED BUSINESS ENTERPRISES:

Policy:

The Arizona Department of Transportation has established a Disadvantaged Business Enterprise (DBE) program in accordance with the regulations of the U.S. Department of Transportation (DOT), 49 CFR Part 26. The Arizona Department of Transportation has received Federal financial assistance from the Department of Transportation and as a condition of receiving this assistance, the Arizona Department of Transportation has signed an assurance that it will comply with 49 CFR Part 26.

It is the policy of the Arizona Department of Transportation to ensure that DBEs, as defined in Part 26, have an equal opportunity to receive and participate in DOT-assisted contracts. It is also the policy of the Department:

1. To ensure nondiscrimination in the award and administration of DOT assisted contracts;
2. To create a level playing field on which DBEs can compete fairly for DOT assisted contracts;
3. To ensure that the DBE program is narrowly tailored in accordance with applicable law;
4. To ensure that only firms that fully meet 49 CFR Part 26 eligibility standards are counted as DBEs;
5. To help remove barriers to the participation of DBEs in DOT assisted contracts; and
6. To assist in the development of firms that can compete successfully in the market place outside the DBE program.

Assurances of Non-Discrimination:

The contractor, subrecipient, or subcontractor shall not discriminate on the basis of race, color, sex or national origin in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the state deems appropriate.

Race Neutral DBE Participation:

The Arizona Department of Transportation has an annual DBE goal of 10.5 percent. The Department is using a race neutral program to work towards meeting this goal. Race neutral participation occurs where (1) a firm's DBE status is not considered when awarding subcontracts, or (2) a DBE is the prime contractor.

The Department has a DBE Supportive Services Program that works with both DBEs and prime contractors to facilitate DBE participation. Ralph "Gonz" Gonzales is the manager of the program. He can be reached at (602) 712-7761 or rgonzales@azdot.gov.

Reporting:

The Department is required to collect data on DBE participation to report to FHWA. Therefore, accurate reporting is needed to track DBE participation. The contractor shall submit a report on a monthly basis indicating the amounts earned by and paid to all DBEs working on the project.

Definitions:

- (A) **Disadvantaged Business Enterprise DBE:** a for-profit small business concern which meets both of the following requirements:
- (1) Is at least 51 percent owned by one or more socially and economically disadvantaged individuals or, in the case of any publicly owned business, at least 51 percent of the stock is owned by one or more such individuals; and,
 - (2) Whose management and daily business operations are controlled by one or more of the socially and economically disadvantaged individuals who own it.
- (B) **Socially and Economically Disadvantaged Individuals:** any individual who is a citizen (or lawfully admitted permanent resident) of the United States and who is:
- (1) Any individual who is found to be a socially and economically disadvantaged individual on a case-by-case basis.
 - (2) Any individual in the following groups, members of which are rebuttably presumed to be socially and economically disadvantaged:
 - (i) "Black Americans," which includes persons having origins in any of the Black racial groups of Africa;
 - (ii) "Hispanic Americans," which includes persons of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish or Portuguese culture or origin, regardless of race;
 - (iii) "Native Americans," which includes persons who are American Indians, Eskimos, Aleuts, or Native Hawaiians;

- (iv) "Asian-Pacific Americans," which includes persons whose origins are from Japan, China, Taiwan, Korea, Burma (Myanmar), Vietnam, Laos, Cambodia (Kampuchea), Thailand, Malaysia, Indonesia, the Philippines, Brunei, Samoa, Guam, the U.S. Trust Territories of the Pacific Islands (Republic of Palau), the Commonwealth of the Northern Marianas Islands, Macao, Fiji, Tonga, Kirbati, Juvalu, Nauru, Federated States of Micronesia, or Hong Kong;
- (v) "Subcontinent Asian Americans," which includes persons whose origins are from India, Pakistan, Bangladesh, Bhutan, the Maldives Islands, Nepal or Sri Lanka;
- (vi) "Women;"
- (vii) Any additional groups whose members are designated as socially and economically disadvantaged by the Small Business Administration (SBA), at such time as the SBA designation becomes effective.

(C) **Joint Venture:** an association of a DBE firm and one or more other firms to carry out a single, for-profit business enterprise, for which parties combine their property, capital, efforts, skills and knowledge, and in which the DBE is responsible for a distinct, clearly defined portion of the work of the contract and whose share in the capital contribution, control, management, risks, and profits of the joint venture are commensurate with its ownership interest.

Working with DBEs:

The Department works with DBEs and assists them in their efforts to participate in the highway construction program. All bidders should contact the Civil Rights Office at the address shown below for assistance in their efforts to use DBEs in the construction program of the Department:

Arizona Department of Transportation
Civil Rights Office
1135 N. 22nd Avenue (second floor), Mail Drop 154A
Phoenix, AZ 85009
Phone (602) 712-7761
FAX (602) 712-8429

Applicability:

The provisions are applicable to all bidders including DBE bidders. As a prime contractor, a DBE shall perform a significant portion of the contract work with its own work force in accordance with normal industry practices and Subsection 108.01 - Subletting of Contract of the Standard Specifications.

Certification:

Certification as a DBE shall be predicated on:

- (1) The completion and execution of an application for certification as a "Disadvantaged Business Enterprise".
- (2) The submission of documents pertaining to the firm(s) as stated in the application(s), including but not limited to a statement of social disadvantage and a personal financial statement.
- (3) The submission of any additional information which the Department may require to determine the firm's eligibility to participate in the DBE program.

Applications for certification may be filed with the Department at any time.

Applications for certification are available at the Department's Civil Rights Office, 1135 N. 22nd Avenue (second floor), mail drop 154A, Phoenix, Arizona 85009, phone (602) 712-7761, or from the internet at www.azdbe.org.

DBE firms and firms seeking DBE certification shall cooperate fully with requests for information relevant to the certification process. Failure or refusal to provide such information is a ground for denial or removal of certification.

Arizona is a member of the AZ Unified Certification Program (AZUCP). Only DBE firms that are certified by the AZUCP are eligible for credit on ADOT projects. A list of DBE firms certified by AZUCP is available on the internet at www.azdbe.org. The list will indicate contact information and specialty for each DBE firm, and may be sorted in a variety of ways. However, ADOT does not guarantee the accuracy and/or completeness of this information, nor does ADOT represent that any licenses or registrations are appropriate for the work to be done.

The contractor bears the responsibility to determine whether the DBE possesses the proper contractor's license(s) to perform the work. If a DBE cannot complete its work due to failure to obtain or maintain its licensing, the contractor bears the responsibility to immediately replace the DBE with another DBE and notify the Department.

The Department's certification is not a representation of qualifications and/or abilities. The contractor bears all risks that the DBE may not be able to perform its work for any reason.

General:

Each contractor shall establish a program that will ensure nondiscrimination in the award and administration of contracts and subcontracts. Each contractor shall also designate a full time employee who shall be responsible for the administration of the contractor's DBE program.

Agreements between the bidder and a DBE in which the DBE promises not to provide subcontracting quotations to other bidders are prohibited.

DBE Participation:

A DBE may participate as a prime contractor, subcontractor, joint venture partner with either a prime contractor or a subcontractor, or as a vendor of materials or supplies. A DBE joint venture partner shall be responsible for a clearly defined portion of the work to be performed, in addition to meeting the requirements for ownership and control.

The contractor may not credit second-tier subcontracts issued to DBEs by non-DBE subcontractors.

Crediting DBE Participation:

General:

Once a firm is determined to be an eligible DBE in accordance with 49 CFR Part 26, only the value of the work actually performed by the DBE can be credited toward DBE participation. Credit is given only after the DBE has been paid for the work performed.

The dollar amount of work to be accomplished by DBEs, including partial amount of a lump sum or other similar item, shall be on the basis of subcontract, purchase order, hourly rate, rate per ton, etc., as agreed to between parties.

DBE credit may be obtained only for specific work done for the project, supply of equipment specifically for physical work on the project, or supply of materials to be incorporated in the work. DBE credit will not be allowed for costs such as overhead items, capital expenditures (for example, purchase of equipment), and office items.

When a DBE performs as a partner in a joint venture, only that portion of the total dollar value of the contract which is clearly and distinctly performed by the DBE's own forces can be credited.

The contractor may not credit second-tier subcontracts issued to DBEs by non-DBE subcontractors.

A prime contractor may credit the entire amount of that portion of a construction contract that is performed by the DBE's own forces. The cost of supplies and materials obtained by the DBE for the work of the contract can be included so long as that cost is reasonable. Leased equipment may also be included. No credit is permitted for supplies purchased or equipment leased from the prime contractor or its affiliate(s).

When a DBE subcontracts a part of the work of its contract to another firm, the value of the subcontract may be credited towards DBE participation only if the DBE's subcontractor is itself a DBE and performs the work with its own forces. Work that a DBE subcontracts to a non-DBE firm does not count towards DBE participation.

A prime contractor may credit the entire amount of fees or commissions charged by a DBE firm for providing a bona fide service, such as professional, technical, consultant, or managerial services, or for providing bonds or insurance specifically required for the performance of a DOT-assisted contract, provided the fees are reasonable and not excessive as compared with fees customarily allowed for similar services.

Police Officers:

DBE credit will not be permitted for procuring DPS officers. For projects on which officers from other agencies are supplied, DBE credit will be given only for the broker fees charged, and will not include amounts paid to the officers.

Commercially Useful Function:

A prime contractor can credit expenditures to a DBE subcontractor only if the DBE performs a commercially useful function on the contract. A DBE performs a commercially useful function when it is responsible for execution of the work of a contract and is carrying out its responsibilities by actually performing, managing, and supervising the work involved. To perform a commercially useful function, the DBE must also be responsible, with respect to materials and supplies on the contract, for negotiating price, determining quality and quantity, ordering the material, and installing (where applicable) and paying for the material itself. To determine whether a DBE is performing a commercially useful function, the Department will evaluate the amount of work subcontracted, industry practices, whether the amount the firm is to be paid under the contract is commensurate with the work it is actually performing and the DBE credit claimed for its performance of the work, and other relevant factors.

A DBE will not be considered to perform a commercially useful function if its role is limited to that of an extra participant in a transaction, contract, or project through which funds are passed in order to obtain the appearance of DBE participation. In determining whether a DBE is such an extra participant, the Department will examine similar transactions, particularly those in which DBEs do not participate.

If a DBE does not perform or exercise responsibility for at least 30 percent of the total cost of its contract with its own work force, or if the DBE subcontracts a greater portion of the work of a contract than would be expected on the basis of normal industry practice for the type of work involved, the Department will presume that the DBE is not performing a commercially useful function.

When a DBE is presumed not to be performing a commercially useful function as provided above, the DBE may present evidence to rebut this presumption. Decisions on commercially useful function matters are subject to review by FHWA, but are not administratively appealable to U.S. DOT.

Trucking:

The Department will use the following factors in determining whether a DBE trucking company is performing a commercially useful function: the DBE must be responsible for the management and supervision of the entire trucking operation for which it is responsible on a particular contract, and there cannot be a contrived arrangement for the purpose of meeting DBE goals.

The DBE must itself own and operate at least one fully licensed, insured, and operational truck used on the contract on every day that credit is to be given for trucking.

The contractor will receive credit for the total value of transportation services provided by the DBE using trucks it owns, insures and operates, and using drivers it employs.

The DBE may lease trucks from another DBE firm, including an owner-operator who is certified as a DBE. The DBE who leases trucks from another DBE receives credit for the total value of the transportation services.

The DBE may also lease trucks from a non-DBE firm, including an owner-operator. The DBE who leases trucks from a non-DBE is entitled to credit for the total value of the transportation services provided by non-DBE lessees not to exceed the value of transportation services provided by DBE-owned trucks on the contract. Additional participation by non-DBE lessees results in credit only for the fee or commission paid to the DBE as a result of the lease agreement.

Example: DBE Firm X uses two of its own trucks on contract. It leases two trucks from DBE Firm Y and six trucks from non-DBE firm Z. DBE credit would only be awarded for the total value of transportation services provided by Firm X and Firm Y, and may also be awarded for the total value of transportation services provided by four of the six trucks provided by Firm Z. In all, full credit would be allowed for the participation of eight trucks. With respect to the other two trucks provided by Firm Z, DBE credit could be awarded only for the fees or commissions pertaining to those trucks Firm X receives as a result of the lease with Firm Z.

Materials and Supplies:

The Department will credit expenditures with DBEs for material and supplies as follows. If the materials or supplies are obtained from a DBE manufacturer, 100 percent of the cost of the materials or supplies is credited. A manufacturer is defined as a firm that operates or maintains a factory or establishment that produces, on the premises, the materials, supplies, articles, or equipment required under the contract, and of the general character described by the specifications.

If the materials or supplies are purchased from a DBE regular dealer, 60 percent of the cost of the materials or supplies is credited. A DBE regular dealer is defined as a firm that owns, operates, or maintains a store or warehouse or other establishment in which the materials, supplies, articles, or equipment of the general character described by the specifications and required under the contract are bought, kept in stock, and regularly sold or leased to the public in the usual course of business. To be a regular dealer, the firm must be an established, regular business that engages, as its principal business and under its own

name, in the purchase and sale or lease of the products in question. A firm may be a DBE regular dealer in such bulk items as petroleum products, steel, cement, stone or asphalt without owning, operating, or maintaining a place of business, as provided above, if the person both owns and operates distribution equipment for the products. Any supplementing of regular dealers' own distribution equipment shall be by a long-term lease agreement, and not on an ad-hoc or contract-by-contract basis. Packagers, brokers, manufacturers' representatives, or other persons who arrange or expedite transactions are not regular dealers within the meaning of this paragraph and the paragraph above.

With respect to materials or supplies purchased from a DBE which is neither a manufacturer nor a regular dealer, the Department will credit the entire amount of the fees or commissions charged by the DBE for assistance in the procurement of the materials and supplies, or fees or transportation charges for the delivery of materials or supplies required on a job site, toward DBE goals, provided the fees are determined to be reasonable and not excessive as compared with fees customarily allowed for similar services. The cost of the materials and supplies themselves may not be counted toward the DBE goal.

DBE credit for supplying paving grade asphalt and other asphalt products will only be permitted for reasonable hauling costs, and only if the DBE is owner or lessee of the equipment and trucks. Leases for trucks must be long term (extending for a fixed time period and not related to time for contract performance) and must include all attendant responsibilities such as insurance, titling, hazardous waste requirements, and payment of drivers.

(MENTOR, 02/23/06)

MENTOR-PROTEGE PROGRAM

Description:

Purpose:

The Mentor-Protege program is an initiative to encourage and develop disadvantaged businesses in the highway construction industry. The program will permit contractors to provide certain types of assistance to certified Disadvantaged Business Enterprise (DBE) subcontractors on highway construction projects.

The program is intended to increase legitimate DBE activities and is not intended to diminish nor circumvent existing DBE rules or regulations. Abuse of this program may be used as the basis for actions against both categories of firms including suspension or debarment.

Policy:

It is the policy of ADOT that contractors and certified DBE subcontractors may engage in a Mentor-Protege agreement under certain conditions. Such an agreement must be mutually beneficial to both parties and ADOT in fulfilling requirements of 49 Code of Federal Regulations Part 23.

Definitions:

DBE: The definition, status, and requirements of DBE firms are defined by 49 CFR Part 23. Please also refer to the special provision entitled "Disadvantaged Business Enterprises".

Mentor: A designated contractor who oversees the development of a designated DBE subcontractor by training, counseling, assisting, and sponsoring the DBE firm in an ADOT approved Mentor-Protege Program.

Protege: An ADOT-certified DBE subcontractor who is guided by a mentor through training and specialized assistance to gain experience, develop expertise in highway construction, and attain general business growth in an approved Mentor-Protege program.

Mentor-Protege Development Plan: A detailed plan outlining a management agreement between a contractor (who agrees to serve as a mentor) and a DBE subcontractor (who agrees to serve as a protege).

Implementation:

Approval Process:

- (1) When a contractor and DBE agree to engage in a Mentor-Protege Development Plan Agreement, ADOT Civil Rights Office will be notified by either party for the purpose of (a) reviewing requirements of STAA, 49 CFR part 23, and Mentor-Protege program; (b) establishing timeline for processing Agreement; (c) preliminary review of Agreement objective(s) and duration; and (d) reporting requirements. (A copy of the suggested form of agreement is included in these special provisions).
- (2) A completed Mentor-Protege Development Plan will be submitted to ADOT within 30 days following the initial review. Approval of the Agreement by ADOT will be in two stages:
 - a) General approval of Agreement by ADOT within 15 working days following submission of Agreement.
 - b) Approval of working plan for the designated project where a Mentor-Protege Development Plan will be implemented.
- (3) Duration of a Mentor-Protege Development Plan may exceed that of a single project, not to exceed three years. Duration of a working plan may exceed that of a single project. However, the continued use of an existing working plan must be approved by the ADOT Civil Rights Office prior to beginning work on a new project.

- (4) The Mentor-Protege program is not intended to provide DBE firms with a means to avoid management and operational responsibilities. Mentors cannot be responsible for the management of DBE proteges. Under the program, all administrative functions must be performed by personnel responsible to or employed by protege. The protege must retain final decision making responsibilities.
- (5) Mentor and protege shall agree to an interview by ADOT Civil Rights Office during the development of the Mentor-Protege Development Plan.
- (6) Mentor and protege shall agree to evaluations by ADOT. The frequency and method will depend on the project.

Content of Mentor-Protege Development Plan:

A Mentor-Protege Development Plan Agreement shall address the following:

- (1) **Areas of Assistance:** Identify the specific areas in which the protege requires assistance.
- (2) **Schedule of Assistance:** Develop an Action Plan which defines the types and scope of assistance the mentor will provide to meet the protege's needs.
- (3) **Responsibilities:** Define the responsibilities of the mentor and the protege in each of the activities.
- (4) **Benchmarks:** Include measurable benchmarks to be reached by the protege at successive stages of the plan.
- (5) **Evaluation:** Provide formal evaluations of the protege's attainment of benchmarks. Evaluations must be made by both the mentor and the protege and reviewed by ADOT.
- (6) **Duration:** Specify the maximum time frame the development plan agreement can remain in effect not to exceed three years.
- (7) **Assurances:** Provide assurances that all agreements, oral and written, pertaining to the Mentor-Protege program do not improperly obtain the benefits of the DBE program.
- (8) **Key Personnel:** Identify mentor's representative(s) responsible for training and/or coordinating the assistance provided to the protege.
- (9) **Fees:** Identify any fees paid as a condition of the agreement.
- (10) **Copies of agreements:** Attach copies of all bonding, security, lease agreements, notes, contracts, etc., made for the duration of the Mentor-Protege Plan.

Type of Assistance:

The type of assistance provided by contractors may include, but not be limited to:

(1) **Financial:**

- a) Working Capital Secured by Time Demand Notes or Stocks. Proteges acquiring working capital through the issuance of stocks must maintain no less than 51 percent ownership to maintain DBE certification. Time demand notes may be used to secure working capital. However, any abusive use of recall features will be cause for terminating program. Where working capital is secured by stocks or demand notes, a third party such as a bank could receive progress payments for work accomplished by the protege, made out jointly to the agent and the protege and make payments, on behalf of the protege, to material suppliers or for Federal and State payroll taxes, etc. In no case can the day-to-day control of the firm be relinquished by the disadvantaged owner as a requirement of the loan.
- b) Bonding. Mentors may bond the entire job and charge a pro-rata share of the cost to the protege. Mentors may bond the entire job and carry the protege by absorbing the cost of the bond. Arrangements of the bonding must be included in the Schedule of Assistance.

(2) **Management Technical Assistance:**

- a) Assist in conducting a Protege Self-Assessment by areas to be strengthened for long-range planning of the protege firm.
- b) Assist in developing business plan, loan packaging, and financial counseling.
- c) Assist the protege in setting up a cost accounting system and train the protege's personnel to assume full control.
- d) Provide training in plan interpretation, estimating, and materials supply function.
- e) Provide guidance in general project management and related areas to make the protege aware of techniques to improve productivity and competitiveness and broaden knowledge of industry practices.

(3) Operation:

- a) Equipment/Facilities Use. Equipment and facilities may be furnished by mentor, provided that separate lease agreements are made and control over the equipment and facilities are under the supervision of protege.
- b) Training of managers and specialists of the protege in state-of-the-art methods in the contracting industry.
- c) Mentors may provide personnel with specialized expertise for a specific purpose and duration as outlined in the Action Plan. Such personnel must be on the protege's payroll and under direct supervision of the protege. Long term, continual, or repetitive use by a protege of personnel primarily employed by the mentor will be construed as an attempt to artificially inflate DBE participation and may be cause for termination of the Mentor-Protege agreement and decertification of the DBE.

General Practice:

- (1) Agreements may not include exclusive arrangements which limit competition.
- (2) DBE firms shall have the latitude to quote bids to other contractors.
- (3) The contractor and the DBE involved in a Mentor Protege agreement must remain separate and independent business entities.
- (4) Middlemen or passive conduits which serve no commercially useful function, or subcontractors acting essentially as brokers are unacceptable.
- (5) Formal or informal agreements which limit control and management by DBE firms are unacceptable.
- (6) Part ownership in a DBE firm by a non-disadvantaged entity, including a mentor, is permitted by the regulations (49 CFR 23) and may be necessary to ensure adequate capital and technical guidance of the DBE participant. However, any financial investment by the mentor must not create a situation wherein the mentor may assume control over the DBE firm.

Modifications:

Modifications to the Mentor-Protege Development Plan shall be subject to the approval of ADOT.

Termination:

The Mentor-Protege Development Plan may be terminated by mutual consent by both parties with notice to ADOT. ADOT may terminate approval of the Plan upon determination that:

- (1) The protege firm no longer meets the eligibility standards for certification as a DBE.
- (2) Either party has failed or is unable to meet its obligations under the Development Plan.
- (3) The DBE is not progressing or is not likely to progress in accordance with the Development Plan.
- (4) The DBE has reached a satisfactory level of self-sufficiency to compete without special treatment provided in the Development Plan.

In the event a Mentor Protege Development Plan is terminated, the contractor will remain responsible for the DBE goals established in the project Special Provisions.

ARIZONA DEPARTMENT OF TRANSPORTATION

Mentor-Protege Development Plan Agreement

PART ONE: General Agreement

This agreement entered into this ____ day of _____, 20__, in the city of _____, Arizona, by and between _____ (hereafter known as Mentor), and _____ (hereafter known as Protege), in accordance with rules and regulations of the Arizona Department of Transportation (ADOT) Mentor-Protege program, and in accordance with the requirements for increased Disadvantaged Business Enterprises (DBE) participation in the Surface Transportation Act of 1982 (STAA) and Surface Transportation and Uniform Relocation Assistance Act of 1987 (STURAA).

This agreement is intended to cover the general relationship between the parties to insure compliance with STAA, STURAA, and ADOT guidelines, and to implement all provisions set forth in the Mentor-Protege Development Plan.

PART TWO: Assurances

- 2.1 Both mentor and protege will remain separate and independent business entities. Protege shall have the latitude to quote bids to other contractors.
- 2.2 Protege is an ADOT-certified DBE firm.
- 2.3 The Mentor-Protege program is not intended to provide DBEs with means to avoid management and operational responsibilities.
- 2.4 All agreements, oral and written, pertaining to this Mentor-Protege Plan Agreement do not cause the protege to improperly obtain the benefits of the DBE program.

PART THREE: Content of Plan

Both parties will agree to content of the plan which will include but not be limited to:

- 3.1 Exhibit A: Areas of Assistance--(Areas identified by both parties as the basis for providing assistance by mentor to protege.)
- 3.2 Exhibit B: Schedule of Assistance-- An Action Plan developed by both parties defining the types and scope of assistance; responsibilities of mentor and protege in each activity; resources to be utilized; and measurable benchmarks to be reached by protege.
- 3.3 Exhibit C: Key Personnel-- A list of mentor and protege representatives responsible for training and/or coordinating the Plan.
- 3.4 Exhibit D: Lease/Agreement(s)--Full copies of all lease agreements for equipment and facilities; financial agreements; and other agreements between the two parties and/or by third parties.

PART FOUR: Monitoring

4.1 Both parties hereby specifically consent to the monitoring of this contract by the appropriate federal and state officials or their agents, and to agree to cooperate with such agencies.

4.2 Both mentor and protege agree to evaluate the progress of the Plan at scheduled intervals with the results reviewed by ADOT.

PART FIVE: Duration

The duration of the Plan will coincide with the length of the project for which the plan was intended. Extended agreement plans shall not exceed a period of three years.

PART SIX: Modifications

None of these agreements may be modified except in writing signed by both parties and approved by ADOT.

PART SEVEN: Termination

The mentor or protege retains the right to terminate this agreement by showing cause in a written notice to all parties and ADOT. ADOT may terminate the approval of this agreement by showing cause in a written notice to mentor and protege. In the event of termination of agreement or termination of ADOT approval, the contractor will remain responsible for the DBE goals established in the project Special Provisions.

PART EIGHT: Privacy Act Provision

The information contained herein and on attachments is used for the ADOT Mentor-Protege Program only, and may not be disclosed without the express permission of all parties involved in this agreement.

IN WITNESS WHEREOF, the parties hereto have caused this agreement to be executed by their duly authorized officers on the day and year first above written.

| | | |
|-------|---|-----------|
| _____ | _____ | _____ |
| Date | Mentor Firm (Authorized Official Name) | Signature |
| _____ | _____ | _____ |
| Date | Protege Firm (Authorized Official Name) | Signature |

April 1987

GENERAL REQUIREMENTS:

Electronic Bidding:

This project is eligible for electronic bidding. Electronic bidding is a process which will allow the bidder to prepare and submit its complete proposal electronically, using a computer-generated bidding schedule and versions of all the required forms listed under "Bid Submission" in these special provisions. The requirements for submitting an electronic bid are included in Section 102 of the special provisions.

Checking Electronic Bids:

Contractors interested in submitting bids electronically are reminded to check their bids prior to final submission. Some computer systems using a scrolling mouse allow the operator to scroll through options presented in a "drop down menu" until the option is finally selected by some affirmative act of the operator (such as by clicking outside the window). The use of the scrolling mouse may therefore cause the operator to inadvertently change the selected option after the operator believes the selection has been finalized. An example of "drop down menu" choices used in the electronic bids is where the bidder must certify that it either "Has" or "Has Not" participated in a previous contract or subcontract subject to the equal opportunity clause. Before submission of the bid, bidders shall confirm that the option selected is the option intended in submission of the bid.

Bidders are further advised that the Department will not allow an adjustment, amendment, or change of any kind to an electronic bid after opening, even if the bidder claims an error or mistake was caused by a defect in the bidding software.

Bidders List Requirement:

Bidders shall submit a list of the names of all subcontractors, service providers, manufacturers and suppliers submitting bids, proposals or quotes for this project on the "List of Subcontractors, Suppliers, Service Providers and Manufacturers Bidding ADOT Contracts" form. The form is appended to the special provisions.

All bidders must submit the required form, whether or not the bid is the low bid.

Bidders must submit this form with all requested information to the ADOT Civil Rights Office no later than 4:00 p.m. on the fifth working day after bids are opened. Faxed copies are acceptable. The fax number is (602) 712-8429.

FAILURE TO SUBMIT THE REQUIRED INFORMATION BY THE STATED TIME AND IN THE MANNER HEREIN SPECIFIED SHALL BE CAUSE FOR THE BIDDER TO BE DEEMED INELIGIBLE FOR AWARD OF THE CONTRACT.

The form must be complete and must include all the names and contact information for all subcontractors, service providers, manufacturers and suppliers that submitted bids, proposals, or quotes on this project regardless of the bidder's intentions to use the sub bid. Information on second tier bids is not required.

Title 49 of the Code of Federal Regulations, Part 26.11, required ADOT to create and maintain a bidders list. The purpose of this list is to develop the list of the DBE and non-DBE firms seeking to work on Federal-aid highway construction contracts. This information is then used to set ADOT's overall DBE goal. The regulation requires the following information be collected: the firm's name; the firm's address; the firm's status as a DBE or non-DBE; the age of the firm; and the annual gross receipts of the firm.

The Civil Rights Office will contact listed firms to obtain information from them that will be used in the agency's annual DBE goal setting process. This information will be maintained as confidential to the extent allowed by federal and state law.

Environmental Mitigation: *this is incomplete, pending Environmental Clearance*

All disturbed soils that will not be landscaped or otherwise permanently stabilized by construction shall be seeded using species native to the project vicinity.

All earth-moving and hauling equipment shall be washed at the contractor's storage facility prior to arriving on site to prevent the introduction of invasive species seed.

The contractor shall submit the Arizona Pollutant Discharge Elimination System Notice of Intent and the Notice of Termination to the Arizona Department of Environmental Quality.

The contractor shall minimize dirt track-out by washing or cleaning trucks before leaving the construction site.

Construction Surveying and Layout:

As a first element of work, the contractor shall verify data and datum for geometric layout and basis of bearing. The contractor shall contact Mr. John C. King of the ADOT Phoenix District Survey Office, 1309 North 22nd Avenue, Phoenix, Arizona 85008, Phone: (602) 712-5740.

Geotechnical Reports:

Geotechnical Reports for this project including pavement design will be available on compact disk. Disks are available at ADOT Contracts and Specifications Section, 1651 W. Jackson Street, Phoenix, Arizona 85007 for \$5.00 each.

Access For and Protection of Pedestrians:

At all times the contractor shall conduct their work to safeguard pedestrians within the vicinity of the project. Any holes or trenches left open overnight shall be protected with six-foot temporary chain link fence. If required or approved by the Engineer, the contractor shall provide Type II barricades and Type A flashing lights connected by warning tape, ribbon rope, a plywood covering or other protection over the holes. No measurement or direct payment for work site protection measures (e.g., temporary chain link fence, plywood or other protection over holes, warning tape, Type II barricades, Type A flashing lights, ribbon rope, etc) the cost is considered included in price of other contract items.

The contractor shall be responsible for restoring all staging areas for all construction phases to their existing conditions unless noted other wise in the contract documents. Restoration of staging areas may include but shall not be limited to landscape irrigation, plants, ground cover (decomposed granite) and removal of temporary utilities. No measurement or direct payment will be made for the restoration of staging areas and the like; the cost being considered as included in the price of other contract items.

Shoring and Bracing of Trenches, Excavation; and Existing Utilities:

Shoring and bracing requirements shall apply to all trenches and excavations required for installation, construction or removal of utilities and related structures, including walls, and structures, for the protection of personnel, property, existing structures or utilities. All shoring and bracing design shall be completed, sealed and signed by an Engineer registered in the State of Arizona.

When construction sequence of structures requires transfer of bracing loads to a completed portion of any structure, the contractor shall secure written approval from the owner prior to installation of such bracing.

The planning, design, installation and removal of all shoring and bracing shall be such as to maintain the required trench or excavated section. Additionally, such shoring and bracing shall maintain the undisturbed state of the soils adjacent to the trench as well as at and below the excavation bottom.

Shoring and bracing shall prevent any movement of earth, which could in any way diminish the width of the excavation to less than the dimensions required for construction, or otherwise endanger the work or adjacent structure or construction. The contractor and their subcontractors shall comply with OSHA standards at all times.

Horizontal strutting across the trench shall not be used below the barrel of a pipe, and the use of pipe as support for the trench will not be allowed. Where used, sheeting shall be driven ahead of the excavation to avoid loss of material from behind the sheeting. If it becomes necessary to excavate beyond the sheeting, care shall be taken to avoid trimming behind the face along which the sheeting will be driven. Care shall be taken to prevent voids outside the sheeting, but if voids occur, they shall be immediately filled with sand.

No measurement or direct payment will be made for shoring and bracing of trenches or excavations, the cost shall be considered included in the price of contract items for the work requiring shoring or bracing.

Sawcutting and Pavement Matching:

Sawcuts at the points of abutting existing pavements will be required. This shall include existing bituminous pavement, portland cement concrete pavement, sidewalks, driveways and parking lots where new construction shall match the grade of existing surfaces that are to remain where called for on the Project Plans or where designated by the Engineer.

Existing pavements, which are to be matched by pavement widening or pavement extension, shall be trimmed to a neat true line with straight vertical edges free from irregularities with a saw specifically designed for this purpose. No wheel cutting will be allowed. Saw cuts shall be made to a minimum depth of 1-1/2 inches and in all cases deep enough to insure a neat vertical joint.

The existing pavement shall be cut and trimmed after placement of the required ABC and just prior to placement of asphalt concrete for pavement widening or extension, and the trimmed edges shall be painted with a light coat of asphalt cement or emulsified asphalt immediately prior to constructing the new abutting asphalt concrete pavements.

No measurement or direct payment will be made for saw cutting, the cost being considered included in the price of other contract items.

Existing Storm Drains:

The contractor shall be responsible for keeping all existing storm drains open, clean and operational during the construction period. No measurement or direct payment will be made for this maintenance, the cost being considered as included in the price of other contract items.

Disposal of Existing Asphaltic Concrete:

Upon removal, disposal of the existing asphaltic concrete off the project site, including the detours, shall be the responsibility of the contractor. Materials not used for construction shall be removed from the project site and disposed of per local ordinances.

Clearing and Grubbing and Removal and Disposal of Trash Debris, Litter and Existing Vegetation:

Upon removal, legal disposal of all trash, debris, litter and vegetation off the project site, including rubber tires, shall be the responsibility of the contractor. Removal and disposal of trash, debris, litter and existing landscaping and vegetation as necessary shall be in accordance with these Special Provisions and Section 201 - Clearing and Grubbing, of the Standard Specifications. No measurement or direct payment will be made for general project clearing and grubbing, the cost shall be considered as included in the price of other contract items. Trash, debris, litter and existing vegetation shall be considered an existing condition of the project site and the contractor shall be responsible for familiarizing themselves with the project site prior to bidding.

ADOT Approved Products List:

A list of approved manufactures and distributors for materials that may be used on this project are shown on the Department's Approved Products List. The Approved Products List is available from the Engineering Records Office, 1655 West Jackson, Phoenix, Arizona, 85007, Phone (602) 712-8216. Copies of the most recent versions are available on the Internet at <http://www.azdot.gov/TPD/ATRC/pride/index.asp>.

Verification of Existing Features:

The locations and dimensions of existing roadway features shown on the plans are based on as-built plans, aerial photographs, and field surveys. It shall be the contractor's responsibility to field-verify the information given on the plans wherever that information affects the new work. Significant differences between the measured and plan information shall be submitted to the Engineer prior to proceeding with the work. Minor adjustments to curb staking, catch basin locations, and other elements, to the extent they are required to match existing construction and do not affect the disposition of other project features, will not require review or approval by the Engineer.

Before ordering pipe, the contractor shall verify all pipe lengths shown on the Project Plans in accordance with Section 925 of the Standard Specifications and these Special Provisions.

Restoration of Existing Survey Monumentation:

The contractor shall be responsible for the restoration in accordance with local government requirements of all existing survey monumentation disturbed by construction. This shall include section and quarter section corners, property corners, and ADOT right-of-way markers that may be disturbed. Restoration of said monuments shall be accomplished by an Arizona registered land surveyor in accordance with applicable State of Arizona statutes.

City of Peoria – New River Trail:

The City of Peoria maintains a trail system on the west side of New River. This project will require closure of the trail to complete certain construction operations and signing of the trail closure at certain key locations. This work is more completely described in ITEM 9240052 – MISCELLANEOUS WORK (MAINTAIN AND RESTORE NEW RIVER TRAIL). The contractor shall coordinate with Mr. Richard Costa, Associate Engineer, City of Peoria as follows:

Richard Costa
Associate Engineer, City of Peoria, Engineering Dept, Capital Improvement Projects
8401 West Monroe Street
Peoria, Arizona 85345
Phone - 623-773-7212
Fax - 623-773-7211
E-Mail - Richard.Costa@peoriaaz.gov

(ERRATA00, 6/29/01)

ADDITIONS AND REVISIONS TO THE 2000 STANDARD SPECIFICATIONS:

STANDARD SPECIFICATIONS ERRATA:

The following changes shall be made to correct errors in the text of the 2000 Standard Specifications:

Page 86

107.07 Sanitary, Health, and Safety Provisions: the fourth sentence in the third paragraph of the Standard Specifications is revised to read:

Any such failure to comply with OSHA regulations shall constitute waiver of any right to claim for such suspended work.

Page 167

207-3 Construction Requirements: the last sentence of the sixth paragraph of the Standard Specifications is revised to read:

When the use of chemical dust suppressants is proposed in lieu of water, the contractor's submittal shall be in accordance with the value engineering process as specified in Subsection 104.13.

Page 185

304-3.06 Curing Seal: the first sentence of the Standard Specifications is modified to add:

After final compaction, the cement treated base shall be covered with a bituminous curing seal, applied uniformly to the surface at an approximate rate of 0.15 gallons per square yard.

Page 308

408-7.08(B)(2) Compaction Acceptance Procedure: the formula for Lower Quality Index (QL) is revised to read:

$$Q L = \frac{A V E - L L}{s}$$

Page 556

610-3.05(B) Concrete Surfaces: the first paragraph of the Standard Specifications is revised to read:

When painting is specified on the plans or in the special provisions, acrylic emulsion paint conforming to the requirements of Subsection 1002-2.04, shall be applied to the exposed concrete surfaces tabulated below, except that sidewalks, appurtenant curbs, down drains, and bridge deck surfaces shall be excluded.

Page 631

709-2.02(J) Retro reflectance: the table at the end of the first paragraph of the Standard Specifications is revised to read:

| Product | Retro Reflectance (Millicandelas) |
|---------|-----------------------------------|
| White | 200 |
| Yellow | 150 |

Page 635

709-3.01 Equipment: the first sentence of the fourth paragraph of the Standard Specifications is revised to read:

Equipment for the application of transverse lines, longitudinal lines less than 200 feet in length, legends and symbols shall be either a hand wand attachment to a longitudinal line application vehicle, or a separate motorized trailer application system.

Page 640

709-3.02(G)(2) Transverse Lines, Symbols, and Legends: the second sentence of the fifth paragraph of the Standard Specifications is revised to read:

Lateral deviation of the marking line shall not exceed one inch in 100 feet.

Page 936

1006-2.03(C) Coarse Aggregate: the third sentence of the first paragraph of the Standard Specifications is revised to read:

The coarse aggregate gradation shall conform to the appropriate size designation of AASHTO M43, except as shown below, when tested in accordance with the requirements of Arizona Test Method 201.

Page 1013

1017-4 **Nonshrink Grout Material Requirements:** the second sentence of the third paragraph of the Standard Specifications is revised to read:

The minimum compressive strength at seven days shall be 2,500 pounds per square inch and the minimum compressive strength at 28 days shall be 5,000 pounds per square inch.

(101ABRV, 06/21/05)

SECTION 101 - DEFINITIONS AND TERMS:

101.01 **Abbreviations:** of the Standard Specifications is modified to add:

- ATTI Arizona Technical Testing Institute
- PCI Precast/Prestressed Concrete Institute
- PTI Post-Tensioning Institute

(102NOBID, 07/31/90)

SECTION 102 - BIDDING REQUIREMENTS AND CONDITIONS:

102.03 **Suspension from Bidding:** of the Standard Specifications is modified to add:

The signature of the bid proposal by a bidder constitutes the bidder's certification, under penalty of perjury under the laws of the United States, that the bidder, or any person associated therewith in the capacity of owner, partner, director, officer, principal investor, project director, manager, auditor, or any position involving the administration of federal funds, has not been, or is not currently, under suspension, debarment, voluntary exclusion or been determined ineligible by any federal agency within the past three years. Signature of the bid proposal also certifies, under penalty of perjury under the laws of the United States, that the bidder does not have a proposed debarment pending. In addition, signature of the bid proposal certifies that the bidder has not been indicted, convicted, or had a civil judgment rendered against (it) by a court of competent jurisdiction in any matter involving fraud or official misconduct within the past three years.

Any exceptions to the above paragraph shall be noted and fully described on a separate sheet and attached to the bid proposal.

(102EBS, 01/06/05)

SECTION 102 - BIDDING REQUIREMENTS AND CONDITIONS:

102.04 Contents of the Proposal Pamphlet: the second and third paragraphs of the Standard Specifications are revised to read:

All papers bound with or attached to the proposal pamphlet are considered a part thereof. The project plans, specifications, Standard Drawings and other documents designated in the proposal pamphlet, will be considered a part of the proposal whether attached or not.

102.08 Preparation of Proposal: of the Standard Specifications is revised to read:

(A) General:

The bidder shall prepare and submit its proposal on either the paper forms furnished by the Department in the proposal pamphlet or, when electronic bidding is available, using Department-furnished bid preparation software.

Proposals shall be prepared and submitted in accordance with the requirements of Subsection 102.08(B) or 102.08(C).

The bidder shall submit its proposal exclusively on either the paper proposal pamphlet forms or using the electronic bid process described herein.

When an item in the proposal contains a choice to be made by the bidder, the bidder shall indicate a choice in accordance with the specifications for that particular item and after the bid opening no further choice will be permitted.

(B) Proposal Pamphlet Paper Submittal:

Proposals submitted using the paper format shall be only upon the forms furnished by the Department. No consideration will be given to any purported proposals on other forms, or to any request to modify or change a proposal.

The bidder shall complete and fully execute all required forms listed under "Bid Submission" in these special provisions. Proposal pamphlets are not transferable.

The bidder shall specify a unit price, in figures, for each pay item for which a quantity is given in the Bidding Schedule and shall also show the amount extended, as the product of the quantity given and the unit price indicated for each bid item, in the column provided for that purpose. The total amount of the bid shall be obtained by adding the amounts of the several items.

In the event that more than two decimal places are used in representing a unit price, all digits beyond the second decimal place will be truncated and the extended amount for the affected item(s) and the total bid will be recomputed accordingly.

An individual bidder shall clearly show his/her name, post office address and signature.

A general partnership bidder shall clearly show the name and post office address of each member of the partnership and the signature of one or more members of the partnership.

A limited partnership bidder shall clearly show the name and post office address of each member of the partnership and the signature of one or more general partners.

A joint venture bidder shall clearly show the name and post office address of each member or officer of the firms and the signature of one or more members or officers of each firm represented by the joint venture.

A corporate bidder shall clearly show the names, titles and business addresses of the president, vice president, secretary and treasurer; the name of the corporation; the state in which the corporation was incorporated; and the signatures of one or more officers of the corporation or by a legally qualified agent of the corporation acceptable to the Department. Evidence of authority of the signing officer(s) to submit a proposal on behalf of the corporation shall either be attached thereto or be on file with the Department. If the corporation is incorporated in any state other than the State of Arizona, the corporation shall submit to the Department, prior to the award of contract, proof from the Arizona Corporation Commission that it has been granted authority to do business in the State of Arizona.

(C) Electronic Submittal:

(1) General:

Projects eligible for electronic bidding will be identified in the Advertisement for Bids. Eligible projects can also be identified on ADOT's website at www.azdot.gov/highways/cns/phone_sheet.asp. Projects with electronic files available (EBS files) will be highlighted.

In order to submit a bid electronically, a firm must have obtained a bidder identification number from the Department, at the office of Contracts and Specifications, 1651 W. Jackson Street, Phoenix, Room 121F, AZ 85007, phone (602) 712-7221.

In addition, bidders must subscribe to Bid Express, an online bidding service, and obtain a digital signature. Bid Express can be reached at www.bidx.com, phone (352) 381-4888. The bidder shall also download and install a copy of the AASHTO "Trns-Port Expedite" bid software from the internet at the Bid Express website by selecting "Arizona" from the map displayed on the Bid Express homepage. The version of the software currently used by ADOT can then be located by selecting the "utilities" tab and choosing the "Expedite" utility.

In order to obtain a digital signature, bidders shall be required to name at least one responsible person who shall be authorized to commit the firm to the terms and conditions specified in the Proposal and the contract documents.

The bidder shall download the electronic copy of the project EBS file, listed as an Expedite Data File on the Bid Express website. The file includes a schedule of items folder containing the bid schedule, and a miscellaneous folder containing the proposal and attachments. The bidder shall review the proposal and complete the bidding schedule, as specified herein, and the attachments.

The bidder shall specify a unit price for each pay item for which a quantity is given in the bidding schedule. The software will automatically produce the extended amount, as the product of the quantity given and the specified unit price. Unit prices shall be stated in whole cents.

The bidder shall also download all addenda issued and update the project file accordingly. The bidder shall be responsible to verify that all addenda issued prior to the bid opening have been included in its submittal.

The bidder shall be responsible for the successful submission of its electronic bid prior to the time specified for submission of bids. Bids submitted after the specified time will not be accepted. The bidder agrees that the Department bears no liability resulting from the bidder's failure to successfully submit an electronic bid.

(2) Procedure for Missing Bids:

If a bidder believes that its electronically submitted bid should have been read at the bid opening but was not read, the bidder shall notify the Department of the apparent irregularity and provide its bid receipt for the bid in question no later than three hours after the time specified for submission of bids.

Upon proper notification of a missing bid by a bidder, the Department will notify all bidders that a missing bid has been reported. The Department will begin an investigation to determine the status of the bid, and will review all electronic bids received from Bid Express.

The Department will direct Bid Express to review their records and determine whether the missing bid was submitted. Bid Express will make a determination about receipt of the bidder's missing bid.

If necessary, Bid Express will attempt to retrieve a copy of the encrypted bid from the bidder's computer.

The Department will authorize Bid Express to send the Department a program which will enable the encrypted bid to be opened and processed.

If the Department determines that a bid cannot be recovered, the Department will notify all bidders of its determination.

If a missing bid is recovered, the Department will determine the validity of the bid, and may award the contract to the bidder submitting the missing bid if appropriate. The Department will notify all bidders.

102.09 Non-Collusion Certification: of the Standard Specifications is revised to read:

Bidders making their submittal using the paper forms in the Proposal Pamphlet shall complete the Non-Collusion Certificate included with the proposal form. This form shall be executed by or on behalf of the person, firm, association or corporation submitting the bid, in the following form:

The bidder certifies that, pursuant to Subsection 112(c) of Title 23, United States Code and Title 44, Chapter 10, Article 1 of the Arizona Revised Statutes, neither it nor anyone associated with the company, firm, corporation, or individual has, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of full competitive bidding in connection with the above-referenced project.

By submission of its bid electronically, the bidder makes the certification stated in the previous paragraph, binding as if it had been signed by the bidder.

102.10 Irregular Proposals: of the Standard Specifications is revised to read:

- (A) Proposals may be considered irregular and may be rejected for any of the following reasons:
- (1) If any of the proposal documents show unauthorized alterations of any kind.
 - (2) If the proposal contains conditional or uncalled-for alternate bids.
 - (3) If the proposal documents contain erasures not initialed by the person or persons signing the proposal.
 - (4) If there is a submission of any kind which may tend to make the proposal incomplete, indefinite or ambiguous as to its meaning.
 - (5) If the bid is mathematically unbalanced.
 - (6) If the bid is materially unbalanced.
 - (7) If the bidder fails to sign the non-collusion certificate when submitting a bid in the paper format.
- (B) Proposals will be considered irregular and will be rejected for any of the following reasons:
- (1) If the proposal, bid bond or bidding schedule is on a form other than that furnished by the Department.
 - (2) If the bidder or surety fails to provide a proposal guaranty as specified in Subsection 102.12.

- (3) If the bidder fails to sign the proposal when submitting a bid in the paper format.
- (4) If the bidding schedule does not contain a unit price for each pay item listed except in the case of authorized alternate pay items.
- (5) If the bidder fails to meet the required goal for Disadvantaged Business Enterprises (DBE) established in the Special Provisions or show good faith effort as determined by the Department.
- (6) If the bidder submits a proposal in both the electronic format and in the paper format.

102.11 Delivery of Proposals: of the Standard Specifications is revised to read:

For submittals made in accordance with 102.08(B), each proposal, together with the required proposal guaranty, shall be placed in the special envelope furnished by the Department for this purpose and the envelope shall be sealed. All proposals shall be submitted prior to the time specified for submission of bids and at the place specified in the advertisement for bids. Proposals received after the time set for opening the bids will be returned to the bidder unopened.

Electronic submittals shall be made in accordance with Subsection 102.08(C).

102.12 Proposal Guaranty: of the Standard Specifications is revised to read:

(A) General:

The bidder shall provide a proposal guaranty payable to the Arizona Department of Transportation for 10 percent of the amount of the bid.

The surety (bid) bond shall be executed by the bidder and a surety company or companies holding a certificate of authority to transact surety business in this State issued by the Director of the Department of Insurance. The agent for the surety shall be licensed to act as an insurance agent in Arizona.

Bidders submitting paper proposals in accordance with Subsection 102.08(B) shall provide a proposal guaranty as specified in 102.12(B), and shall include the guaranty with the proposal at the time of submittal.

Bidders submitting proposals electronically in accordance with Subsection 102.08(C) shall provide either a paper proposal guaranty in accordance with Subsection 102.12(B) or an electronic proposal guaranty in accordance with Subsection 102.12(C).

If the bidder elects to submit the guaranty in paper format, it shall be submitted prior to the time specified for submission of bids. The paper guaranty shall be placed in the special envelope furnished by the Department for submittal of bids, and shall be sealed. The bidder shall write "Proposal Guaranty Only" on the envelope. If the bidder elects to submit the guaranty in electronic format, it shall be included as part of the proposal at the time of the submittal.

(B) Paper Submittal of Proposal Guaranty:

The paper proposal guaranty shall be in the form of either a certified or a cashier's check made payable to the Arizona Department of Transportation for 10 percent of the amount of the bid, or in the form of a surety (bid) bond for 10 percent of the amount of the bid.

The surety (bid) bond will be accepted only on the form provided by the Department.

The surety shall provide a current Power of Attorney attached to the surety bond.

Paper proposal guarantees shall be delivered to the Department, at the Office of Contracts and Specifications, 1651 W. Jackson Street, Phoenix, AZ, Room 121F, phone (602) 712-7221.

(C) Electronic Submittal of Proposal Guaranty:

Two companies have established web-based surety processing procedures with Bid Express: Surety 2000 (www.surety2000.com) and Sure Path Network (www.insurevision.com). Bidders interested in providing an electronic proposal guaranty may contact these companies for additional information and requirements.

102.13 Withdrawal of Proposals: of the Standard Specifications is revised to read:

(A) General:

The bidder may withdraw its bid prior to the time scheduled for submission of bids.

For paper submittals made in accordance with Subsection 102.08(B), a bidder may withdraw its proposal unopened after it has been submitted to the Department, provided its request in writing is received by the Department prior to the time specified for submission of bids.

For electronic submittals, in accordance with Subsection 102.08(C), a bidder may withdraw its submittal at any time prior to the time specified for submission of bids, provided that the bidder withdraws such bid electronically.

(B) Conditional Withdrawal:

When proposals for more than one contract are to be publicly read on any one date, a bidder may request that, in the event it is the apparent low bidder on a given contract or contracts, one or more subsequent bids are withdrawn.

The bidder shall submit a written request for conditional withdrawal, separate from the proposal submittals and signed by a responsible person, prior to the time specified for submission of bids. Bids withdrawn will be retained by the Department and will not be read.

No requests for conditional withdrawals will be accepted after the time specified for submission of bids.

(102LOBY, 10/01/90)

SECTION 102 - BIDDING REQUIREMENTS AND CONDITIONS:

102.09 Non-Collusion Certification: of the Standard Specifications is modified to add:

(A) Lobbying:

The bidder certifies, by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:

- (1) No Federally appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract grant, loan, or cooperative agreement.
- (2) If any funds other than Federally appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions. Copies of Form-LLL, "Disclosure Form to Report Lobbying", are available at ADOT Contracts and Specifications Services, 1651 W. Jackson, Room 121F, Phoenix, AZ 85007.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by Section 1352, Title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

The bidder also agrees, by submitting his or her bid or proposal, that he or she shall require that the language of this certification be included in all subcontracts and lower tier subcontracts which exceed \$100,000 and that all such subcontractors and lower tier subcontractors shall certify and disclose accordingly.

The Department will keep the prime contractors' certifications on file as part of their original bid proposals. Each prime contractor shall keep individual certifications from all subcontractors and lower tier subcontractors on file. Certifications shall be retained for three years following completion and acceptance of any given project.

Disclosure forms for the prime contractor shall be submitted to the Engineer at the pre-construction conference. Disclosure forms for subcontractors and lower tier subcontractors shall be submitted to the Engineer by the prime contractor along with the submittal of each subcontract or lower tier subcontract, as required under Subsection 108.01, when said subcontracts exceed \$100,000.00. During the performance of the contract the prime contractor and any affected subcontractors shall file revised disclosure forms at the end of each calendar year quarter in which events occur that materially affect the accuracy of any previously filed disclosure form. Disclosure forms will be submitted by the Engineer to the Federal Highway Administration for further processing.

(103AWARD, 07/31/90)

SECTION 103 - AWARD AND EXECUTION OF CONTRACT:

103.04 Award of Contract: the first paragraph of the Standard Specifications is modified to add:

When a contract is funded, either wholly or in part, by federal funds, an award of contract may be made contingent upon the successful bidder obtaining an appropriate license from the State Registrar of Contractors, in accordance with Arizona Revised Statutes 32-1101 through 32-1170.03. The license must be obtained within 60 calendar days following opening of bid proposals. No adjustment in proposed bid prices or damages for delay will be allowed as a result of any delay caused by the lack of an appropriate license.

Failure to acquire the necessary licensing within the specified period of time shall result in either award to the next lowest responsible bidder, or re-advertisement of the contract, as may be in the best interests of the Department.

Licensing information is available from:

Registrar of Contractors
800 W. Washington
6th Floor
Phoenix, AZ 85007
Phone: (602) 542-1502

(104APA, 02/26/99)

SECTION 104 - SCOPE OF WORK:

104.04 Maintenance of traffic: of the Standard Specifications is modified to add:

In order to eliminate the possibility of causing or exacerbating air quality violations resulting from construction activities, any traffic control plans which include temporary traffic detours involving local adjacent streets or alternate routes must be approved by the Engineer.

104.08 Prevention to Air and Noise Pollution: of the Standard Specifications is modified to add:

In the event that the Governor declares an air pollution emergency, pursuant to ARS § 49-465.B., which restricts work schedules for all employees of the state and its political subdivisions, the Engineer will direct the contractor suspend all work activities until further notice. The contractor shall discontinue all current work activities as soon as possible, but not later than four hours after notification by the Engineer. The contractor will be compensated for labor costs incurred through the end of the work shift in which the notification occurs. No payment adjustments will be made for equipment or overhead costs resulting from the suspension of work. An extension of the time allowable under the contract will be granted in accordance with Subsection 108.08 of these specifications. In the event that any local air quality authority declares an air pollution advisory, the cooperation of the contractor is requested in complying with the actions recommended by the local authority to the maximum extent possible.

(104DUST, 11/01/95)

104.08 Prevention of Air and Noise Pollution: of the Standard Specifications is modified to add:

For work performed within Maricopa County, the contractor will be required to prepare a comprehensive fugitive dust control plan, in accordance with the guidelines established in Rule 310 of Maricopa County Regulation III, Control of Air Contaminants. The contractor may contact Maricopa County, Division of Air Pollution Control, to purchase a copy of the guidelines. The contractor shall complete and submit the control plan with the permit application, and obtain approval prior to construction or any other activities that may produce dust pollutants.

Some of the measures which the contractor may use to control or minimize fugitive dust include: increased use of water or chemical dust suppressants, cease work temporarily during high winds, reducing vehicle speeds and number of trips, maintaining freeboard of three inches or more in hauling, and covering or stabilizing stockpiles. The contractor shall be required to cover haul trucks associated with this contract with tarps or other suitable enclosures.

No separate payment will be made for preparation and implementation of the fugitive dust control plan, the costs being considered as included in the price of contract items.

(104MTBRN, 06/04/96)

104.08 **Prevention of Air and Noise Pollution:** the first paragraph of the Standard Specifications is modified to add:

Burning of trash, debris, plant material, wood, or any other waste materials will not be allowed. The contractor shall dispose of such materials in accordance with the requirements of Subsection 107.11.

(104SWDEQ, 6/17/05)

SECTION 104 - SCOPE OF WORK:

104.09 **Prevention of Landscape Defacement; Protection of Streams, Lakes and Reservoirs:** of the Standard Specifications is revised to read:

(A) General:

The contractor shall give attention to the effect of the contractor's operations upon the landscape, and shall take care to maintain natural surroundings undamaged.

The contractor shall be responsible to implement the requirements of the Arizona Pollutant Discharge Elimination System (AZPDES) for erosion control as specified in the "General Permit For Discharge From Construction Activities To the Waters Of The United States" as issued by the Arizona Department of Environmental Quality (ADEQ). That document is hereinafter referred to as the AZPDES general permit.

Useful information related to stormwater controls and erosion control measures is presented in the "Fact Sheet For The Issuance Of An AZPDES Construction General Permit," available from ADEQ, and ADOT's "Erosion and Pollution Control Manual," available from Engineering Records, 1655 West Jackson, Room 112F, Phoenix, AZ 85007; Phone (602) 712-7498.

The work shall include providing, installing, maintaining, removing and disposing of erosion control measures such as gravel filter berms, dikes, catch basin inlet protection, end-of-pipe filtering devices, silt fences, dams, sediment basins, earth berms, netting, geotextile fabrics, slope drains, seeding, stream stabilization, and other erosion control devices or methods. Erosion control measures may be temporary or permanent. The contractor shall also be responsible for the preparation and processing of all documents required in the AZPDES general permit.

The plans will include preliminary erosion control measures and additional information to be included in the project's Storm Water Pollution Prevention Plan (SWPPP), as specified in Subsection 104.09(B). The contractor, with input from the Engineer, shall finalize the SWPPP, file a Notice of Intent (NOI), implement the SWPPP, and file a Notice of Termination (NOT), all as described herein.

Except for the NOI, all signatures required of the contractor by the AZPDES general permit, including those required for the NOT, SWPPP, and inspection reports, shall be provided by a duly authorized representative of the contractor, as defined in Part VII.K.2 of said permit. Signature of the NOI shall be by a responsible corporate officer, as defined in Part VII.K.1 of the AZPDES general permit.

No clearing, grubbing, earthwork, or other work elements affected by the erosion control requirements in the SWPPP, shall be started until the SWPPP has been approved, the NOI's completed and filed in accordance with Subsection 104.09(C), and the SWPPP implemented.

Submission of the contractor's NOI shall certify that the contractor and its subcontractors have read and will comply with all provisions of the AZPDES general permit.

(B) Stormwater Pollution Prevention Plan (SWPPP):

The plans will include descriptions of temporary and permanent erosion control measures, a project description, estimated runoff coefficients for both pre-construction and post-construction conditions, inspection schedule, and site-specific diagrams indicating proposed locations where erosion and sediment control devices or pollution control measures may be required during successive construction stages. The plans may also include an initial schedule detailing the proposed sequence of construction and related erosion control measures.

The contractor shall review the preliminary information, including the erosion control features and phasing, evaluate all SWPPP requirements for adequacy in addressing pollution prevention during construction, and prepare a draft SWPPP for review by the Engineer.

The contractor shall designate an erosion control coordinator, in accordance with Subsection 104.09(D), to be responsible for finalization and implementation of the SWPPP, as well as all other applicable requirements of the AZPDES general permit. The contractor's erosion control coordinator shall be approved as specified in Subsection 104.09(D) before the draft SWPPP can be finalized and submitted to the Engineer. After approval, the contractor shall designate the erosion control coordinator as an authorized representative of the contractor in accordance with Part VII.K.2 of the AZPDES General Permit.

The draft SWPPP shall include all information required in the AZPDES general permit, including a site map; identification of receiving waters and wetlands impacted by the project; a list of potential pollutant sources; inspection schedule; any onsite or off-site material storage sites; additional or modified stormwater, erosion, and sediment controls; procedures for maintaining temporary and permanent erosion control measures; a list of the contractor's "good housekeeping practices"; and other permit requirements stipulated in the AZPDES program as well as other applicable state or local programs. The contractor shall coordinate with the Engineer on all such additional information.

The draft SWPPP shall also identify any potential for discharge into a municipal separate storm sewer system, including the name of the owner/operator of the system. If requested, the contractor shall also submit a copy of the approved SWPPP to the owner/operator of the system.

Unless otherwise approved by the Engineer, the contractor shall not expose a surface area of greater than 750,000 square feet to erosion through clearing and grubbing, or excavation and filling operations within the project limits until temporary or permanent erosion control devices for that portion of the project have been installed and accepted by the Engineer.

As an example, installation of temporary silt fence concurrently with construction of an embankment area, along the toe of slope, may be appropriate to meet the above requirement until permanent erosion control measures are constructed.

The contractor shall indicate each 750,000 square-foot sub-area in the draft SWPPP, along with proposed erosion control measures for each sub-area. The draft SWPPP shall also include the sequence of construction for each sub-area, and installation of the required temporary or permanent erosion control measures.

The contractor shall give installation of permanent erosion control measures priority over reliance on temporary measures. Permanent erosion control measures and drainage structures shall be installed as soon as possible in the construction sequencing of the project, preferably concurrent with construction of the related sub-area or drainage device. However, except as specified in Part IV, Section D.4.b of the AZPDES general permit and approved by the Engineer, erosion control measures shall be installed no later than 14 calendar days after construction activity has temporarily or permanently ceased for the affected sub-area.

Temporary or permanent sedimentation basins may be required for reducing or eliminating sediment from stormwater runoff. When required, such basins shall be completed before any clearing and grubbing of the site is initiated. The contractor shall evaluate the need and attainability of installing sediment basins as described in the AZPDES permit and, if approved by the Engineer, include the basins into the SWPPP as appropriate. When sedimentation basins are determined to be necessary and feasible, such work will be paid in accordance with Subsection 109.04(D). The plans may also include sediment basins as part of the preliminary information. No additional payment will be made for such basins, the cost being considered as included in contract items.

The draft SWPPP shall also identify and address erosion control at on-site fueling operations, waste piles, material storage sites, and off-site dedicated asphalt and concrete plants, contractor-use areas, storage areas, and support activity locations which are used solely for the project and are covered by the AZPDES general permit. The draft SWPPP shall also accommodate all requirements for the contractor's "good housekeeping" procedures specified in Subsection 104.09(E). In addition, the SWPPP shall specifically identify the erosion control measures proposed by the contractor during any vegetation removal and salvaging phases of the project (such as during timber harvesting or native plant salvaging).

The draft SWPPP shall specify the mechanism whereby revisions may be proposed by the contractor or the Engineer throughout the project and incorporated into the plan, including review and approval procedure. The Engineer and contractor shall jointly approve and sign each revision to the SWPPP before implementation. Any subsequent submittals required by the contractor to revise or update the SWPPP will require at least 48 hours for review.

Contractors and subcontractors responsible for implementing all or portions of the SWPPP shall be listed in the draft SWPPP, along with the measures for which they are responsible.

The contractor shall submit two copies of the draft SWPPP, including all information specified herein, to the Engineer at the preconstruction conference if possible, but not later than 14 calendar days from the Department's approval of the contractor's Erosion Control Coordinator.

The Engineer will provide the contractor with the following forms at the preconstruction conference:

- Maintenance, inspection, and site-monitoring report forms;
- Other record keeping forms and procedures, as needed; and
- Notice of Intent (NOI) and Notice of Termination (NOT) forms.

Notice of Intent and Notice of Termination blank forms are also available on the internet at <http://azdeq.gov/function/forms/appswater.html#cgp>.

Within 10 calendar days from the SWPPP submittal, the Engineer and contractor will jointly review the contractor's draft SWPPP, and include any additional revisions directed by the Engineer. The finalized SWPPP shall meet the terms and conditions of the AZDPES general permit, and be compatible with construction sequencing and maintenance of traffic plans.

When agreement has been reached, the Engineer and contractor's authorized representative will sign the finalized SWPPP. The Engineer's signature will constitute approval of the SWPPP. Upon approval of the SWPPP, the Engineer and contractor shall each file a Notice of Intent (NOI) as specified in Subsection 104.09(C). At this time the Engineer will also provide a copy of the Department's NOI to the contractor.

After the time period specified in Subsection 104.09(C), the contractor shall implement the requirements of the SWPPP. No clearing, grubbing, earthwork, or other work elements affected by the erosion control requirements in the SWPPP, shall be started until the SWPPP has been approved, the NOI's completed and filed in accordance with Subsection 104.09(C), and the SWPPP implemented.

The contractor shall maintain all related erosion control elements in proper working order throughout the project. Work under this section also includes inspections, record-keeping, and implementation of "good housekeeping" practices as described in Subsection 104.09(E).

The approved SWPPP shall be updated whenever a change in design, construction method, operation, maintenance procedure, or other activity may cause a significant effect on the discharge of pollutants to surface waters, or when a change is proposed to the personnel responsible for implementing any portion of the SWPPP. The SWPPP shall also be amended if inspections indicate that the SWPPP is ineffective in eliminating or significantly reducing pollutants in the discharges from the construction site. All necessary modifications to the SWPPP shall be made within seven calendar days following the inspection that revealed the deficiency.

ADEQ may notify the contractor at any time that the SWPPP does not comply with the permit requirements. The notification will identify the provisions of the permit that are not being met and parts of the SWPPP that require modification. Within 15 business days of receipt of the notification from ADEQ the contractor shall make the required changes to the SWPPP and submit a written certification to ADEQ that the requested changes have been made.

The contractor's erosion control coordinator shall maintain the SWPPP along with completed inspection forms and other AZPDES records in a three-ring binder. The erosion control coordinator shall maintain a current copy of the SWPPP, including all associated records and forms, at the job site from the time construction begins until completion of the project. The SWPPP shall be available for public inspection and for use by the Engineer. The erosion control coordinator shall provide copies of any or all of such documents to the Engineer upon request. When requested, such copies shall be provided within three working days of the request.

The SWPPP (including inspection forms) and all data used to complete the NOI and NOT shall be provided to the Department at the completion of the project. The contractor shall retain its own records for a period of at least three years from the filing of the contractor's NOT.

No condition of the AZPDES general permit or the SWPPP shall release the contractor from any responsibilities or requirements under other environmental statutes or regulations.

(C) Notice of Intent (NOI):

After the project Storm Water Pollution Prevention Plan (SWPPP) has been approved, the Engineer and contractor will each complete separate Notice-of-Intent (NOI) forms for the project. The NOI submitted by the contractor includes a certification statement which must be signed and dated by a responsible corporate officer of the contractor, as defined in Part VII.K.1 of the AZPDES General Permit, and include the name and title of that officer.

The NOI's shall be submitted to the Arizona Department of Environmental Quality (ADEQ) at the following address:

Arizona Department of Environmental Quality
Water Permits Section/Stormwater NOI (5415B-3)
1110 W. Washington Street
Phoenix, Arizona 85007
or fax to (602) 771-4674

The submittals shall be made to allow for the full two business-day review period required by ADEQ before the anticipated start of construction. The contractor shall also allow sufficient time, depending on the manner of submittal, for the NOIs to be received by ADEQ before commencement of the two-day review period. Unless otherwise notified by ADEQ, construction activities that are covered by the terms and conditions of the AZPDES permit may begin after the submittal period plus the two business-day review period.

At any time after authorization, ADEQ may determine that the contractor's stormwater discharges may cause or contribute to non-attainment of any applicable water quality standards. If ADEQ makes that determination, the contractor will be notified in writing. The contractor shall develop a supplemental erosion control action plan describing SWPPP modifications to address the identified water quality concerns. If the written notice from ADEQ requires a response, failure to respond in a timely manner constitutes a permit violation. All responses shall be in accordance with the AZPDES general permit.

If there is a potential to discharge into a municipal separate storm sewer system (MS4), a signed copy of the NOI shall also be submitted to the owner/operator of the municipal system at the time that the NOI's are submitted to ADEQ. Also, contractor's operating under an approved local sediment and erosion plan, grading plan, or stormwater management plan shall submit a signed copy of the NOI to the local authority upon their request.

The contractor shall post both NOI's and the information required in the AZPDES general permit on the construction-site bulletin board throughout the duration of the project. A copy of the AZPDES general permit shall also be kept at the construction site at all times.

(D) Contractor's Erosion and Pollution Control Coordinator:

(1) General Requirements:

The contractor shall designate a competent person as the contractor's erosion and pollution control coordinator (referred to elsewhere herein as erosion control coordinator) responsible for finalizing the draft SWPPP from the preliminary information included with the plans. The erosion control coordinator shall also be responsible for implementing, monitoring, and revising the approved SWPPP throughout the project, for making the required inspections, and for implementing any other permit requirements stipulated in the AZPDES general permit. The person shall be knowledgeable in the principles and practice of erosion and sediment controls, and possess the skills to assess conditions at the site that could impact stormwater quality and the effectiveness of the contractor's erosion control measures used to control the quality of the stormwater discharges.

Stormwater runoff from construction activities may contaminate adjacent bodies of water, or otherwise exceed water quality standards, and result in possible major civil and/or criminal penalties. Therefore the Engineer will closely consider the qualifications of the contractor's erosion control coordinator. The contractor shall not assume that the person proposed as erosion control coordinator will be acceptable to the Department merely because the experience and education requirements listed herein have been met.

The contractor bears all risks and liabilities for the failure of its erosion control coordinator to properly implement the requirements of the AZPDES general permit.

The person shall be capable of identifying existing and predictable effects of the contractor's operations, and shall have complete authority to direct the contractor's personnel and equipment to implement the requirements described herein, including prompt placement of corrective measures to minimize or eliminate pollution and damage to downstream watercourses. The erosion control coordinator shall also be familiar with procedures and practices identified in the SWPPP, and shall ensure that emergency procedures are up to date and available at project sites.

The erosion control coordinator shall at all times be aware of the contractor's work activities, schedule, and effect of the work on the environment, and shall, at any time, be accessible to direct the contractor's personnel to replace or repair erosion control measures as necessary. Should the erosion control coordinator not be present at the project site on a full-time basis, the contractor shall establish procedures to ensure that its erosion control coordinator is promptly notified of any damage or displacement of the required erosion control measures, whether from construction, vandalism, or other causes. In addition, the contractor shall provide the Engineer with a phone number through which the erosion control coordinator can be contacted at any time, 24 hours a day, seven days a week, including holidays. The erosion control coordinator must be present at the jobsite within 24 hours of such call being placed.

The erosion control coordinator shall also be aware of and comply with all requirements of the AZPDES general permit to address discharges at the site associated with the contractor's activities other than construction, including contractor staging areas, and other potential pollutant and off-site material storage and borrow areas.

Failure of the contractor to properly maintain the erosion control measures required in the approved SWPPP will be cause for the Engineer to reject the erosion control coordinator and issue a stop work order, as specified in Subsection 104.09(G).

(2) Certification Requirements:

The proposed erosion control coordinator shall have successfully completed the two-day (16 hour) "Erosion Control Coordinator" training class provided by the Associated General Contractors (Arizona Chapter), phone (602) 252-3926. In addition, the proposed erosion control coordinator shall have documented experience equal to a minimum of one year from either of the following two categories:

- (a) Experience in the development and implementation of Stormwater Pollution Prevention Plans (SWPPP's), as specified in the AZPDES general permit referenced herein, or the National Pollutant Discharge Elimination System (NPDES) for highway construction projects. The proposed erosion control coordinator's experience shall demonstrate full-time responsibility for directly supervising construction personnel in the installation, monitoring, and maintenance of erosion control items.
- (b) Experience in re-vegetation or restoration of disturbed areas in environments similar to those on the project. Experience in temporary or permanent stabilization of disturbed areas will also be considered. The proposed erosion control coordinator's experience shall demonstrate full-time responsibility for directly supervising personnel in temporary or permanent re-vegetation or restoration of disturbed areas.

The contractor's documentation shall provide details indicating the types of relevant experience, and shall provide the number of months of each type of experience to be considered for approval. Documentation shall also indicate that the proposed erosion control coordinator has completed the "Erosion Control Coordinator" training class prior to consideration for approval.

(3) Acceptance:

The contractor shall submit documentation indicating the qualifications of the proposed erosion control coordinator to the Engineer for approval within seven calendar days of the notice of award of the contract. The Engineer will review the proposed candidate's information within seven calendar days. The contractor may begin development of the draft SWPPP from the preliminary information included with the plans prior to approval of the erosion control coordinator. However no clearing, grubbing, earthwork, or other work elements that, in the opinion of the Engineer, may be subject to the requirements of the AZPDES general permit shall be started until the erosion control coordinator has been

approved, the SWPPP finalized and implemented, and the NOI's completed and filed, all as specified herein.

(E) "Good Housekeeping" Practices and Requirements:

The SWPPP shall also specify the contractor's "good housekeeping" practices and requirements, including vehicle wash-down areas, onsite and off-site tracking control, protection of equipment storage and maintenance areas, methods to minimize generation of dust, and sweeping of highways and roadways related to hauling activities. The contractor shall show each planned location of service and refueling areas on the SWPPP's site map. Changes to the contractor's "good housekeeping" practices that are related to construction phasing shall also be shown on the SWPPP.

The contractor shall take aggressive actions, considering all conditions, to prevent pollution of streams, lakes, and reservoirs with fuels, oil, bitumens, calcium chloride, fresh Portland cement, fresh Portland cement concrete, raw sewage, muddy water, chemicals or other harmful materials. None of these materials shall be discharged into any channels leading to streams, lakes or reservoirs. The SWPPP shall include the implementation of spill prevention and material management controls and practices to prevent the release of pollutants into stormwater. The SWPPP shall also provide storage procedures for chemicals and construction materials; disposal procedures; cleanup procedures; the contractor's plans for handling such pollutants; and other pollution prevention measures as required.

Machinery service and refueling areas shall be located away from streambeds or washes, and in a manner which prevents discharges into streams or washes.

Waste materials from blasting, including explosives containers, shall be disposed of off-site in accordance with applicable federal regulations. Other waste materials, such as used cans, oils, machine and equipment parts, paint, hazardous materials, plastic and rubber parts, discarded metals, and building materials, shall be removed from the construction site and disposed of according to applicable state and federal regulations.

Where the contractor's working area encroaches on a running or intermittent stream, barriers shall be constructed and maintained between the working areas and the stream bed adequate to prevent the discharge of any contaminants. The SWPPP shall identify the location of streams that may be affected and the specific types of barriers proposed for protecting these resources.

Unless otherwise approved in writing by the Engineer, fording of running streams with construction equipment will not be permitted; therefore, temporary bridges or other structures shall be used whenever an appreciable number of crossings is necessary.

Temporary bridges or other structures proposed by the contractor shall be designed to accommodate the ten-year storm event if to remain in place for up to a one-year period. If a structure is planned to remain in place for longer than one year, the hydraulic conveyance may be subject to more stringent requirements. The contractor shall be responsible for all permits, authorizations, and environmental clearances that may be necessary to approve the use of such structures. The contractor shall submit the design and all required

documentation to the Engineer for approval. The contractor is advised that the review and approval process for such structures could be lengthy. Unless otherwise provided for in the contract, the contractor shall be responsible for all costs associated with the design and construction of such structures. Also, no extension of contract time will be allowed for any review and approval periods, or for the time required to construct temporary bridges proposed by the contractor.

Mechanical equipment shall not be operated in running streams.

Material which is to be stockpiled or disposed of off-site shall be in accordance with Subsection 107.11.

Streams, lakes and reservoirs shall be cleared of all falsework, piling, debris or other obstructions resulting from the contractor's activities, inadvertently placed thereby or resulting from construction operations, within 24 hours from the time the obstruction was observed.

Spill prevention, containment and counter-measures shall be included in the SWPPP if the volume of project-site fuel in a single container exceeds 660 gallons, or if the total fuel storage volume at any one site exceeds 1,320 gallons.

In the event of a spill of a hazardous material, the contractor shall follow the provisions of Subsection 107.07. In addition, the erosion control coordinator shall modify the SWPPP as necessary within 14 calendar days of the discharge. The SWPPP shall be modified to include a description of the release, the circumstances leading to the release, and the date of the release.

The contractor shall assist in any efforts to clean up hazardous material spills, as directed by the Engineer or other authorities. Soil contaminated from spills shall be disposed of according to applicable state and federal regulations.

(F) Inspections:

(1) General:

The Engineer and the erosion control coordinator shall inspect the project at least every 14 calendar days, and also within 24 hours after any storm event of 0.50 inches or more. The inspections shall include disturbed areas that have been temporarily stabilized, areas used for storage of materials, locations where vehicles enter or exit the site, and all of the erosion and sediment controls included in the SWPPP. The contractor shall monitor rainfall on the site with a commercially manufactured rain gauge accurate to within 0.10 inches of rain. Rainfall records shall be submitted to the Engineer on a weekly basis.

For each inspection, the contractor's erosion control coordinator shall complete and sign a Compliance Evaluation Report as described in the permit. Copies of the completed reports shall be retained on-site in the SWPPP file throughout the construction period. The erosion control coordinator shall also provide a copy of the report to the Engineer following each inspection.

(2) Adjustments:

When deficiencies are noted during scheduled inspections, the contractor shall take immediate steps to make the required corrections as soon as practical. Deficiencies shall be fully corrected, to the satisfaction of the Engineer, within four calendar days or by the next anticipated storm event, whichever is sooner. Deficiencies noted between designated inspections shall be corrected within the time period directed by the Engineer, but not later than four calendar days after observation.

Direct inflows of sediment into a watercourse shall be corrected by the end of the same day or work shift in which the inflow as observed.

In accordance with Subsection 104.09(G), failure to implement adjustments within the specified time periods may be cause for the Engineer to reject the contractor's erosion control coordinator and issue a stop work order for the affected portions of the project.

(G) Non-Compliance:

The Engineer may reject the contractor's erosion control coordinator if, in the opinion of the Engineer, the conditions of the AZPDES general permit or the approved SWPPP are not being fulfilled. Rejection of the contractor's erosion control coordinator shall be for failure to complete any of the following:

- (1) Should the Engineer determine that the SWPPP is not being properly implemented, the contractor will be notified in writing of such deficiencies. The contractor's erosion control coordinator shall fully implement, to the satisfaction of the Engineer, the requirements of the approved SWPPP within three working days.
- (2) Should any corrective measures required in Subsection 104.09(F)(2) not be completed within the time periods specified therein, the Engineer will notify the contractor in writing. The contractor's erosion control coordinator shall complete all required corrective measures within two calendar days of such notification, except that direct inflows of sediment into a watercourse shall be corrected within 24 hours.
- (3) Should the Engineer determine that routine maintenance of the project's erosion control measures is not being adequately performed, the contractor will be notified in writing. Within three working days, the contractor's erosion control coordinator shall demonstrate, to the satisfaction of the Engineer, that such steps have been taken to correct the problem.

In the event of the erosion control coordinator's failure to comply with any of the above requirements, the Engineer will direct the contractor to stop all affected work and propose a new erosion control coordinator as soon as possible. However, all erosion and pollution control items specified in the SWPPP shall be maintained at all times. No additional work on construction items affected by the SWPPP will be allowed until a new erosion control coordinator has been approved by the Engineer. The contractor will not be allowed compensation or an extension of contract time for any delays to the work because of the

failure of the contractor's erosion control coordinator to properly fulfill the requirements of the approved SWPPP.

(H) Record of Major Construction And Erosion Control Measures:

In addition to the compliance evaluation report, the contractor shall keep records of the major construction activities, including the erosion control measures associated with these activities. In particular, the contractor shall keep a record of the following activities:

- The dates when major grading activities (including clearing and grubbing, excavation and embankment construction) occur in a particular area or portion of the site.
- The dates when construction activities cease in an area, temporarily or permanently.
- The dates when an area is stabilized, temporarily or permanently.

Such information shall be noted within two working days of the occurrence of any of the listed activities, and a copy of the report shall be included in the SWPPP. The contractor shall also provide one copy of such records, and any subsequent up-dated information, to the Engineer within three working days of completion or amendment of the report.

(I) Notice of Termination (NOT):

Upon final acceptance by the Engineer in accordance with Subsection 105.20, and as specified herein, the contractor shall complete and mail a Notice-of-Termination (NOT) for the project to the address shown below. The NOT submitted by the contractor includes a certification statement which must be signed and dated by an authorized representative of the contractor, as defined in Part VII.K.2 of the AZPDES General Permit, and include the name and title of that authorized representative.

Arizona Department of Environmental Quality
Water Permits Section/Stormwater NOT (5415B-3)
1110 W. Washington Street
Phoenix, Arizona 85007

When the approved SWPPP includes the use of Class II seeding as an erosion control measure, seeded areas shall be maintained for 45 calendar days, as specified in the special provisions, and approved by the Engineer before the contractor's NOT can be submitted. Seeding, when used in the SWPPP as an erosion control measure, will not be considered as part of any Landscape Establishment Phase that may be included with the project.

(J) Measurement and Payment:

Measurement and payment for work specified in the SWPPP will be made in accordance with the requirements of Section 810. Erosion control and pollution prevention work specified in the contract which is to be accomplished under any of the other various contract items will be paid for as specified under those items.

If a force account pay item for erosion control is included in the bidding schedule, the contractor may be reimbursed for such additional erosion control items proposed by the contractor but not included with the plans or specifications. Such additional erosion control

items must be approved in writing by the Engineer before use. Erosion control items approved by the Engineer will be paid in accordance with Subsection 109.04(D). No measurement or payment will be made for such additional items not approved by the Engineer.

No measurement or payment will be made to the contractor for time spent in preparing, reviewing, and revising the Storm Water Pollution Prevention Plan (SWPPP), or providing other required documentation, the cost being considered as included in the price of contract items. No measurement or payment will be made for inspections, the contractor's erosion control coordinator, or the contractor's "good housekeeping" practices and requirements, the costs being considered as included in contract items.

Unless otherwise specified, no measurement or payment will be made for maintenance of temporary and permanent erosion control measures, the cost being considered as included in contract items.

104.10 Contractor's Responsibility for Work: of the Standard Specifications is revised to read:

The contractor shall implement the requirements of the Arizona Pollutant Discharge Elimination System (AZPDES) for erosion control due to storm water runoff during construction, as specified above in Subsection 104.09, Prevention of Landscape Defacement; Protection of Streams, Lakes, and Reservoirs.

Until final written acceptance of the project by the Engineer, the contractor shall have the charge and care thereof and shall take every precaution against injury or damage to any part thereof by the action of the elements, or from any other cause, whether arising from the execution or from the nonexecution of the work. The contractor shall rebuild, repair, restore and make good all injuries or damages to any portion of the work occasioned by any of the above causes before final acceptance. No reimbursement shall be made for work necessary due to the contractor's failure to comply with the requirements of the SWPPP.

Except as specifically provided under Subsection 104.04, in case of suspension of work from any cause whatever, the contractor shall be responsible for the project and shall take such precautions as may be necessary to prevent damage to the project and provide for normal drainage. The contractor shall also erect any necessary temporary structures, signs or other facilities. During such period of suspension of work, the contractor shall properly and continuously maintain in an acceptable growing condition all living material in newly established plantings, seedings and soddings, furnished under its contract and shall take adequate precautions to protect new tree growth and other important vegetative growth against injury.

(104STORM, 11/01/95)

SECTION 104 - SCOPE OF WORK:

104.11 Damage by Storm, Flood or Earthquake: Item (D), Idled Equipment and Remobilization, of the Standard Specifications is hereby deleted.

104.11 Damage by Storm, Flood or Earthquake: Items (E) and (F) of the Standard Specifications are revised to read:

(D) Payment for Repair Work:

The State will pay the cost of the repair work as determined in Subsection 109.04.

(E) Termination of Contract:

If the Department elects to terminate the contract, the termination and the determination of the total compensation payable to the contractor shall be governed by the provisions of Subsection 108.11, Termination of Contract for Convenience of the Department.

(104TWIRE, 12/23/05)

SECTION 104 - SCOPE OF WORK: of the Standard Specifications is modified to add:

104.15 Providing Magnetic Detection for Underground Facilities:

(A) General:

All new underground utility facilities, including service connections, placed within ADOT Right-of Way by the contractor must be magnetically detectable with standard locating instruments, such as a Metrotech Model 810 or approved equal. The contractor shall place continuous detectable tracer wire with all those underground utility facilities that lack a continuous and integral metallic component capable of detection by standard locating instruments.

Tracer wire will not be required for power cables and wires, telephonic or electronic communications, or for landscape irrigation lines smaller than two inches in diameter. For Salt River Project Water Users Association (S.R.V.W.U.A.) irrigation facilities, no tracer wire will be required if Salt River Project provides their own tracer system.

Tracer wire will be required for non-metallic pipe such as High Density Polyethylene (HDPE) and Vitrified Clay Pipe (VCP); and for Polyvinyl Chloride pipe (PVC) two inches in diameter and larger. Tracer wire will be required where the metallic component is encased within the pipe, such as reinforced concrete pipe (RCP) and (RGRCP), and Steel Cylinder Concrete Pipe.

Tracer wire will also be required for non-metallic cable, service connections, and other utility lines; fiber optic lines; empty duct banks and duct banks containing a utility that is not magnetically detectable, either before or after backfilling; and other facilities as determined by the Engineer.

Cast iron and ductile iron pipes may be non-conductive because of site-specific soil conditions or construction configuration; as a consequence all new installations of cast iron and ductile iron pipes shall also be made detectable with tracer wire.

For all other underground facilities, should the magnetic characteristics be unknown, the contractor shall perform sufficient tests with standard locating instruments to determine whether tracer wire will be necessary, and provide the results to the Engineer. Such tests shall be performed prior to construction.

The contractor shall also provide access points, as specified below, for all facilities that will receive tracer wire.

(B) Materials:

Tracer wire shall be a minimum 12 American Wire Gauge (AWG) solid copper. Tracer wire shall be coated with a minimum 30 mil polyethylene jacket designed specifically for buried use. Tracer wire shall conform to the specifications of the NEC, UL, and other applicable industry standards. Splices as required to promote continuity shall utilize sealed water tight connections.

New access boxes shall be concrete pull boxes in accordance with Subsection 732-2.03 (Number 5 Pull Box, Traffic Standard T.S. 1-1), except that the cover shall be marked with the name of the utility or type of facility.

(C) Construction Requirements:

The contractor shall install tracer wire along the top of the entire length of the underground facilities. The tracer wire shall be attached to the facility at minimum intervals of not more than 20 feet, and shall be secured in such a manner that the wire remains firmly attached throughout the construction period.

Tracer wire shall be made accessible along the facility through appropriate pull boxes or other means as approved by the Engineer. New or existing junction boxes or pull boxes included in the construction of conduit or other transmission facilities shall be utilized as access structures wherever possible. For sanitary and storm sewer pipe, tracer wire shall be constructed into the manhole at the pipe entry point, secured to the inside wall along the full length, and be accessible from above upon removal of the manhole cover. For water lines requiring tracer wire, the contractor shall provide access to the wire within the valve boxes. The contractor shall provide and install new access boxes for all tracer wire which cannot be terminated in a new or existing junction or pull box, or new manhole or valve box.

Pull boxes shall be installed flush with the finished grade.

Tracer wire shall be securely attached to the facility at each access point and extended vertically to the access box. The tracer wire shall be terminated with a minimum of 12 inches of slack above the bottom of the pull box.

Tracer wire installed for each segment of underground utility shall be terminated at each access point within the pull box, junction box, manhole, or valve box. The contractor shall make no connections or splices of tracer wire across access points.

New pull boxes installed exclusively for tracer wire shall be placed directly above the utility line in easily reachable areas.

For facilities that cross ADOT right-of-way, tracer wire shall be made accessible at the right-of-way line at approved access points.

For facilities placed longitudinally in ADOT right-of-way, access points shall be located between the right-of-way line and the outside edge of the shoulder or grader ditch, or back of sidewalk or curb and gutter as applicable. Access boxes installed exclusively for tracer wire shall be provided at intervals no greater than 2,000 feet or, as a minimum, at the point each line crosses ADOT right of way. If the utility line is placed outside the preferred location of the access box as described above, the box shall be located in the preferred location and tracer wire shall be installed in a suitable conduit and brought up to the pull box.

For jacking and boring, tracer wire shall be placed inside the jacked sleeve and attached to the utility facility

Empty conduits and duct banks shall have a trace wire attached to the outside of the facility.

When sanitary sewer force mains are installed in ADOT right-of-way, tracer wire access shall be accomplished by attaching the wire to the outside of wet wells and terminating the wire in pull boxes (Number 5, Traffic Standard T.S. 1-1) placed adjacent to the wet well.

(D) Testing:

The contractor shall test all installed tracer wire, and all those facilities determined to be magnetically detectable without tracer wire, with standard locating instruments to verify conductivity, both before and after backfilling, and provide the results to the Engineer. The contractor shall install new tracer wire for those newly installed utilities that fail to be detectable, at no additional cost to the Department. Tracer wires that fail to test properly shall also be replaced at no additional cost to the Department.

(E) Payment:

No measurement or direct payment will be made for furnishing and installing tracer wires and access boxes, or for testing the installed wires or facilities. Such costs shall be considered as included in the cost of contract items.

(105MNRP, 3/29/02)

SECTION 105 - CONTROL OF WORK:

105.10 Construction Stakes, Lines and Grades: of the Standard Specifications is modified to add:

The contractor shall be responsible to maintain all existing monumentation, including section line, right-of-way, and roadway monumentation.

Monumentation disturbed by construction activities shall be re-established at no additional cost to the Department. Monumentation shall be re-established in accordance with Subsection 925-3.02.

(106SRP, 11/21/03)

SECTION 106 - CONTROL OF MATERIALS:

106.01 Source of Supply and Quality Requirements: of the Standard Specifications is modified to add:

Unless otherwise specified, the contractor shall be responsible for furnishing all water required for construction. Water obtained from sources within the Salt River or Verde River watersheds and administered by Salt River Project, or obtained from Salt River Valley Water Users Association (S.R.V.W.U.A.) delivery canals within the Phoenix metropolitan areas, shall be subject to the following conditions:

For water obtained from rivers, streams, lakes, or other sources within the watershed, the contractor shall execute a Construction Water Exchange Permit. Water obtained from surface water sources or wells in close proximity to a river, stream, or lake located within the watershed may also require a Construction Water Exchange Permit.

For water obtained from S.R.V.W.U.A. canals, the contractor shall contact Salt River Project to determine the most appropriate delivery method and associated permits and costs. As an example, a Permit for Operation of Mobile Tank Trucks shall be required for water pumped into mobile water trucks.

The contractor shall contact Salt River Project at the address shown below to determine whether its anticipated water sources will be subject to Salt River Project regulations and, if necessary, the appropriate requirements, permits, and fees.

Salt River Project
Water Accounting & Contract Services SSW302
PO Box 52149
Phoenix, Arizona 85072-2149
(602) 236-2763
Fax (602) 236-5919

No water shall be obtained from sources as specified herein until the contractor has furnished the Engineer with a completely executed copy of the appropriate permits.

(106QCMAT, 06/22/05)

SECTION 106 CONTROL OF MATERIAL:

106.04(A) General: the second, third, and fourth paragraphs of the Standard Specifications are revised to read:

Unless otherwise specified in the contract documents, materials will be sampled and tested by a qualified representative of the Department. Copies of all test results will be furnished to the contractor's representative at the contractor's request.

Any laboratory performing sampling and testing for an ADOT project shall be open to unrestricted access for inspection and review by the Department. The laboratory shall provide an adequate amount of enclosed space and be supplied with the proper equipment, facilities, and utilities so that the required testing procedures can be performed. It shall have adequate lighting, ventilation, and means of ingress and egress. The laboratory shall be equipped with heating and cooling equipment capable of maintaining an ambient air temperature of 68 to 78 degrees F. The laboratory and all equipment and facilities therein shall be kept clean and maintained in good working order.

Sampling and testing of materials shall be in accordance with the requirements of:

- The ADOT Materials Testing Manual.
- The ADOT Materials Policy and Procedure Directives Manual.
- Applicable Federal, AASHTO, or ASTM specifications or test designations.
- Applicable specifications or test designations of other nationally recognized organizations.

Whenever a reference is made to an Arizona Test Method or an ADOT Materials Policy and Procedure Directive, it shall mean the test method or policy and procedure directive in effect on the bid opening date.

Unless otherwise specified, whenever a reference is made to a Federal, AASHTO, or ASTM specification or test designation, or to a specification or test designation of other nationally recognized organizations, specification or test designation in effect on the bid opening date.

106.04(B) Contractor Quality Control: of the Standard Specifications is revised to read:

The contractor is responsible for quality control measures necessary to provide acceptable quality in the production, handling, and placement of all materials. Except as specified below, no payment will be made for such measures, the cost being considered as included in contract items.

Certain construction items may require additional quality control measures, as specified in Subsection 106.04(C). When so specified, the contractor shall provide all the personnel, equipment, materials, supplies, and facilities necessary to obtain samples and perform the tests listed in the applicable section and as given herein in Subsection 106.04(C). Specific contractor quality control requirements will be shown in the applicable construction items. Payment for such additional work shall be in accordance with the Special Provisions, and shall be included in Bidding Schedule Item 9240170.

106.04(C)(2) Quality Control Laboratory: of the Standard Specifications is revised to read:

All field and laboratory sampling and testing shall be performed by a laboratory or laboratories approved by the Department. The requirements for approval of laboratories are specified in the ADOT System for the Evaluation of Testing Laboratories. Approved laboratories, and the test methods for which they are approved to perform, are listed in the ADOT Directory of Approved Materials Testing Laboratories. Approved test methods listed in the ADOT Directory of Approved Materials Testing Laboratories do not include field sampling and testing procedures. When field sampling and testing procedures are performed, the appropriate valid Arizona Technical Testing Institute (ATTI) and/or American Concrete Institute (ACI) certification(s) are required. The ADOT System for the Evaluation of Testing Laboratories and the ADOT Directory of Approved Materials Testing Laboratories may be obtained from ADOT Materials Group, Quality Assurance Section, 1221 North 21st Avenue, Phoenix, Arizona 85009.

The Engineer will promptly advise the contractor in writing of any noted deficiencies concerning the laboratory facility, equipment, supplies, or sampling and testing personnel and procedures.

106.04(C)(3) Quality Testing Supervisor: the title and text of the Standard Specifications are revised to read:

106.04(C)(3) Quality Sampling and Testing Supervisor:

The contractor shall designate a Quality Sampling and Testing Supervisor(s) who is responsible to supervise the sampling and testing, and who meets the requirements given in Table 106-1 for the specific material on which sampling and testing is being performed. The Quality Sampling and Testing Supervisor(s) shall be an employee of the contractor or a consultant engaged by the contractor, and may be responsible for supervising the sampling and testing on more than one project. The Quality Sampling and Testing Supervisor(s) shall be able to be at the job site within 24 hours from any point in time. Additional information regarding Quality Sampling and Testing Supervisor certification can be obtained from the ADOT Materials Group, Quality Assurance Section, 1221 North 21st Avenue, Phoenix, Arizona 85009.

| TABLE 106-1 | |
|---|---|
| QUALITY SAMPLING AND TESTING SUPERVISOR REQUIREMENTS | |
| Soils and Aggregate | |
| Field | Laboratory |
| Arizona Technical Testing Institute (ATTI) "Field" certification plus one of (a) through (g) below. | Arizona Technical Testing Institute (ATTI) "Laboratory Soils/Aggregate" certification plus one of (a) through (g) below. |
| Asphaltic Concrete | |
| Field | Laboratory |
| Arizona Technical Testing Institute (ATTI) "Field" certification plus one of (a) through (g) below. | Arizona Technical Testing Institute (ATTI) "Asphalt" certification plus one of (a) through (g) below. |
| Concrete | |
| Field | Laboratory |
| American Concrete Institute (ACI) "Concrete Field Testing Technician Grade I" certification plus one of (a) through (g) below. | American Concrete Institute (ACI) "Concrete Strength Testing Technician" certification plus one of (a) through (g) below. |
| <p>(a) Professional Engineer, registered in the State of Arizona, with one year of highway materials sampling and testing experience acceptable to the Department.</p> <p>(b) Engineer-In-Training, certified by the State of Arizona, with two years of highway materials sampling and testing experience acceptable to the Department.</p> <p>(c) Obtained a Bachelor of Science Degree in Civil Engineering, Civil Engineering Technology, Construction, or related field acceptable to the Department; and with three years of highway materials sampling and testing experience acceptable to the Department.</p> <p>(d) Certified by the National Institute for Certification in Engineering Technologies (NICET) in the Construction Materials Testing field as an Engineering Technician (Level III) or higher in the appropriate subfield in which sampling and testing is being performed.</p> <p>(e) Certified by NICET in the Transportation Engineering Technology field as an Engineering Technician (Level III) or higher in the Highway Materials subfield.</p> <p>(f) Certified by NICET as an Engineering Technician, or higher, in Civil Engineering Technology with five years of highway materials sampling and testing experience acceptable to the Department.</p> <p>(g) An individual with eight years of highway materials sampling and testing and construction experience acceptable to the Department.</p> | |

106.04(C)(4) Quality Testing Technician: the title and text of the Standard Specifications are revised to read:

106.04(C)(4) Quality Sampling and Testing Technician:

Quality Sampling and Testing Technicians who perform the actual sampling and testing shall meet the requirements given in Table 106-2 for the specific material on which sampling and testing is being performed. Quality Sampling and Testing Technicians shall be employees of the Quality Control Laboratory and be supervised by a qualified Quality Sampling and Testing Supervisor for the specific material on which sampling and testing is being performed. Additional information regarding Quality Sampling and Testing Technician certification can be obtained from the ADOT Materials Group, Quality Assurance Section, 1221 North 21st Avenue, Phoenix, Arizona 85009.

| TABLE 106-2 QUALITY SAMPLING AND TESTING TECHNICIAN REQUIREMENTS | |
|--|---|
| Soils and Aggregate | |
| Field | Laboratory |
| Arizona Technical Testing Institute (ATTI) "Field" certification. | Arizona Technical Testing Institute (ATTI) "Laboratory Soils/Aggregate" certification. |
| Asphaltic Concrete | |
| Field | Laboratory |
| Arizona Technical Testing Institute (ATTI) "Field" certification. | Arizona Technical Testing Institute (ATTI) "Asphalt" Certification. |
| Concrete | |
| Field | Laboratory |
| American Concrete Institute (ACI) "Concrete Field Testing Technician Grade I" certification. | American Concrete Institute (ACI) "Concrete Strength Testing Technician" certification. |

106.04(C)(5) Records: the first paragraph of the Standard Specifications is revised to read:

The Quality Control Laboratory shall maintain all sampling and testing records and supporting documentation used in the preparation of the Weekly Quality Control Report. Upon request, the contractor shall make those records and supporting documentation available to the Department for review and copying as desired.

106.04(C)(6) Weekly Quality Control Reports: of the Standard Specifications is revised to read:

The contractor shall submit Weekly Quality Control Reports to the Engineer. The weekly reports shall state the types of work, such as earthwork, Portland cement concrete, or asphaltic concrete, which have been performed during the report period, and shall also include the process control measures taken to assure quality. The weekly report shall provide sample identification information for materials tested during the report period, including sample number, date sampled, sample location, person obtaining sample, and

original source of material. The report shall also provide the results for all required tests and any retests, corrective actions, and any other information relevant to quality control. Although hand-written documentation can be included, the quality control report narrative, sample identification information, results for tests and any retests, and corrective actions shall be typed to ensure the Department can make clear reproductions of the documents.

The report period shall end at midnight of each Friday, and the report shall be submitted to the Engineer no later than 5:00 p.m. of the following Wednesday.

Reports not submitted by the above-referenced deadline shall be considered delinquent, and monies shall be deducted from the contractor's monthly estimate in accordance with the requirements of Subsection 3.2 of Item 9240170 – CONTRACTOR QUALITY CONTROL.

(106DMAT, 3/13/02)

SECTION 106 - CONTROL OF MATERIALS: of the Standard Specifications is modified to add:

106.15 Domestic Materials:

Cement used on this project may be foreign or domestic. Certificates of Compliance and Certificates of Analysis for cement shall conform to the requirements of Subsection 106.05, and shall additionally identify whether the cement is foreign or domestic.

All manufacturing processes to produce steel products used on this project shall occur in the United States. Raw materials used in manufacturing the steel products may be foreign or domestic. Steel not meeting these requirements may be used in products on this project provided that the invoiced cost to the contractor for such steel products incorporated into the work does not exceed either one-tenth of one percent of the total (final) contract cost or \$2,500, whichever is greater.

Convict-produced materials may not be used unless the materials were produced prior to July 1, 1991 at a prison facility specifically producing convict-made materials for Federal-aid construction projects.

Any process which involves the application of a coating to iron or steel shall occur in the United States. These processes include epoxy coating, galvanizing, painting, or any other coating which protects or enhances the value of covered material.

The contractor shall furnish the Engineer with Certificates of Compliance, conforming to the requirements of Subsection 106.05, which state that steel products utilized on the project meet the requirements specified. The Certificates of Compliance shall also certify that all manufacturing processes to produce steel products, and any application of a coating to iron or steel, occurred in the United States.

(107SWRSP, 01/28/03)

SECTION 107 - LEGAL RELATIONS AND RESPONSIBILITY TO PUBLIC:

107.15 Contractor's Responsibility for Utility Property and Services: of the Standard Specifications is revised to read:

(A) General:

The contractor's attention is directed to the requirements of Arizona Revised Statutes Section 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.

The contractor shall review copies of existing ADOT permits, subject to availability, prior to start of construction, to assist the contractor in determining the location of any utilities, which the Department may have record of and which are not otherwise shown in the contract documents. Utility locations obtained from the Department are for information only and shall not relieve the contractor of responsibility for identifying, locating and protecting any existing utility lines. Copies of permits may be obtained from the ADOT Area Permit Supervisor in the District in which a project is located.

The contractor shall contact the owners of the various utilities prior to the start of construction and shall obtain from them any information pertaining to existing utilities that will either supplement information shown on the project plans or will correct any such information that may be incorrect. The contractor shall furnish the Engineer with evidence that the contractor has contacted the utility companies. Such evidence shall be submitted at the preconstruction conference, and shall include a copy of the information received from each utility as a result of such contacts.

If the contractor learns from either the owner of the utility or from any other source of the existence and location of properties of railway, telegraph, telephone, fiber optics cable, water, sewer, septic tanks or systems, electric, gas and cable television companies either omitted from or shown incorrectly on the project plans, the contractor shall immediately notify the Engineer and shall not disturb the utilities. Relocation or adjustment of such utilities, if deemed necessary, will be either performed by others or shall be performed by the contractor in accordance with the provisions of Subsection 104.02.

The contractor shall cooperate with the owners of any underground or overhead utility lines in their removal and rearrangement operations in order that these operations may progress in a reasonable manner, that duplication of rearrangement work may be reduced to a minimum and that services rendered by these parties will not be unnecessarily interrupted.

Temporary or permanent relocation or adjustment of any utility line or service connection desired by the contractor for its convenience shall be its responsibility. The contractor shall obtain the approval of both the Engineer and the utility company and upon approval shall make all necessary arrangements with the utility company and shall bear all costs in connection with such relocation or adjustment. The contractor shall also submit a Sewer Discharge Prevention Plan, as specified in Subsection 107.15(C)(1), describing each

anticipated relocation or adjustment involving existing sanitary sewer lines. No work on a particular facility shall begin until all approvals for that facility have been received.

(B) Contractor Qualifications for Water and Sewer Lines:

Breakage of active sanitary sewer lines may result in the potential spread of disease, contamination of the site and any adjacent bodies of water, and other hazards to the public. Substantial cleanup costs may be associated with such breakage, as well as possible major civil and/or criminal penalties. Therefore, the Engineer will closely consider the qualifications of any personnel proposed by the contractor to oversee or perform work involving active sanitary sewer lines. The contractor shall not assume that the personnel assigned to perform such work will be acceptable to the Department merely because they meet the experience requirements listed herein.

The contractor, or the subcontracting firm assigned to perform the water and sewer work, shall have a minimum of five years of experience in the installation and construction of underground large diameter (18-inch or above) water and sewer improvements.

In addition, the key personnel assigned by the contractor to perform any work on water or sewer lines, whether from the prime contractor or a subcontracting firm, shall also have at least five years of experience in the installation and construction of underground large diameter (18-inch or above) water and sewer improvements. A minimum of two such people shall be designated by the contractor. The designated personnel may have the title of foreman or superintendent; however, at least one of these people shall be present at all times at the location of any work being performed at or near an active sanitary sewer line.

For both the firm and the key personnel, the experience shall include working with and around water and sewer utility lines that are in service. The contractor shall submit the following documentation to the Engineer for review and approval:

- (1) A list indicating that the designated key project personnel have at least five years of applicable experience, as specified above. The list shall be accompanied with resumes for each of the key people. The resumes shall include the following information, and demonstrate compliance with the specified requirements:
 - (a) Detailed relevant experience for a minimum of two projects, including project description, date of work, actual work performed by the individual, and references (a minimum of one for each project).
 - (b) Level of applicable formal training.
 - (c) Number of years of relevant experience in performing like construction.

- (2) A list of water and sewer construction projects completed by the firm performing the water or sewer work, as specified above, indicating a minimum of five years of applicable experience. Include the dates of work, type of work, description of the project, amount of work performed by the contractor/subcontractor, and the name and phone number of a contact with the owning company or agency for which the work was completed.
- (3) List of equipment that will be used for this project. The list shall include, as a minimum, equipment type, date of manufacture, and if contractor-owned or rented.
- (4) A list of all violations and citations in the past five years of applicable water and wastewater laws and statutes for both the prime contractor and the subcontractor responsible for the utility work.

The contractor shall submit this documentation to the Engineer for approval at least 21 calendar days prior to any anticipated work involving active sanitary sewer lines, whether new or existing.

(C) Protection of Existing Utility Lines:

At points where the contractor's operations are adjacent to right-of-way properties or easements for railway, telegraph, telephone, water, sewer, electric, gas and cable television companies, hereinafter referred to as utilities, or are adjacent to other facilities and property, damage to which might result in considerable expense, loss, inconvenience, injury or death, work shall not be commenced until all arrangements necessary for the protection thereof have been made.

The exact locations and depths of all utilities that are underground or the location of those on or near the surface of the ground which are not readily visible shall be determined. Such locations shall be marked in such a manner so that all workmen or equipment operators will be thoroughly apprised of their existence and location. It will be the contractor's responsibility to see that every effort possible has been made to acquaint those actually involved in working near utilities not only with the type, size, location and depth, but with the consequences that might follow any disturbance. No trenching or similar operation shall be commenced until the Engineer is satisfied that every possible effort has been taken by the contractor to protect utilities.

The contractor shall coordinate with others working near new or existing sewer lines or other utilities on the procedures to be followed to prevent damaging of these utilities.

(1) Sewage Discharge Prevention Plan (SDPP):

For any work which may impact active sanitary sewer pipes, whether new or existing, the contractor shall prepare a Sewage Discharge Prevention Plan (SDPP) which shall describe the contractor's procedures and work plan for such lines. The Sewage Discharge Prevention Plan shall also describe the precautions that the contractor shall take to prevent unplanned breakage or spills, and the procedure which the contractor shall follow if breakage or a spill occurs.

The contractor's method of work described in the SDPP shall ensure that any work done in or near any active sewer line is performed in a safe and controlled manner resulting in no accidental discharges. As a minimum, the contractor's equipment and procedures shall be appropriate for the intended work, and shall conform to standard industry practices.

The SDPP shall include information, as specified below, for all portions of the project which involve the following work activities, and for any other element of work which may involve contact with an active sanitary sewer line:

- Interrupt, divert, relocate, plug, or abandon a sewer line or service connection, or
- Brace, or tie into a sewer line or service connection.

Construction activities in the vicinity of active sanitary sewer lines or service connections shall also be included in the SDPP if any of the following conditions exist:

- (1) Any work crossing beneath the pipe, at any angle, regardless of vertical separation.
- (2) Any work crossing over the pipe, at any angle, within two feet of the top of pipe.
- (3) Work located parallel to the pipe within the following areas:
 - (a) For the area from the bottom of the pipe to two feet above the top of the pipe, any work within two feet horizontally of the pipe wall.
 - (b) For the area below the bottom of the pipe, any work located below an imaginary line beginning at the pipe springline and progressing downward at a slope of 1.5 feet vertically to 1.0 feet horizontally.

The contractor's Sewage Discharge Prevention Plan shall address each of the items tabulated below, as applicable, for every location where construction activity will involve an active sanitary sewer line.

(2) Required Elements of the Sewage Discharge Prevention Plan:

The following elements shall be addressed in the SDPP:

- (a) Describe the proposed work in general, including the reasons for the work, scope, objectives, locations, dates, and estimated times the work will be conducted. Include project plan sheets detailing the proposed work, and indicating the peak flowrates of active sewer lines, determined as specified.
- (b) For all existing sanitary sewer pipes, determine whether the lines are active or abandoned, and the peak flowrates of lines in service, as provided by the owner of the utility.

- (c) List the key personnel (crew foreman, superintendent, and manager) and field office that are proposed to perform the work (include phone numbers).
- (d) Describe the work in step-by-step detail for each location, including excavation plans and how both the new and existing structures and utilities will be identified and protected.
- (e) Provide a detailed listing of any hardware, fittings, pipe plugs, flex couplings, tools, and materials needed to accomplish the work, and note the status of these items (on-hand, to-be-fabricated, on-order with expected delivery date, etc.). Include any manufacturer's specifications or recommendations, especially for any pipe plugs, sewer line fittings, and patching materials.
- (f) List all major equipment to be used to perform the work. Include in this item any pumps that will be used to perform the work and the rated capacity of the pumps at the anticipated suction head.
- (g) List all equipment to be used in the event of an unplanned release and specify how the equipment will be used. The locations of standby pumps shall be specified in this item. The plan shall indicate that all standby equipment to be used in the event of an unplanned discharge can be delivered to the site and put into service within two hours of identification of any unplanned flow.
- (h) List the safety equipment to be used, and describe any unique safety procedures. Cite the applicable OSHA standards covering the work.
- (i) Describe any contingency plans the contractor will implement in the event of unplanned releases and/or damage to existing facilities. List all personnel and subcontractors that will be responsible for responding to unplanned releases or damaged lines. Provide qualifications for all such personnel and subcontractors, including education, formal training, and relevant experience.
- (j) Describe how the public will be protected during the work, and include or cite any applicable traffic control plans.
- (k) Describe the quality control procedures that will be used in the field.
- (l) Discuss how temporary plugs or flow control devices will be secured, monitored, and removed.

The SDPP shall be in written form, and shall include any diagrams or sketches necessary for clarity. When possible, diagrams and sketches should be shown using the applicable project plan sheets.

The contractor shall modify the SDPP as necessary throughout the project to include any new or revised information relevant to the items listed above. The contractor shall resubmit the revised SDPP to the Engineer for approval in each case.

(3) Sewage Discharge Prevention Plan Approval:

The SDPP shall be submitted to the Engineer at least 21 calendar days before any work involving an active sewer line is to be done. The Engineer will review the plan, solicit comments from the owner/operator of the sewer line, and return the plan to the contractor within 14 calendar days from original submittal.

No work involving active sanitary sewer lines shall be done until a final SDPP meeting all the requirements specified in Subsection 107.15(C)(2) has been approved by the Engineer.

Approval of the contractor's Sewage Discharge Prevention Plans, personnel, or construction methods and operation shall not relieve the contractor from its responsibility to safely perform the work included in this contract, nor from its liability for damage resulting, either directly or indirectly, from its work performed under this contract.

(D) Service Connections:

(1) General:

In the event of interruption to water, sewer, or utility services as a result of accidental breakage or as a result of lines being exposed or unsupported, the contractor shall promptly notify the proper authority and shall cooperate with the said authority in the restoration of service. When service is interrupted, repair work shall be continuous until the service is restored. No work shall be undertaken around fire hydrants until provisions for continued service have been approved by the local fire authority.

(2) Unidentified Water and Sewer Connections:

The contractor shall protect unidentified, undamaged water or sewer service connections encountered during excavation. The contractor shall immediately notify the Engineer when an unidentified service connection is encountered.

The contractor shall immediately repair unidentified water or sewer service connections that are damaged during excavation. Any damaged service connections shall be reported to the Engineer, including all remedial actions taken.

(E) Repairing Damaged Lines:

When the operations of the contractor result in damage to any utility line or service connection, the location of which has been brought to the contractor's attention, the contractor shall assume full responsibility for such damage.

Should an unplanned breakage occur in an active sewer line as a result of the contractor's operations, the contractor shall immediately notify the Engineer, and begin repairs to halt any flows and restore normal service, in accordance with the procedures described in the approved Sewage Discharge Prevention Plan. The contractor shall also immediately notify the affected utility company and the appropriate regulatory agencies. The contractor shall be responsible for repairing the damaged pipe, restoring any interruptions in service, and cleaning up the affected areas within 24 hours of the beginning of the spill. Sewage

discharge damage assessments, as specified in Subsection 107.15(F), will be charged to the contractor for any unplanned breakage which results in a discharge.

The contractor shall be responsible to repair any breakage, in accordance with requirements of the broken line's owner/operator, and clean up the site per applicable codes and regulations of the Environmental Protection Agency, OSHA, Arizona Department of Environmental Quality (ADEQ), and all other agencies' specifications, at no additional cost to the Department.

(F) Sewage Discharge Damage Assessments:

The Department will assess liquidated damages in accordance with the Table 1 below for each 24-hour period, or portion thereof, for each unplanned breakage that occurs in an active sanitary sewer line as a result of the contractor's operation. The rate of liquidated damages assessed is based on the type and quantity of effluent discharged as determined by the Engineer.

These liquidated damages do not relieve the contractor from any of its responsibilities under the contract, including any liquidated damages that may be assessed under Subsection 108.09 for late completion of the project.

Liquidated damages assessed by the Department will be independent of any penalties imposed by others.

The contractor acknowledges that Regulatory agencies may assess or impose civil or criminal penalties on the contractor resulting from sewer discharges.

The Department will not be responsible for any civil or criminal penalties, fines, damages, or other charges imposed on the contractor by any regulatory agency or court for sewage discharges that are a result, directly or indirectly, of the contractor's work performed under this contract.

| Table 1 | | |
|--|--|-------------------------|
| Liquidated Damages | | |
| (each 24 hour period, or portion thereof) | | |
| Volume of Discharge | Raw Sewage or Industrial Wastewater | Treated Effluent |
| Less than 10,000 gallons | \$5,000.00 | \$1,000.00 |
| 10,000-99,999 gallons | \$10,000.00 | \$2,000.00 |
| 100,000-1 million gallons | \$25,000.00 | \$3,000.00 |
| Greater than 1 million gallons | \$40,000.00 | \$5,000.00 |

Liquidated damages shall be assessed for each 24 hour period, or portion thereof, until the contractor has completed all of the following tasks:

- (A) Stopped the discharge.
- (B) Repaired the damaged pipe.
- (C) Restored normal service.
- (D) Fully cleaned and disinfected the site to the satisfaction of the Engineer.

REDUCTION OF LIQUIDATED DAMAGES: Upon completion of tasks A, B, and C above, and prior to completion of Task D, the liquidated damages assessed for the current 24-hour period shall be at the rate shown in Table 1. However, for each subsequent 24-hour period, the assessment will be one half of the rate shown in Table 1.

Damages will continue at the reduced rate until the site has been fully cleaned and disinfected to the satisfaction of the Engineer.

As an example, the amounts assessed each 24-hour period for an unplanned discharge of 20,000 gallons of raw sewage, in which the contractor completes tasks A, B, and C within the second 24-hour period but does not complete full cleanup until the third 24-hour period, will be as follows:

| | |
|------------------------|-------------|
| First 24 hour period: | \$10,000.00 |
| Second 24-hour period: | \$10,000.00 |
| Third 24-hour period: | \$5,000.00 |

For this example, the total liquidated damage assessment will be \$25,000.00 (\$10,000 + \$10,000 + \$5,000).

(107UTIL, 10/12/06)

SECTION 107 - LEGAL RELATIONS AND RESPONSIBILITY TO PUBLIC:

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

The contractor shall be ADOT's Blue Stake field locator, and perform all requirements as prescribed in A.R.S. 40-360.21 through .29, for all underground facilities that have been installed by the contractor on the current project, until the project is accepted by ADOT.

At least two working days 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. The number to be called is as follows:

Projects In Maricopa County (602) 263-1100

Copies of existing ADOT permits, subject to availability, may be obtained from the ADOT Area Permit Supervisor as listed below:

PHOENIX MAINTENANCE DISTRICT

(602) 712-7521 2140 W. Hilton Avenue
(602) 712-7522 Phoenix, AZ 85009

Utility facilities will be in close proximity to the contractor's work throughout the project. These conditions require close coordination by the contractor with the utility companies and project personnel and will be a key issue for this project. Therefore, the contractor shall be aware of the following general conditions relating to utilities:

The contractor will be required to coordinate directly with the utility companies as identified in this and other sections of the Special Provisions. The contractor, when preparing the project, shall take into consideration the notice and days required for utility related work and/or coordination identified in the project Special Provisions. For the purposes of notice, the reference of days shall be working days.

The contractor will be required to submit a copy of the proposed and approved construction schedules, to the project Engineer and the utility company representatives that may have work activities included in this project that may be impacted by, or present impact to, the contractor's schedule. The contractor shall work directly with the utility companies and the project Engineer to ensure that ample notice regarding construction progress and phasing is provided to the Utility Companies to allow for acquisition of materials and have work crews perform their work within the established and approved time frames.

The contractor, in accordance with Arizona Blue Stake requirements, shall determine the exact location of all utilities prior to commencing construction operations and shall coordinate with the affected utility to provide "in place" protection of affected overhead and underground utilities during construction. Throughout the project, new electrical conduit work will be crossing under, over or near utilities which are not in direct conflict with any new conduit, but will require the contractor to coordinate with the affected utility. The contractor shall be responsible for providing all bracing and supporting exposed utilities unless otherwise directed by the utility or Engineer.

IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE EXACT LOCATION OF UTILITIES IN ACCORDANCE WITH ARIZONA BLUE STAKE LAW. ARIZONA BLUE STAKE MUST BE CALLED AT LEAST TWO (2) WORKING DAYS PRIOR TO COMMENCING ANY PROJECT CONSTRUCTION OPERATIONS. FACILITIES OWNED BY THE FOLLOWING AGENCIES AND UTILITY COMPANIES MAY EXIST IN THE AREA OF, BUT ARE NOT ANTICIPATED TO BE IN CONFLICT WITH, THIS PROJECT. OTHER UTILITY OWNERS NOT LISTED MAY EXIST.

Arizona Department of Transportation (ADOT)

Scott Vollrath (602) 712-6665
PMD-District Blue Stake
2209 West Durango
Phoenix, AZ 85009
Email: svollrath@azdot.gov

ADOT owns drainage, lighting and traffic signal facilities within the project limits. The contractor shall contact Scott Vollrath before excavating in the area.

Arizona Public Service (APS)

Bobbu Garza (602) 371-7989
PO Box 53933 Station 3062
Phoenix, AZ 85072
Email: baldemar.garza@aps.com

APS facilities existing within the boundaries of the project have been identified. Conflicts exist between overhead power lines and the roadway widening. APS is scheduled to complete relocation of the lines in conflict by Date xx, 2008. The contractor shall be required to brace poles if excavating in the vicinity of APS poles.

Arizona American Water Company

Tom Williams (623) 445-2435
19820 N. 7th St, Suite 201
Phoenix, AZ 85024
Email: twilliams@amwater.com

Arizona American Water Company facilities existing within the boundaries of the project have been identified. No conflicts are anticipated.

Salt River Project – Irrigation

Aaron Dick (602) 236-2902
Mail Station PAB 106
PO Box 52025
Phoenix, AZ 85072-2025
Email: amdick@srpnet.com

Salt River Project facilities existing within the boundaries of the project have been identified. No conflicts are anticipated.

Salt River Project – Electrical

Mariann Ward (602) 236-5527
P.O. Box 52025
Mail Station XCT 241
Tempe, AZ 85072
Email: mariann.ward@srpnet.com

Salt River Project facilities existing within the boundaries of the project have been identified. No conflicts are anticipated.

Cox Communications – Fiber Optic and Coaxial CATV

Suzanne Holzer (623) 328-3522
1550 W. Deer Valley Rd.
Phoenix, AZ 85027
Email: suzanne.holzer@cox.com

Cox Communications facilities existing within the boundaries of the project have been identified. No conflicts are anticipated.

Qwest – Fiber Optic and Telecommunications

Eric Hitchcock (602) 630-0496
5025 North Black Canyon
Tempe, AZ 85015
Email: eric.hitchcock@qwest.com

QWest communications facilities existing within the boundaries of the project have been identified. Conflicts exist with sidewalk, curb & gutter, and drainage construction. Relocations of the items in conflict are scheduled for completion by Date xx, 2008.

Southwest Gas – Natural Gas

Yvonne Aguire (602) 484-5338
Southwest Gas
Franchise 420-586
9 South 43rd Ave.
Phoenix, AZ 85009
Email: yvonne.aguirre@swgas.com

Southwest Gas facilities existing within the boundaries of the project have been identified. Conflicts exist with sidewalk, curb & gutter, and drainage construction. Relocations of the items in conflict are scheduled for completion by Date xx, 2008.

CBS Outdoor – Outdoor Sign

Justin Lalley (602) 477-3063
3150 S. 48th St, Suite 200
Phoenix, AZ 85040
Email: justin.lalley@cbsoutdoor.com

CBS Outdoor facilities existing within the boundaries of the project have been identified. No conflicts are anticipated.

MCI Communications – Fiber Optic Telecommunications

Investigations (972) 729-6016
Department 42864, Location 107
2400 N. Glenville
Richardson, TX 75082
Email: N/A
Fax: (972) 729-6240

MCI communications facilities existing within the boundaries of the project have been identified. No conflicts are anticipated.

City of Peoria – Water, Sewer, Storm Drain

Leisa Burdine (623) 773-7297
Engineering Dept, Rm. 210
8401 W. Monroe St.
Peoria, AZ 85345
Email: leisa.burdine@peoriaaz.gov

City of Peoria facilities existing within the boundaries of the project have been identified. Conflicts exist with roadway and driveway construction and City of Peoria waterlines. Relocations of the items in conflict are scheduled for completion by Date xx, 2008.

Flood Control District of Maricopa County – Electrical, Water, Storm Drain

Angie Hardesty, CFM (602) 506-4583
2801 West Durango Street
Phoenix, AZ 85019
Email: alh@mail.maricopa.gov

FCDMC requires that the contractor obtain a Right-of-Way Permit for construction activities in New River. The contractor is advised that the permit will take approximately two weeks to be issued once the permit application has been submitted. The contractor shall be required to post a \$xx,xxx Performance Bond. The District's approved form for the performance bond is included in the permit application package included in these Special Provisions as Attachment C. The Flood Control District shall also be named as an additional insured on the contractor's liability insurance coverage.

Southwest Fiber Net / Integra Telecom – Fiber Optic

Robert Russell (602) 889-6008
3540 East Baseline Road, Suite #100
Phoenix, AZ 85042
Email: Robert.Russell@integratelecom.com

Southwest Fiber Net communications facilities existing within the boundaries of the project have been identified. No conflicts are anticipated.

Recreation Centers of Sun City – Water
Chuck Manning (623) 876-3039
9774 Alabama Ave.
Sun City, AZ 85351
Email: cmanning@sunaz.com

Sun City facilities existing within the boundaries of the project have been identified. No conflicts are anticipated.

(107FINA, 03/31/07)

SECTION 107 - LEGAL RELATIONS AND RESPONSIBILITY TO PUBLIC: of the Standard Specifications is modified to add:

107.19 Federal Immigration and Nationality Act:

(A) General:

The contractor, including all subcontractors, shall comply with all federal, state and local immigration laws and regulations, as set forth in Arizona Executive Order 2005-30, relating to the immigration status of their employees who perform services on the contract during the duration of the contract. The State shall retain the right to perform random audits of contractor and subcontractor records or to inspect papers of any employee thereof to ensure compliance.

(B) Compliance Requirements:

By submission of a bid, the contractor warrants that the contractor and all proposed subcontractors are and shall remain in compliance with all federal, state and local immigration laws and regulations relating to the immigration status of their employees who perform services on the contract. The State may, at its sole discretion, require evidence of compliance from the contractor or subcontractor. Should the State request evidence of compliance, the contractor or subcontractor shall have ten working days from receipt of the request to supply adequate information.

The Department will accept, as evidence of compliance, a showing by the contractor or subcontractor that it has followed the employment verification provisions of the Federal Immigration and Nationality Act as set forth in Sections 274A and 274B of that Act, including implementation of regulations and agreements between the Department of Homeland Security and the Social Security Administration's verification service.

The contractor shall include the provisions of Subsection 107.19 in all its subcontracts.

(C) Sanctions for Non-Compliance:

Failure to comply with the immigration laws or to submit proof of compliance constitutes a material breach of contract. The Department will reduce the contractor's compensation by \$10,000 for the initial instance of non-compliance by the contractor or a subcontractor. Should the same contractor or subcontractor commit subsequent violations within a two-year time period from the initial violation, the contractor's compensation will be reduced by \$50,000 for each violation. The third instance by the same contractor or subcontractor within a two-year period may result, in addition to the \$50,000 reduction in compensation, in removal of the offending contractor or subcontractor, suspension of work in whole or in part or, in the case of a third violation by the contractor, termination of the contract for default. In addition, the Department may debar a contractor or subcontractor who has committed three violations within a two-year period for up to one year. For purposes of this paragraph, a violation by a subcontractor does not count as a violation by the contractor.

Any delay resulting from a sanction under this subsection is a non-excusable delay. The contractor is not entitled to any compensation or extension of time for any delays or additional costs resulting from a sanction under this subsection.

An example of the sanctions under this subsection is presented in the following table:

| Offense by: | | | Reduction in Compensation |
|---|-----------------|-----------------|---------------------------|
| Contractor | Subcontractor A | Subcontractor B | |
| First | | | \$10,000 |
| | First | | \$10,000 |
| | Second | | \$50,000 |
| | | First | \$10,000 |
| | Third | | \$50,000 * |
| * May, in addition, result in removal of the subcontractor and/or debarment of the subcontractor. | | | |

(108START, 04/10/06)

SECTION 108 - PROSECUTION AND PROGRESS:

108.02 Start of Work: the table of the Standard Specifications is revised to read:

| Contract Size (Dollars) | Calendar Day Period |
|-------------------------------|---------------------|
| 0 to 10,000,000 | 30 |
| over 10,000,000 to 30,000,000 | 45 |
| over 30,000,000 | 60 |

108.02 Start of Work: the first sentence of the last paragraph of the Standard Specifications is revised to read:

When the contract time is on a calendar day basis or on a working day basis, contract time will be charged commencing on the date 30, 45, or 60 calendar days, as determined by the contract size, after the date of the notice of award letter.

(108TIME, 10/12/01)

SECTION 108 - PROSECUTION AND PROGRESS:

108.08 Determination and Extension of Contract Time: the first paragraph of the Standard Specifications is revised to read:

The time allowed for the completion of the work included in the contract will be 110 working (???) days, and will be known as the "Contract Time."

(109CONV, 07/15/05)

SECTION 109 MEASUREMENT AND PAYMENT:

109.01 Measurement of Quantities: the twentieth paragraph of the Standard Specifications is revised to read:

When material will be measured by weight for payment using platform scales, trucks hauling such material shall be weighed empty at least once daily and at such other times as the Engineer directs. Each truck shall bear a plainly legible identification mark.

109.01 Measurement of Quantities: the twenty-fourth and twenty-fifth paragraphs of the Standard Specifications are revised to read:

When bituminous materials are measured by the gallon, the volume as measured shall be corrected to the volume at 60 degrees F. Conversion from volume at 60 degrees F to tons is made in accordance with the requirements of Table 1005-6.

(109FORCE, 10/23/06)

SECTION 109 - MEASUREMENT AND PAYMENT:

109.04(A) Letter Agreement for Alterations of \$5,000 or Less: the title and the first sentence of the Standard Specifications are revised to read:

109.04(A) Letter Agreement for Alterations of \$10,000 or Less:

When the Department makes alterations in the details of construction or specifications that are limited in scope to the extent that the cost of the alterations will not exceed \$10,000.00,

the Engineer and the contractor may reach agreement upon the scope of work and a lump sum amount to cover the cost of the work to be performed.

109.04(D)(1) Labor: sub-paragraph (c) of the Standard Specifications is revised to read:

(c) Subsistence and travel allowances paid to workers as required by collective bargaining agreements, or as approved by ADOT Construction Group. Rates for lodging, meals, and mileage shall not exceed the rates published by the State at the time of the force account work. No markup will be allowed for profit or overhead.

109.04(D)(3)(a) Rental Rates (Without Operators): of the Standard Specifications is modified to add:

The Rental Rate Blue Book adjustment factor (F) will be 0.933.

109.04(D)(3)(c) Outside Rented Equipment: of the Standard Specifications is revised to read:

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 contractor will be paid as follows:

$$[\text{Rental Invoice} \times 1.10] + \text{HOC}$$

The above formula includes a 10 percent markup of the rental invoice for all overhead and incidental costs for furnishing the equipment.

109.04(D)(3)(d) Owner-Operated Equipment: of the Standard Specifications is hereby deleted.

109.04(D)(3)(e) Moving of Equipment: the subsection letter of the Standard Specifications is revised to read:

(d) Moving of Equipment:

109.04(D)(7) Force Account Work by Subcontractors: of the Standard Specifications is revised to read:

When force account work is determined by the Engineer to require specialized labor or equipment not normally utilized by the contractor, and such force account work is performed by subcontractors, the contractor will be allowed a supplemental markup of five percent of the subcontractor's costs. Such allowance will be applied to the subcontractor's force account costs less its markups for overhead and profit.

(109RET, 2/28/05)

SECTION 109 - MEASUREMENT AND PAYMENT:

109.06 Partial Payments and Retention: of the Standard Specifications is revised to read:

(A) Partial Payments:

If satisfactory progress is being made, the contractor will receive a payment each month based on the amount of work completed during the preceding month. Except as herein provided, the Department will not retain monies from the monthly payments.

Partial payment on either a lump sum item or on an item paid for as a unit (each) may be made if the amount of work, in the opinion of the Engineer, is of sufficient magnitude to warrant partial payment. The amount of the partial payment to be made will be in proportion to the percentage of the work completed on the item, as estimated by the Engineer.

The monthly payments will be approximate only and all partial statements and payments will be subject to correction in the final statement and payment.

If, in the opinion of the Engineer, progress is unsatisfactory after 75 percent of the contract time has expired, the Department reserves the right to withhold 10 percent of payments due the contractor until progress is determined to be satisfactory.

The acceptance of work for purposes of partial payment does not constitute final acceptance of the work.

Should any defective work or material be discovered prior to the final acceptance, the Department will deduct monies from subsequent monthly payments to provide for correction of the defective work. Payment for such defective work will not be allowed until the defect has been remedied.

(B) Subcontractor Payments:

(1) Partial Payment:

The contractor shall make prompt partial payments to its subcontractors within seven days of receipt of payment from the Department in accordance with the requirements of Arizona Revised Statutes Section 28-6924 Paragraph A.2.

(2) Final Payment:

The contractor shall make prompt final payment to each of its subcontractors all monies, including retention, due the subcontractor within 14 days after the subcontractor has satisfactorily completed all of its work.

(3) Non-compliance:

If prompt partial payment, or prompt final payment including any retention, is not made within the time frames established above, the Department will retain \$2,000 per subcontractor, per occurrence. Each additional month that payment is not made constitutes an additional occurrence. The amount withheld by the Department will be released after the issue is resolved.

(C) Payroll Submittals:

If, by the 15th of the month, the contractor has not submitted its payrolls for all work performed during the preceding month, the Engineer will provide written notification of the discrepancies to the contractor. For each payroll document that the contractor fails to submit within 10 days after the written notification, the Department will retain \$2,500.00 from the progress payment for the current month. The contractor shall submit each complete and correct payroll within 90 days of the date of written notification. If the payroll is complete and correct within the 90-day time frame, the Department will release the \$2,500.00 on the next monthly estimate. For each payroll that is not acceptable until after the 90-day time frame, the Department will only release \$2,000.00 of the \$2,500.00 retained. The Department will retain \$500.00 as liquidated damages. These liquidated damages shall be in addition to all other retention or liquidated damages provided for elsewhere in the contract.

109.07 Partial Payment for Material on Hand: of the Standard Specifications is modified to add:

Partial payments will not be made on items until all required certificates of compliance have been provided.

109.08 Payment of Withheld Funds: the title and text of the Standard Specifications are revised to read:

109.08 Blank

(109LSUM, 01/31/00)

SECTION 109 - MEASUREMENT AND PAYMENT:

109.10(A) General: of the Standard 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) New River EB Bridge, Structure No. 00895
- (B) New River WB Bridge, Structure No. 00314

(109ACCP, 01/22/07)

SECTION 109 MEASUREMENT AND PAYMENT: of the Standard Specifications is modified to add:

109.11 Statistical Acceptance:

(A) General:

When referenced in individual specifications, this subsection will be used to determine the "Total Percentage of Lot Within UL and LL (PT)" or the "Percent of Lot Within Limits (PWL)" for statistical acceptance.

Subsection 109.11(B) is used for asphaltic concrete. Subsection 109.11(C) is used for thickness of Portland cement concrete pavement, and Subsection 109.11(D) for compressive strength of Portland cement concrete pavement.

(B) Definitions, Abbreviations, and Formulas for Determining the "Total Percentage of Lot Within UL and LL (PT)" for Asphaltic Concrete:

Target Value (TV):

Target values shall be as given in individual specifications.

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.

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, as shown in the equation below. The standard deviation will be determined to two decimal places.

$$s = \sqrt{\frac{\sum \left[(\text{Individual Test Result} - \text{AVE})^2 \right]}{\text{Number of Tests} - 1}}$$

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 the appropriate "N" value table with QU.

Percentage of Lot Within LL (PL):

Determined by entering the appropriate "N" value table with QL.

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

$$PT = (PU + PL) - 100$$

(C) Definitions, Abbreviations, and Formulas for Determining the "Percent of Lot Within Limits (PWL)" for Thickness of Portland Cement Concrete Pavement:

Average (AVE): The average of the thickness measurements of the cores obtained in accordance with Subsection 401-4.04. The average will be determined to the nearest hundredth of an inch.

Standard Deviation (s): The square root of the value formed by summing the squared difference between the thickness measurement for each core and AVE, divided by the number of cores minus one, as shown in the equation below. Standard deviation will be reported to two decimal places.

$$s = \sqrt{\frac{\sum \left[(\text{Thickness Measurement for each Core} - \text{AVE})^2 \right]}{\text{Number of Cores} - 1}}$$

Lower Limit (LL): The required thickness less 0.2 inches.

Lower Quality Index (QL):

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

QL will be determined to three decimal places.

Percent of Lot Within Limits (PWL):

Determined by entering the appropriate "N" value table with QL.

(D) **Definitions, Abbreviations, and Formulas for Determining the "Percent of Lot Within Limits (PWL)" for Compressive Strength of Portland Cement Concrete Pavement:**

Average (AVE): The average of the compressive strengths of the samples. The average 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 compressive strength result for each sample and AVE, divided by the number of samples minus one, as shown in the equation below. The standard deviation will be determined to the nearest whole number.

$$s = \sqrt{\frac{\sum [(Compressive Strength Result for each Sample - AVE)^2]}{Number of Samples - 1}}$$

Lower Limit (LL): The specified minimum strength.

Lower Quality Index (QL):

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

QL will be determined to three decimal places.

Percent of Lot Within Limits (PWL):

Determined by entering the appropriate "N" value table with QL.

| DETERMINATION OF PU, PL, or PWL | | | | | |
|---------------------------------|----------|----------------|----------|-----------|----------------|
| Number of Tests "N" = 3 | | | | | |
| QU or QL | | PU, PL, or PWL | QU or QL | | PU, PL, or PWL |
| 1.155 or More | | 100 | 0.000 | to -0.017 | 50 |
| 1.153 | to 1.154 | 99 | -0.018 | to -0.054 | 49 |
| 1.151 | to 1.152 | 98 | -0.055 | to -0.090 | 48 |
| 1.148 | to 1.150 | 97 | -0.091 | to -0.126 | 47 |
| 1.143 | to 1.147 | 96 | -0.127 | to -0.162 | 46 |
| 1.137 | to 1.142 | 95 | -0.163 | to -0.198 | 45 |
| 1.131 | to 1.136 | 94 | -0.199 | to -0.233 | 44 |
| 1.123 | to 1.130 | 93 | -0.234 | to -0.269 | 43 |
| 1.114 | to 1.122 | 92 | -0.270 | to -0.304 | 42 |
| 1.104 | to 1.113 | 91 | -0.305 | to -0.339 | 41 |
| 1.092 | to 1.103 | 90 | -0.340 | to -0.373 | 40 |
| 1.080 | to 1.091 | 89 | -0.374 | to -0.407 | 39 |
| 1.067 | to 1.079 | 88 | -0.408 | to -0.441 | 38 |
| 1.053 | to 1.066 | 87 | -0.442 | to -0.475 | 37 |
| 1.037 | to 1.052 | 86 | -0.476 | to -0.507 | 36 |
| 1.021 | to 1.036 | 85 | -0.508 | to -0.539 | 35 |
| 1.003 | to 1.020 | 84 | -0.540 | to -0.571 | 34 |
| 0.985 | to 1.002 | 83 | -0.572 | to -0.603 | 33 |
| 0.965 | to 0.984 | 82 | -0.604 | to -0.633 | 32 |
| 0.945 | to 0.964 | 81 | -0.634 | to -0.663 | 31 |
| 0.923 | to 0.944 | 80 | -0.664 | to -0.693 | 30 |
| 0.901 | to 0.922 | 79 | -0.694 | to -0.721 | 29 |
| 0.878 | to 0.900 | 78 | -0.722 | to -0.749 | 28 |
| 0.854 | to 0.877 | 77 | -0.750 | to -0.776 | 27 |
| 0.829 | to 0.853 | 76 | -0.777 | to -0.802 | 26 |
| 0.803 | to 0.828 | 75 | -0.803 | to -0.828 | 25 |
| 0.777 | to 0.802 | 74 | -0.829 | to -0.853 | 24 |
| 0.750 | to 0.776 | 73 | -0.854 | to -0.877 | 23 |
| 0.722 | to 0.749 | 72 | -0.878 | to -0.900 | 22 |
| 0.694 | to 0.721 | 71 | -0.901 | to -0.922 | 21 |
| 0.664 | to 0.693 | 70 | -0.923 | to -0.944 | 20 |
| 0.634 | to 0.663 | 69 | -0.945 | to -0.964 | 19 |
| 0.604 | to 0.633 | 68 | -0.965 | to -0.984 | 18 |
| 0.572 | to 0.603 | 67 | -0.985 | to -1.002 | 17 |
| 0.540 | to 0.571 | 66 | -1.003 | to -1.020 | 16 |
| 0.508 | to 0.539 | 65 | -1.021 | to -1.036 | 15 |
| 0.476 | to 0.507 | 64 | -1.037 | to -1.052 | 14 |

| DETERMINATION OF PU, PL, or PWL | | | | | | | |
|---------------------------------|----|-------|----------------|----------------|----|--------|----------------|
| Number of Tests "N" = 3 | | | | | | | |
| QU or QL | | | PU, PL, or PWL | QU or QL | | | PU, PL, or PWL |
| 0.442 | to | 0.475 | 63 | -1.053 | to | -1.066 | 13 |
| 0.408 | to | 0.441 | 62 | -1.067 | to | -1.079 | 12 |
| 0.374 | to | 0.407 | 61 | -1.080 | to | -1.091 | 11 |
| 0.340 | to | 0.373 | 60 | -1.092 | to | -1.103 | 10 |
| 0.305 | to | 0.339 | 59 | -1.104 | to | -1.113 | 9 |
| 0.270 | to | 0.304 | 58 | -1.114 | to | -1.122 | 8 |
| 0.234 | to | 0.269 | 57 | -1.123 | to | -1.130 | 7 |
| 0.199 | to | 0.233 | 56 | -1.131 | to | -1.136 | 6 |
| 0.163 | to | 0.198 | 55 | -1.137 | to | -1.142 | 5 |
| 0.127 | to | 0.162 | 54 | -1.143 | to | -1.147 | 4 |
| 0.091 | to | 0.126 | 53 | -1.148 | to | -1.150 | 3 |
| 0.055 | to | 0.090 | 52 | -1.151 | to | -1.152 | 2 |
| 0.018 | to | 0.054 | 51 | -1.153 | to | -1.154 | 1 |
| 0.000 | to | 0.017 | 50 | -1.155 or Less | | | 0 |

| DETERMINATION OF PU, PL, or PWL | | | | | | | |
|---------------------------------|----|-------|----------------|----------|----|--------|----------------|
| Number of Tests "N" = 4 | | | | | | | |
| QU or QL | | | PU, PL, or PWL | QU or QL | | | PU, PL, or PWL |
| 1.485 or More | | | 100 | 0.000 | to | -0.014 | 50 |
| 1.455 | to | 1.484 | 99 | -0.015 | to | -0.044 | 49 |
| 1.425 | to | 1.454 | 98 | -0.045 | to | -0.074 | 48 |
| 1.395 | to | 1.424 | 97 | 0.075 | to | -0.104 | 47 |
| 1.365 | to | 1.394 | 96 | -0.105 | to | -0.134 | 46 |
| 1.335 | to | 1.364 | 95 | -0.135 | to | -0.164 | 45 |
| 1.305 | to | 1.334 | 94 | -0.165 | to | -0.194 | 44 |
| 1.275 | to | 1.304 | 93 | -0.195 | to | -0.224 | 43 |
| 1.245 | to | 1.274 | 92 | -0.225 | to | -0.254 | 42 |
| 1.215 | to | 1.244 | 91 | -0.255 | to | -0.284 | 41 |
| 1.185 | to | 1.214 | 90 | -0.285 | to | -0.314 | 40 |
| 1.155 | to | 1.184 | 89 | -0.315 | to | -0.344 | 39 |
| 1.125 | to | 1.154 | 88 | -0.345 | to | -0.374 | 38 |
| 1.095 | to | 1.124 | 87 | -0.375 | to | -0.404 | 37 |
| 1.065 | to | 1.094 | 86 | -0.405 | to | -0.434 | 36 |
| 1.035 | to | 1.064 | 85 | -0.435 | to | -0.464 | 35 |
| 1.005 | to | 1.034 | 84 | -0.465 | to | -0.494 | 34 |
| 0.975 | to | 1.004 | 83 | -0.495 | to | -0.524 | 33 |
| 0.945 | to | 0.974 | 82 | -0.525 | to | -0.554 | 32 |
| 0.915 | to | 0.944 | 81 | -0.555 | to | -0.584 | 31 |
| 0.885 | to | 0.914 | 80 | -0.585 | to | -0.614 | 30 |
| 0.855 | to | 0.884 | 79 | -0.615 | to | -0.644 | 29 |

| DETERMINATION OF PU, PL, or PWL | | | | | |
|---------------------------------|----|----------------|----------|------------------|----------------|
| Number of Tests "N" = 4 | | | | | |
| QU or QL | | PU, PL, or PWL | QU or QL | | PU, PL, or PWL |
| 0.825 | to | 0.854 | 78 | -0.645 to -0.674 | 28 |
| 0.795 | to | 0.824 | 77 | -0.675 to -0.704 | 27 |
| 0.765 | to | 0.794 | 76 | -0.705 to -0.734 | 26 |
| 0.735 | to | 0.764 | 75 | -0.735 to -0.764 | 25 |
| 0.705 | to | 0.734 | 74 | -0.765 to -0.794 | 24 |
| 0.675 | to | 0.704 | 73 | -0.795 to -0.824 | 23 |
| 0.645 | to | 0.674 | 72 | -0.825 to -0.854 | 22 |
| 0.615 | to | 0.644 | 71 | -0.855 to -0.884 | 21 |
| 0.585 | to | 0.614 | 70 | -0.885 to -0.914 | 20 |
| 0.555 | to | 0.584 | 69 | -0.915 to -0.944 | 19 |
| 0.525 | to | 0.554 | 68 | -0.945 to -0.974 | 18 |
| 0.495 | to | 0.524 | 67 | -0.975 to -1.004 | 17 |
| 0.465 | to | 0.494 | 66 | -1.005 to -1.034 | 16 |
| 0.435 | to | 0.464 | 65 | -1.035 to -1.064 | 15 |
| 0.405 | to | 0.434 | 64 | -1.065 to -1.094 | 14 |
| 0.375 | to | 0.404 | 63 | -1.095 to -1.124 | 13 |
| 0.345 | to | 0.374 | 62 | -1.125 to -1.154 | 12 |
| 0.315 | to | 0.344 | 61 | -1.155 to -1.184 | 11 |
| 0.285 | to | 0.314 | 60 | -1.185 to -1.214 | 10 |
| 0.255 | to | 0.284 | 59 | -1.215 to -1.244 | 9 |
| 0.225 | to | 0.254 | 58 | -1.245 to -1.274 | 8 |
| 0.195 | to | 0.224 | 57 | -1.275 to -1.304 | 7 |
| 0.165 | to | 0.194 | 56 | -1.305 to -1.334 | 6 |
| 0.135 | to | 0.164 | 55 | -1.335 to -1.364 | 5 |
| 0.105 | to | 0.134 | 54 | -1.365 to -1.394 | 4 |
| 0.075 | to | 0.104 | 53 | -1.395 to -1.424 | 3 |
| 0.045 | to | 0.074 | 52 | -1.425 to -1.454 | 2 |
| 0.015 | to | 0.044 | 51 | -1.455 to -1.484 | 1 |
| 0.000 | to | 0.014 | 50 | -1.485 or Less | 0 |

| DETERMINATION OF PU, PL, or PWL | | | | | |
|---------------------------------|----|----------------|-----------------|------------------|----------------|
| Number of Tests "N" = 5 | | | | | |
| QU or QL | | PU, PL, or PWL | QU or QL | | PU, PL, or PWL |
| 1.716 or More | | 100 | 0.000 to -0.013 | | 50 |
| 1.637 | to | 1.715 | 99 | -0.014 to -0.041 | 49 |
| 1.573 | to | 1.636 | 98 | -0.042 to -0.069 | 48 |
| 1.517 | to | 1.572 | 97 | -0.070 to -0.097 | 47 |
| 1.466 | to | 1.516 | 96 | -0.098 to -0.126 | 46 |
| 1.418 | to | 1.465 | 95 | -0.127 to -0.154 | 45 |
| 1.373 | to | 1.417 | 94 | -0.155 to -0.182 | 44 |

| DETERMINATION OF PU, PL, or PWL | | | | | | | |
|---------------------------------|----|-------|----------------|----------|----|--------|----------------|
| Number of Tests "N" = 5 | | | | | | | |
| QU or QL | | | PU, PL, or PWL | QU or QL | | | PU, PL, or PWL |
| 1.330 | to | 1.372 | 93 | -0.183 | to | -0.210 | 43 |
| 1.289 | to | 1.329 | 92 | -0.211 | to | -0.239 | 42 |
| 1.249 | to | 1.288 | 91 | -0.240 | to | -0.267 | 41 |
| 1.210 | to | 1.248 | 90 | -0.268 | to | -0.296 | 40 |
| 1.173 | to | 1.209 | 89 | -0.297 | to | -0.324 | 39 |
| 1.136 | to | 1.172 | 88 | -0.325 | to | -0.353 | 38 |
| 1.100 | to | 1.135 | 87 | -0.354 | to | -0.382 | 37 |
| 1.065 | to | 1.099 | 86 | -0.383 | to | -0.411 | 36 |
| 1.030 | to | 1.064 | 85 | -0.412 | to | -0.440 | 35 |
| 0.996 | to | 1.029 | 84 | -0.441 | to | -0.469 | 34 |
| 0.962 | to | 0.995 | 83 | -0.470 | to | -0.498 | 33 |
| 0.929 | to | 0.961 | 82 | -0.499 | to | -0.527 | 32 |
| 0.896 | to | 0.928 | 81 | -0.528 | to | -0.556 | 31 |
| 0.864 | to | 0.895 | 80 | -0.557 | to | -0.586 | 30 |
| 0.832 | to | 0.863 | 79 | -0.587 | to | -0.616 | 29 |
| 0.801 | to | 0.831 | 78 | -0.617 | to | -0.646 | 28 |
| 0.769 | to | 0.800 | 77 | -0.647 | to | -0.676 | 27 |
| 0.738 | to | 0.768 | 76 | -0.677 | to | -0.707 | 26 |
| 0.708 | to | 0.737 | 75 | -0.708 | to | -0.737 | 25 |
| 0.677 | to | 0.707 | 74 | -0.738 | to | -0.768 | 24 |
| 0.647 | to | 0.676 | 73 | -0.769 | to | -0.800 | 23 |
| 0.617 | to | 0.646 | 72 | -0.801 | to | -0.831 | 22 |
| 0.587 | to | 0.616 | 71 | -0.832 | to | -0.863 | 21 |
| 0.557 | to | 0.586 | 70 | -0.864 | to | -0.895 | 20 |
| 0.528 | to | 0.556 | 69 | -0.896 | to | -0.928 | 19 |
| 0.499 | to | 0.527 | 68 | -0.929 | to | -0.961 | 18 |
| 0.470 | to | 0.498 | 67 | -0.962 | to | -0.995 | 17 |
| 0.441 | to | 0.469 | 66 | -0.996 | to | -1.029 | 16 |
| 0.412 | to | 0.440 | 65 | -1.030 | to | -1.064 | 15 |
| 0.383 | to | 0.411 | 64 | -1.065 | to | -1.099 | 14 |
| 0.354 | to | 0.382 | 63 | -1.100 | to | -1.135 | 13 |
| 0.325 | to | 0.353 | 62 | -1.136 | to | -1.172 | 12 |
| 0.297 | to | 0.324 | 61 | -1.173 | to | -1.209 | 11 |
| 0.268 | to | 0.296 | 60 | -1.210 | to | -1.248 | 10 |
| 0.240 | to | 0.267 | 59 | -1.249 | to | -1.288 | 9 |
| 0.211 | to | 0.239 | 58 | -1.289 | to | -1.329 | 8 |
| 0.183 | to | 0.210 | 57 | -1.330 | to | -1.372 | 7 |
| 0.155 | to | 0.182 | 56 | -1.373 | to | -1.417 | 6 |
| 0.127 | to | 0.154 | 55 | -1.418 | to | -1.465 | 5 |
| 0.098 | to | 0.126 | 54 | -1.466 | to | -1.516 | 4 |

| DETERMINATION OF PU, PL, or PWL | | | | | |
|---------------------------------|----------|----------------|----------------|-----------|----------------|
| Number of Tests "N" = 5 | | | | | |
| QU or QL | | PU, PL, or PWL | QU or QL | | PU, PL, or PWL |
| 0.070 | to 0.097 | 53 | -1.517 | to -1.572 | 3 |
| 0.042 | to 0.069 | 52 | -1.573 | to -1.636 | 2 |
| 0.014 | to 0.041 | 51 | -1.637 | to -1.715 | 1 |
| 0.000 | to 0.013 | 50 | -1.716 or Less | | 0 |

| DETERMINATION OF PU, PL, or PWL | | | | | |
|---------------------------------|----------|----------------|----------|-----------|----------------|
| Number of Tests "N" = 6 | | | | | |
| QU or QL | | PU, PL, or PWL | QU or QL | | PU, PL, or PWL |
| 1.876 or More | | 100 | 0.000 | to -0.013 | 50 |
| 1.750 | to 1.875 | 99 | -0.014 | to -0.040 | 49 |
| 1.658 | to 1.749 | 98 | -0.041 | to -0.067 | 48 |
| 1.584 | to 1.657 | 97 | -0.068 | to -0.095 | 47 |
| 1.520 | to 1.583 | 96 | -0.096 | to -0.122 | 46 |
| 1.461 | to 1.519 | 95 | -0.123 | to -0.149 | 45 |
| 1.407 | to 1.460 | 94 | -0.150 | to -0.177 | 44 |
| 1.357 | to 1.406 | 93 | -0.178 | to -0.204 | 43 |
| 1.309 | to 1.356 | 92 | -0.205 | to -0.232 | 42 |
| 1.264 | to 1.308 | 91 | -0.233 | to -0.259 | 41 |
| 1.221 | to 1.263 | 90 | -0.260 | to -0.287 | 40 |
| 1.179 | to 1.220 | 89 | -0.288 | to -0.315 | 39 |
| 1.139 | to 1.178 | 88 | -0.316 | to -0.342 | 38 |
| 1.100 | to 1.138 | 87 | -0.343 | to -0.371 | 37 |
| 1.062 | to 1.099 | 86 | -0.372 | to -0.399 | 36 |
| 1.025 | to 1.061 | 85 | -0.400 | to -0.427 | 35 |
| 0.990 | to 1.024 | 84 | -0.428 | to -0.456 | 34 |
| 0.955 | to 0.989 | 83 | -0.457 | to -0.485 | 33 |
| 0.920 | to 0.954 | 82 | -0.486 | to -0.514 | 32 |
| 0.886 | to 0.919 | 81 | -0.515 | to -0.543 | 31 |
| 0.853 | to 0.885 | 80 | -0.544 | to -0.572 | 30 |
| 0.820 | to 0.852 | 79 | -0.573 | to -0.602 | 29 |
| 0.788 | to 0.819 | 78 | -0.603 | to -0.632 | 28 |
| 0.756 | to 0.787 | 77 | -0.633 | to -0.662 | 27 |
| 0.725 | to 0.755 | 76 | -0.663 | to -0.693 | 26 |
| 0.694 | to 0.724 | 75 | -0.694 | to -0.724 | 25 |
| 0.663 | to 0.693 | 74 | -0.725 | to -0.755 | 24 |
| 0.633 | to 0.662 | 73 | -0.756 | to -0.787 | 23 |
| 0.603 | to 0.632 | 72 | -0.788 | to -0.819 | 22 |
| 0.573 | to 0.602 | 71 | -0.820 | to -0.852 | 21 |
| 0.544 | to 0.572 | 70 | -0.853 | to -0.885 | 20 |
| 0.515 | to 0.543 | 69 | -0.886 | to -0.919 | 19 |

| DETERMINATION OF PU, PL, or PWL | | | | | | | |
|---------------------------------|----|-------|----------------|----------------|----|--------|----------------|
| Number of Tests "N" = 6 | | | | | | | |
| QU or QL | | | PU, PL, or PWL | QU or QL | | | PU, PL, or PWL |
| 0.486 | to | 0.514 | 68 | -0.920 | to | -0.954 | 18 |
| 0.457 | to | 0.485 | 67 | -0.955 | to | -0.989 | 17 |
| 0.428 | to | 0.456 | 66 | -0.990 | to | -1.024 | 16 |
| 0.400 | to | 0.427 | 65 | -1.025 | to | -1.061 | 15 |
| 0.372 | to | 0.399 | 64 | -1.062 | to | -1.099 | 14 |
| 0.343 | to | 0.371 | 63 | -1.100 | to | -1.138 | 13 |
| 0.316 | to | 0.342 | 62 | -1.139 | to | -1.178 | 12 |
| 0.288 | to | 0.315 | 61 | -1.179 | to | -1.220 | 11 |
| 0.260 | to | 0.287 | 60 | -1.221 | to | -1.263 | 10 |
| 0.233 | to | 0.259 | 59 | -1.264 | to | -1.308 | 9 |
| 0.205 | to | 0.232 | 58 | -1.309 | to | -1.356 | 8 |
| 0.178 | to | 0.204 | 57 | -1.357 | to | -1.406 | 7 |
| 0.150 | to | 0.177 | 56 | -1.407 | to | -1.460 | 6 |
| 0.123 | to | 0.149 | 55 | -1.461 | to | -1.519 | 5 |
| 0.096 | to | 0.122 | 54 | -1.520 | to | -1.583 | 4 |
| 0.068 | to | 0.095 | 53 | -1.584 | to | -1.657 | 3 |
| 0.041 | to | 0.067 | 52 | -1.658 | to | -1.749 | 2 |
| 0.014 | to | 0.040 | 51 | -1.750 | to | -1.875 | 1 |
| 0.000 | to | 0.013 | 50 | -1.876 or Less | | | 0 |

| DETERMINATION OF PU, PL, or PWL | | | | | | | |
|---------------------------------|----|-------|----------------|----------|----|--------|----------------|
| Number of Tests "N" = 7 | | | | | | | |
| QU or QL | | | PU, PL, or PWL | QU or QL | | | PU, PL, or PWL |
| 1.983 or More | | | 100 | 0.000 | to | -0.013 | 50 |
| 1.825 | to | 1.982 | 99 | -0.014 | to | -0.039 | 49 |
| 1.714 | to | 1.824 | 98 | -0.040 | to | -0.066 | 48 |
| 1.627 | to | 1.713 | 97 | -0.067 | to | -0.093 | 47 |
| 1.553 | to | 1.626 | 96 | -0.094 | to | -0.120 | 46 |
| 1.487 | to | 1.552 | 95 | -0.121 | to | -0.147 | 45 |
| 1.428 | to | 1.486 | 94 | -0.148 | to | -0.174 | 44 |
| 1.373 | to | 1.427 | 93 | -0.175 | to | -0.201 | 43 |
| 1.321 | to | 1.372 | 92 | -0.202 | to | -0.228 | 42 |
| 1.273 | to | 1.320 | 91 | -0.229 | to | -0.255 | 41 |
| 1.227 | to | 1.272 | 90 | -0.256 | to | -0.282 | 40 |
| 1.183 | to | 1.226 | 89 | -0.283 | to | -0.309 | 39 |
| 1.141 | to | 1.182 | 88 | -0.310 | to | -0.337 | 38 |
| 1.100 | to | 1.140 | 87 | -0.338 | to | -0.365 | 37 |
| 1.061 | to | 1.099 | 86 | -0.366 | to | -0.392 | 36 |
| 1.023 | to | 1.060 | 85 | -0.393 | to | -0.420 | 35 |
| 0.986 | to | 1.022 | 84 | -0.421 | to | -0.449 | 34 |

| DETERMINATION OF PU, PL, or PWL | | | | | | | |
|---------------------------------|----|-------|----------------|----------------|----|--------|----------------|
| Number of Tests "N" = 7 | | | | | | | |
| QU or QL | | | PU, PL, or PWL | QU or QL | | | PU, PL, or PWL |
| 0.949 | to | 0.985 | 83 | -0.450 | to | -0.477 | 33 |
| 0.914 | to | 0.948 | 82 | -0.478 | to | -0.506 | 32 |
| 0.880 | to | 0.913 | 81 | -0.507 | to | -0.535 | 31 |
| 0.846 | to | 0.879 | 80 | -0.536 | to | -0.564 | 30 |
| 0.813 | to | 0.845 | 79 | -0.565 | to | -0.594 | 29 |
| 0.780 | to | 0.812 | 78 | -0.595 | to | -0.624 | 28 |
| 0.748 | to | 0.779 | 77 | -0.625 | to | -0.654 | 27 |
| 0.717 | to | 0.747 | 76 | -0.655 | to | -0.685 | 26 |
| 0.686 | to | 0.716 | 75 | -0.686 | to | -0.716 | 25 |
| 0.655 | to | 0.685 | 74 | -0.717 | to | -0.747 | 24 |
| 0.625 | to | 0.654 | 73 | -0.748 | to | -0.779 | 23 |
| 0.595 | to | 0.624 | 72 | -0.780 | to | -0.812 | 22 |
| 0.565 | to | 0.594 | 71 | -0.813 | to | -0.845 | 21 |
| 0.536 | to | 0.564 | 70 | -0.846 | to | -0.879 | 20 |
| 0.507 | to | 0.535 | 69 | -0.880 | to | -0.913 | 19 |
| 0.478 | to | 0.506 | 68 | -0.914 | to | -0.948 | 18 |
| 0.450 | to | 0.477 | 67 | -0.949 | to | -0.985 | 17 |
| 0.421 | to | 0.449 | 66 | -0.986 | to | -1.022 | 16 |
| 0.393 | to | 0.420 | 65 | -1.023 | to | -1.060 | 15 |
| 0.366 | to | 0.392 | 64 | -1.061 | to | -1.099 | 14 |
| 0.338 | to | 0.365 | 63 | -1.100 | to | -1.140 | 13 |
| 0.310 | to | 0.337 | 62 | -1.141 | to | -1.182 | 12 |
| 0.283 | to | 0.309 | 61 | -1.183 | to | -1.226 | 11 |
| 0.256 | to | 0.282 | 60 | -1.227 | to | -1.272 | 10 |
| 0.229 | to | 0.255 | 59 | -1.273 | to | -1.320 | 9 |
| 0.202 | to | 0.228 | 58 | -1.321 | to | -1.372 | 8 |
| 0.175 | to | 0.201 | 57 | -1.373 | to | -1.427 | 7 |
| 0.148 | to | 0.174 | 56 | -1.428 | to | -1.486 | 6 |
| 0.121 | to | 0.147 | 55 | -1.487 | to | -1.552 | 5 |
| 0.094 | to | 0.120 | 54 | -1.553 | to | -1.626 | 4 |
| 0.067 | to | 0.093 | 53 | -1.627 | to | -1.713 | 3 |
| 0.040 | to | 0.066 | 52 | -1.714 | to | -1.824 | 2 |
| 0.014 | to | 0.039 | 51 | -1.825 | to | -1.982 | 1 |
| 0.000 | to | 0.013 | 50 | -1.983 or Less | | | 0 |

| DETERMINATION OF PU, PL, or PWL | | | | |
|---------------------------------|----------------|------------------|----------------|--|
| Number of Tests "N" = 8 | | | | |
| QU or QL | PU, PL, or PWL | QU or QL | PU, PL, or PWL | |
| 2.064 or More | 100 | 0.000 to -0.012 | 50 | |
| 1.879 to 2.063 | 99 | -0.013 to -0.039 | 49 | |
| 1.752 to 1.878 | 98 | -0.040 to -0.065 | 48 | |
| 1.656 to 1.751 | 97 | -0.066 to -0.092 | 47 | |
| 1.576 to 1.655 | 96 | -0.093 to -0.118 | 46 | |
| 1.505 to 1.575 | 95 | -0.119 to -0.145 | 45 | |
| 1.442 to 1.504 | 94 | -0.146 to -0.171 | 44 | |
| 1.383 to 1.441 | 93 | -0.172 to -0.198 | 43 | |
| 1.329 to 1.382 | 92 | -0.199 to -0.225 | 42 | |
| 1.279 to 1.328 | 91 | -0.226 to -0.252 | 41 | |
| 1.231 to 1.278 | 90 | -0.253 to -0.279 | 40 | |
| 1.185 to 1.230 | 89 | -0.280 to -0.306 | 39 | |
| 1.142 to 1.184 | 88 | -0.307 to -0.333 | 38 | |
| 1.100 to 1.141 | 87 | -0.334 to -0.361 | 37 | |
| 1.060 to 1.099 | 86 | -0.362 to -0.388 | 36 | |
| 1.021 to 1.059 | 85 | -0.389 to -0.416 | 35 | |
| 0.983 to 1.020 | 84 | -0.417 to -0.444 | 34 | |
| 0.946 to 0.982 | 83 | -0.445 to -0.473 | 33 | |
| 0.911 to 0.945 | 82 | -0.474 to -0.501 | 32 | |
| 0.876 to 0.910 | 81 | -0.502 to -0.530 | 31 | |
| 0.842 to 0.875 | 80 | -0.531 to -0.559 | 30 | |
| 0.808 to 0.841 | 79 | -0.560 to -0.589 | 29 | |
| 0.775 to 0.807 | 78 | -0.590 to -0.618 | 28 | |
| 0.743 to 0.774 | 77 | -0.619 to -0.649 | 27 | |
| 0.712 to 0.742 | 76 | -0.650 to -0.680 | 26 | |
| 0.681 to 0.711 | 75 | -0.681 to -0.711 | 25 | |
| 0.650 to 0.680 | 74 | -0.712 to -0.742 | 24 | |
| 0.619 to 0.649 | 73 | -0.743 to -0.774 | 23 | |
| 0.590 to 0.618 | 72 | -0.775 to -0.807 | 22 | |
| 0.560 to 0.589 | 71 | -0.808 to -0.841 | 21 | |
| 0.531 to 0.559 | 70 | -0.842 to -0.875 | 20 | |
| 0.502 to 0.530 | 69 | -0.876 to -0.910 | 19 | |
| 0.474 to 0.501 | 68 | -0.911 to -0.945 | 18 | |
| 0.445 to 0.473 | 67 | -0.946 to -0.982 | 17 | |
| 0.417 to 0.444 | 66 | -0.983 to -1.020 | 16 | |
| 0.389 to 0.416 | 65 | -1.021 to -1.059 | 15 | |
| 0.362 to 0.388 | 64 | -1.060 to -1.099 | 14 | |
| 0.334 to 0.361 | 63 | -1.100 to -1.141 | 13 | |
| 0.307 to 0.333 | 62 | -1.142 to -1.184 | 12 | |

| DETERMINATION OF PU, PL, or PWL | | | | | | | |
|---------------------------------|----|-------|----------------|----------------|----|--------|----------------|
| Number of Tests "N" = 8 | | | | | | | |
| QU or QL | | | PU, PL, or PWL | QU or QL | | | PU, PL, or PWL |
| 0.280 | to | 0.306 | 61 | -1.185 | to | -1.230 | 11 |
| 0.253 | to | 0.279 | 60 | -1.231 | to | -1.278 | 10 |
| 0.226 | to | 0.252 | 59 | -1.279 | to | -1.328 | 9 |
| 0.199 | to | 0.225 | 58 | -1.329 | to | -1.382 | 8 |
| 0.172 | to | 0.198 | 57 | -1.383 | to | -1.441 | 7 |
| 0.146 | to | 0.171 | 56 | -1.442 | to | -1.504 | 6 |
| 0.119 | to | 0.145 | 55 | -1.505 | to | -1.575 | 5 |
| 0.093 | to | 0.118 | 54 | -1.576 | to | -1.655 | 4 |
| 0.066 | to | 0.092 | 53 | -1.656 | to | -1.751 | 3 |
| 0.040 | to | 0.065 | 52 | -1.752 | to | -1.878 | 2 |
| 0.013 | to | 0.039 | 51 | -1.879 | to | -2.063 | 1 |
| 0.000 | to | 0.012 | 50 | -2.064 or Less | | | 0 |

| DETERMINATION OF PU, PL, or PWL | | | | | | | |
|---------------------------------|----|-------|----------------|----------|----|--------|----------------|
| Number of Tests "N" = 9 | | | | | | | |
| QU or QL | | | PU, PL, or PWL | QU or QL | | | PU, PL, or PWL |
| 2.127 or More | | | 100 | 0.000 | to | -0.012 | 50 |
| 1.919 | to | 2.126 | 99 | -0.013 | to | -0.038 | 49 |
| 1.781 | to | 1.918 | 98 | -0.039 | to | -0.065 | 48 |
| 1.678 | to | 1.780 | 97 | -0.066 | to | -0.091 | 47 |
| 1.592 | to | 1.677 | 96 | -0.092 | to | -0.117 | 46 |
| 1.518 | to | 1.591 | 95 | -0.118 | to | -0.144 | 45 |
| 1.452 | to | 1.517 | 94 | -0.145 | to | -0.170 | 44 |
| 1.391 | to | 1.451 | 93 | -0.171 | to | -0.196 | 43 |
| 1.335 | to | 1.390 | 92 | -0.197 | to | -0.223 | 42 |
| 1.283 | to | 1.334 | 91 | -0.224 | to | -0.250 | 41 |
| 1.234 | to | 1.282 | 90 | -0.251 | to | -0.277 | 40 |
| 1.187 | to | 1.233 | 89 | -0.278 | to | -0.304 | 39 |
| 1.143 | to | 1.186 | 88 | -0.305 | to | -0.331 | 38 |
| 1.100 | to | 1.142 | 87 | -0.332 | to | -0.358 | 37 |
| 1.059 | to | 1.099 | 86 | -0.359 | to | -0.386 | 36 |
| 1.020 | to | 1.058 | 85 | -0.387 | to | -0.413 | 35 |
| 0.981 | to | 1.019 | 84 | -0.414 | to | -0.441 | 34 |
| 0.944 | to | 0.980 | 83 | -0.442 | to | -0.469 | 33 |
| 0.908 | to | 0.943 | 82 | -0.470 | to | -0.498 | 32 |
| 0.873 | to | 0.907 | 81 | -0.499 | to | -0.527 | 31 |
| 0.838 | to | 0.872 | 80 | -0.528 | to | -0.556 | 30 |
| 0.805 | to | 0.837 | 79 | -0.557 | to | -0.585 | 29 |
| 0.772 | to | 0.804 | 78 | -0.586 | to | -0.615 | 28 |
| 0.740 | to | 0.771 | 77 | -0.616 | to | -0.645 | 27 |

| DETERMINATION OF PU, PL, or PWL | | | | | | | |
|---------------------------------|----|----------------|----------|----------------|----------------|--------|----|
| Number of Tests "N" = 9 | | | | | | | |
| QU or QL | | PU, PL, or PWL | QU or QL | | PU, PL, or PWL | | |
| 0.708 | to | 0.739 | 76 | -0.646 | to | -0.676 | 26 |
| 0.677 | to | 0.707 | 75 | -0.677 | to | -0.707 | 25 |
| 0.646 | to | 0.676 | 74 | -0.708 | to | -0.739 | 24 |
| 0.616 | to | 0.645 | 73 | -0.740 | to | -0.771 | 23 |
| 0.586 | to | 0.615 | 72 | -0.772 | to | -0.804 | 22 |
| 0.557 | to | 0.585 | 71 | -0.805 | to | -0.837 | 21 |
| 0.528 | to | 0.556 | 70 | -0.838 | to | -0.872 | 20 |
| 0.499 | to | 0.527 | 69 | -0.873 | to | -0.907 | 19 |
| 0.470 | to | 0.498 | 68 | -0.908 | to | -0.943 | 18 |
| 0.442 | to | 0.469 | 67 | -0.944 | to | -0.980 | 17 |
| 0.414 | to | 0.441 | 66 | -0.981 | to | -1.019 | 16 |
| 0.387 | to | 0.413 | 65 | -1.020 | to | -1.058 | 15 |
| 0.359 | to | 0.386 | 64 | -1.059 | to | -1.099 | 14 |
| 0.332 | to | 0.358 | 63 | -1.100 | to | -1.142 | 13 |
| 0.305 | to | 0.331 | 62 | -1.143 | to | -1.186 | 12 |
| 0.278 | to | 0.304 | 61 | -1.187 | to | -1.233 | 11 |
| 0.251 | to | 0.277 | 60 | -1.234 | to | -1.282 | 10 |
| 0.224 | to | 0.250 | 59 | -1.283 | to | -1.334 | 9 |
| 0.197 | to | 0.223 | 58 | -1.335 | to | -1.390 | 8 |
| 0.171 | to | 0.196 | 57 | -1.391 | to | -1.451 | 7 |
| 0.145 | to | 0.170 | 56 | -1.452 | to | -1.517 | 6 |
| 0.118 | to | 0.144 | 55 | -1.518 | to | -1.591 | 5 |
| 0.092 | to | 0.117 | 54 | -1.592 | to | -1.677 | 4 |
| 0.066 | to | 0.091 | 53 | -1.678 | to | -1.780 | 3 |
| 0.039 | to | 0.065 | 52 | -1.781 | to | -1.918 | 2 |
| 0.013 | to | 0.038 | 51 | -1.919 | to | -2.126 | 1 |
| 0.000 | to | 0.012 | 50 | -2.127 or Less | | 0 | |

| DETERMINATION OF PU, PL, or PWL | | | | | | | |
|---------------------------------|----|----------------|----------|--------|----------------|--------|----|
| Number of Tests "N" = 10 | | | | | | | |
| QU or QL | | PU, PL, or PWL | QU or QL | | PU, PL, or PWL | | |
| 2.176 or More | | 100 | 0.000 | to | -0.012 | 50 | |
| 1.950 | to | 2.175 | 99 | -0.013 | to | -0.038 | 49 |
| 1.803 | to | 1.949 | 98 | -0.039 | to | -0.064 | 48 |
| 1.694 | to | 1.802 | 97 | -0.065 | to | -0.090 | 47 |
| 1.605 | to | 1.693 | 96 | -0.091 | to | -0.116 | 46 |
| 1.528 | to | 1.604 | 95 | -0.117 | to | -0.143 | 45 |
| 1.459 | to | 1.527 | 94 | -0.144 | to | -0.169 | 44 |
| 1.397 | to | 1.458 | 93 | -0.170 | to | -0.195 | 43 |
| 1.340 | to | 1.396 | 92 | -0.196 | to | -0.222 | 42 |

| DETERMINATION OF PU, PL, or PWL | | | | | | | |
|---------------------------------|----|-------|----------------|----------|----|--------|----------------|
| Number of Tests "N" = 10 | | | | | | | |
| QU or QL | | | PU, PL, or PWL | QU or QL | | | PU, PL, or PWL |
| 1.286 | to | 1.339 | 91 | -0.223 | to | -0.248 | 41 |
| 1.236 | to | 1.285 | 90 | -0.249 | to | -0.275 | 40 |
| 1.188 | to | 1.235 | 89 | -0.276 | to | -0.302 | 39 |
| 1.143 | to | 1.187 | 88 | -0.303 | to | -0.329 | 38 |
| 1.100 | to | 1.142 | 87 | -0.330 | to | -0.356 | 37 |
| 1.059 | to | 1.099 | 86 | -0.357 | to | -0.383 | 36 |
| 1.019 | to | 1.058 | 85 | -0.384 | to | -0.411 | 35 |
| 0.980 | to | 1.018 | 84 | -0.412 | to | -0.439 | 34 |
| 0.943 | to | 0.979 | 83 | -0.440 | to | -0.467 | 33 |
| 0.906 | to | 0.942 | 82 | -0.468 | to | -0.495 | 32 |
| 0.871 | to | 0.905 | 81 | -0.496 | to | -0.524 | 31 |
| 0.836 | to | 0.870 | 80 | -0.525 | to | -0.553 | 30 |
| 0.803 | to | 0.835 | 79 | -0.554 | to | -0.583 | 29 |
| 0.770 | to | 0.802 | 78 | -0.584 | to | -0.612 | 28 |
| 0.737 | to | 0.769 | 77 | -0.613 | to | -0.643 | 27 |
| 0.706 | to | 0.736 | 76 | -0.644 | to | -0.674 | 26 |
| 0.675 | to | 0.705 | 75 | -0.675 | to | -0.705 | 25 |
| 0.644 | to | 0.674 | 74 | -0.706 | to | -0.736 | 24 |
| 0.613 | to | 0.643 | 73 | -0.737 | to | -0.769 | 23 |
| 0.584 | to | 0.612 | 72 | -0.770 | to | -0.802 | 22 |
| 0.554 | to | 0.583 | 71 | -0.803 | to | -0.835 | 21 |
| 0.525 | to | 0.553 | 70 | -0.836 | to | -0.870 | 20 |
| 0.496 | to | 0.524 | 69 | -0.871 | to | -0.905 | 19 |
| 0.468 | to | 0.495 | 68 | -0.906 | to | -0.942 | 18 |
| 0.440 | to | 0.467 | 67 | -0.943 | to | -0.979 | 17 |
| 0.412 | to | 0.439 | 66 | -0.980 | to | -1.018 | 16 |
| 0.384 | to | 0.411 | 65 | -1.019 | to | -1.058 | 15 |
| 0.357 | to | 0.383 | 64 | -1.059 | to | -1.099 | 14 |
| 0.330 | to | 0.356 | 63 | -1.100 | to | -1.142 | 13 |
| 0.303 | to | 0.329 | 62 | -1.143 | to | -1.187 | 12 |
| 0.276 | to | 0.302 | 61 | -1.188 | to | -1.235 | 11 |
| 0.249 | to | 0.275 | 60 | -1.236 | to | -1.285 | 10 |
| 0.223 | to | 0.248 | 59 | -1.286 | to | -1.339 | 9 |
| 0.196 | to | 0.222 | 58 | -1.340 | to | -1.396 | 8 |
| 0.170 | to | 0.195 | 57 | -1.397 | to | -1.458 | 7 |
| 0.144 | to | 0.169 | 56 | -1.459 | to | -1.527 | 6 |
| 0.117 | to | 0.143 | 55 | -1.528 | to | -1.604 | 5 |
| 0.091 | to | 0.116 | 54 | -1.605 | to | -1.693 | 4 |
| 0.065 | to | 0.090 | 53 | -1.694 | to | -1.802 | 3 |
| 0.039 | to | 0.064 | 52 | -1.803 | to | -1.949 | 2 |

| DETERMINATION OF PU, PL, or PWL | | | | | |
|---------------------------------|----------|----------------|----------------|-----------|----------------|
| Number of Tests "N" = 10 | | | | | |
| QU or QL | | PU, PL, or PWL | QU or QL | | PU, PL, or PWL |
| 0.013 | to 0.038 | 51 | -1.950 | to -2.175 | 1 |
| 0.000 | to 0.012 | 50 | -2.176 or Less | | 0 |

(109FUEL, 10/11/06)

SECTION 109 - MEASUREMENT AND PAYMENT: of the Standard Specifications is modified to add:

109.12 Fuel Cost Adjustment:

(A) General:

The Department will adjust monthly progress payments up or down as appropriate for cost fluctuations in diesel fuel as determined in accordance with these special provisions.

A fuel cost adjustment will be made when fluctuations in the price of diesel fuel, in excess of 15 percent, occur throughout this contract. The Department will not provide such adjustments for fluctuations in the price of diesel fuel of 15 percent or less.

No adjustments will be made for fluctuations in the price of fuels other than diesel.

(B) Measurement:

The base index price of fuel will be determined by the Department from the selling prices of diesel fuel published by OPIS (Oil Price Information Service). The base index price to be used will be the price for Diesel fuel No. 2, Ultra Low Sulfur, PAD 5, City of Phoenix Rack. The reported average value for the Phoenix area will be used.

The base index price for each month will be the arithmetic average of the selling price for diesel fuel, as specified above, shown in the last four reports received prior to the last Wednesday of the month.

This price will be made known by means of a memorandum issued on the last Wednesday of each month and mailed to those currently receiving copies of the Advertisements for Bids. This price may also be obtained from Contracts and Specifications Services at (602) 712-7221.

This price will be deemed to be the "initial cost" for diesel fuel on projects for which bids are opened during the following month.

The current index price for diesel fuel in subsequent months will be the base index price, determined as specified above, for the current month. The amount of adjustment per gallon will be the net difference between the "initial cost," adjusted by 15 percent, and the current

index price. The monthly adjustment will be determined by the Engineer and included in the payment estimate as a fuel adjustment. For fluctuations in excess of 15 percent, fuel cost adjustments will only be made for current price index increases greater than 1.15 times the "initial cost" or for decreases less than 0.85 times the "initial cost." No calculation will be made for fluctuations in the current index price of 15 percent or less when compared to the "initial cost."

The number of gallons of diesel fuel used per month will be considered to equal 1.5 percent of the dollar amount of work reported by the contractor for each month. Such dollar amount will not include any incentives earned by the contractor, including those for pavement smoothness, thickness, or strength. A monthly adjustment, if applicable, will be made on this quantity, as shown below:

$$S = 0.015(Q) \times (CP-AC)$$

Where; S = Monetary amount of the adjustment (plus or minus) in dollars
Q = Dollar amount of work completed for the month
CP = Current index price in dollars per gallon
AC = Adjusted "initial cost" (1.15 or 0.85 times IC) in dollars per gallon
IC = "Initial cost" as determined above, dollars per gallon

If adjustments are made in the contract quantities, the contractor shall accept any fuel adjustment as full compensation for increases or decreases in the price of fuel regardless of the amounts of overrun or underrun.

No additional compensation will be made for any additional charges, costs, expenses, etc., which the contractor may have incurred since the time of bidding and which may be the result of any fluctuation in the base index price of diesel fuel.

No adjustments will be made for work performed after Substantial Completion, as defined in Subsection 105.19, has been achieved.

The need for application of the adjustments herein to extra work will be determined by the Engineer on an individual basis and, if appropriate, will be specified on the work order.

(C) Payment:

Price adjustments will be shown on the monthly progress estimate, but will not be included in the total cost of work for determination of progress or for extension of contract time.

SECTION 109 - MEASUREMENT AND PAYMENT: of the Standard Specifications is modified to add:

109.13 Measurement and Payment for Pavement Smoothness:

(A) General:

The final pavement surface shall be evaluated for smoothness by testing. When a surface treatment other than ACFC or AR-ACFC is placed as part of the project, the immediate underlying pavement surface will be evaluated for smoothness.

At the completion of paving, the contractor shall notify the Engineer in writing that the pavement is ready for testing. The Engineer will then evaluate the pavement to be tested. If the Engineer determines that additional pavement preparation is required, the contractor shall perform such preparation as directed by the Engineer. The contractor shall ensure that the pavement to be tested can be driven safely at the design speed. Testing will not be performed on any portions that cannot be made safe for testing at the design speed, or on any lanes of less than 0.30 miles in length. If requested by the Engineer, the contractor shall broom the pavement immediately prior to testing. No measurement or direct payment will be made for preparing the pavement, the cost being considered as included in the price of contract items.

The Actual Smoothness Value (AS) for each 0.1 lane-mile increment will be determined, by the Department, in accordance with the provisions of Arizona Test Method 829.

Testing will not be done when the ambient air temperature is less than 40 degrees F, or during rain or other weather conditions determined to be inclement by the Engineer.

Traffic control costs during the initial smoothness testing period will be reimbursed under the provisions of Section 701 of the Specifications. Any additional traffic control costs incurred, outside the normal scope of work, due to pavement repairs and subsequent pavement smoothness measurements shall be borne solely by the contractor.

The testing will be performed within ten days after the Engineer has accepted the pavement for testing. The Engineer will notify the contractor of the test results no later than ten days after the testing has been performed.

Testing will be performed on mainline traffic lanes, and will include the full length of the pavement placed under the contract. Unless otherwise specified in the contract documents, testing of distress lanes, shoulders, ramps, tapers, cross roads, and frontage roads will not be performed.

The existing pavement has the following smoothness values (inches per mile).

**** INSERT 0.1-MILE SMOOTHNESS VALUES HERE, IF AVAILABLE; ****
**** OTHERWISE DELETE ABOVE SENTENCE. ****

THIS INFORMATION HAS BEEN REQUESTED FROM THE MATERIALS DEPARTMENT

The Correction Value (CV) for this contract for new construction / widening is 86 inches per mile and for rehabilitation of existing pavement is 84 inches per mile.

Any 0.1 lane-mile increment having an Actual Smoothness Value (AS) equal to or greater than the Correction Value (CV) shall be repaired by the contractor at no additional expense to the Department.

If repairs are required, the contractor shall prepare a written proposal detailing corrective actions and submit the proposal to the Engineer within ten working days after the contractor's receipt of test results. Within three working days, the Engineer will review the submitted proposal and either accept it, or reject it and ask for a new proposal. If rejected, the contractor shall, within ten working days, prepare and submit a new proposal for corrective action, based on discussions with the Engineer. The Engineer will review, and either accept or reject, the new proposal within three working days of receipt.

Upon completion of any necessary repairs, the 0.1 lane-mile increments containing repaired areas will be re-tested in accordance with the provisions of Arizona Test Method 829. Resultant values from re-testing will be used in determining the adjustment in payment to the contractor.

(B) Payment:

An adjustment in payment to the contractor will be made as follows.

New Construction / Widening:

For new construction / widening, the adjustment in payment, either incentive or disincentive, for each 0.1 lane-mile increment shall be determined using the following formulas:

When AS < 39:

$$\text{Incentive} = [(39 - AS) / (39 + 2)] \times \$3,750$$

When AS > 43:

$$\text{Disincentive} = [(43 - AS) / (39 + 2)] \times \$1,200$$

The existing smoothness values, and the values (other than AS) which are utilized in the incentive and disincentive formulas, are determined prior to the contract bid opening date and are not subject to revision or dispute after the awarding of the contract.

The total adjustment in payment to the contractor shall be the summation of the individual adjustments for the respective 0.1 lane-mile increments, except the maximum total incentive allowed shall be \$11,000 per tested lane-mile.

Rehabilitation of Existing Pavement:

For rehabilitation of existing pavement, the adjustment in payment, either incentive or disincentive, for each 0.1 lane-mile increment shall be determined using the following formulas:

When AS < 37:

$$\text{Incentive} = [(37 - AS) / (37 + 2)] \times \$2,700$$

When AS > 49:

$$\text{Disincentive} = [(49 - AS) / (37 + 2)] \times \$1,200$$

The existing smoothness values, and the values (other than AS) which are utilized in the incentive and disincentive formulas, are determined prior to the contract bid opening date and are not subject to revision or dispute after the awarding of the contract.

The total adjustment in payment to the contractor shall be the summation of the individual adjustments for the respective 0.1 lane-mile increments, except the maximum total incentive allowed shall be \$9,000 per tested lane-mile.

For projects where pavement is removed and replaced to grade, followed by an ACFC or an AR-ACFC overlay, no smoothness measurements will be made for the following areas:

Pavement placed within 35 feet of the termini of the project.

Pavement placed within 35 feet of the approaches and departures for bridge structures not being overlain as part of the project.

For projects where pavement is removed and replaced to grade, followed by an overlay, followed by an ACFC or an AR-ACFC overlay, no smoothness measurements will be made for the following areas:

Pavement placed within 100 feet of the termini of the project.

Pavement placed within 100 feet of the approaches and departures for bridge structures not being overlain as part of the project.

Bridges and their approaches and departures that are overlain as part of the project will be subject to the smoothness requirements.

(201MTBRN, 06/04/96)

SECTION 201 - CLEARING AND GRUBBING:

201-3.02 Removal and Disposal of Materials: the third paragraph of the Standard Specifications is revised to read:

Burning of trash, debris, plant material, wood, or any other waste materials will not be allowed.

(203QCEW, 07/15/05)

SECTION 203 EARTHWORK: of the Standard Specifications is modified to add:

203-2.02 Contractor Quality Control:

The contractor shall perform the quality control measures described in Subsection 106.04(C). At the weekly meeting, the contractor shall be prepared to explain and discuss how the following processes will be employed:

- (a) Backfill production, including crusher methods, pit extraction, and washing.
- (b) Stockpile management, including stacking methods, separation techniques, stockpile pad thickness, and segregation prevention.
- (c) Transporting and placing, including transport technique, lift thickness, processing and mixing technique, and compaction methods.
- (d) Excavation and transporting, including method of excavation and transporting methods.
- (e) Embankment, including method of mixing, compaction methods, unsuitable material control, waste site, and lift thickness.

The contractor shall obtain samples and perform the tests specified in the following table:

| CONTRACTOR QUALITY CONTROL TESTING REQUIREMENTS | | | |
|--|----------------------------------|-----------------------|----------------------------------|
| TYPE OF TEST | TEST METHOD | SAMPLING POINT | MINIMUM TESTING FREQUENCY |
| Structural Backfill | | | |
| Gradation | ARIZ 201 | Stockpile | 1 per 500 CY per Source |
| PI | AASHTO T 89 AASHTO T 90 | | |
| Proctor Density | ARIZ 225 ARIZ 226 ARIZ 245 | Stockpile | 1 per Source and as needed |

| CONTRACTOR QUALITY CONTROL TESTING REQUIREMENTS (CON'T.) | | | |
|---|--|-----------------------|-------------------------------------|
| TYPE OF TEST | TEST METHOD | SAMPLING POINT | MINIMUM TESTING FREQUENCY |
| Structural Backfill | | | |
| Field Density | ARIZ 227 ARIZ 230 ARIZ 232 ARIZ 235 ARIZ 246 | In-place | 1 per 200 CY, minimum 1 per lift |
| Subgrade | | | |
| Gradation | ARIZ 201 | Roadway | 1 per Soil Type |
| PI | AASHTO T 89 AASHTO T 90 | | |
| Proctor Density | ARIZ 225 ARIZ 226 ARIZ 245 | Roadway | 1 per Soil Type |
| Field Density | ARIZ 227 ARIZ 230 ARIZ 232 ARIZ 235 ARIZ 246 | Roadway | 1 per 1,000 feet |
| Natural Ground for Embankment Less than Five Feet | | | |
| Proctor Density | ARIZ 225 ARIZ 226 ARIZ 245 | In-place | 1 per Soil Type |
| Field Density | ARIZ 227 ARIZ 230 ARIZ 232 ARIZ 235 ARIZ 246 | In-place | 1 per 1,000 feet |
| Embankment | | | |
| Proctor Density | ARIZ 225 ARIZ 226 ARIZ 245 | In-place | 1 per Soil Type |
| Field Density | ARIZ 227 ARIZ 230 ARIZ 232 ARIZ 235 ARIZ 246 | In-place | 1 per 1,000 feet per lift |
| Borrow Within Three Feet of Finished Subgrade Elevation | | | |
| Gradation | ARIZ 201 | In-place | 1 per 2,000 CY |
| PI | AASHTO T 89 AASHTO T 90 | | |

(203ERWK, 10/31/00)

SECTION 203 - EARTHWORK:

203-3.03(B) Slopes: the first paragraph is modified to add:

When earth slopes are to be seeded, the surface shall be finished to a loose, evenly roughened condition, in accordance with the requirements of Subsection 805-3.02(B).

203-3.03 (D) Unsuitable Material: of the Standard Specifications is revised to read:

Subgrade material not meeting the requirements of the Subgrade Acceptance Chart (Attachment A) shall be overexcavated to a depth of three feet below finished subgrade elevation and replaced with acceptable material as outlined in Section 203-9 of the Standard Specifications.

203-8.05 Basis of Payment: the last sentence of the Standard Specifications is hereby deleted.

203-9.02 Materials: the last sentence of the Standard Specifications is revised to read:

Borrow placed within three feet of the finished subgrade elevation shall conform to the following requirement:

$PC + (2.83 \times PI)$ shall not exceed 115,

where:

PC = Percent of material passing the No. 200 sieve (determined in accordance with Arizona Test Method 201), and

PI = Plasticity Index (determined in accordance with AASHTO T 90).

203-9.05 Basis of Payment: the last sentence of the Standard Specifications is hereby deleted.

203-10.03(A) Placement: is modified to add:

When embankment slopes are to be seeded, the surface shall be finished to a loose, evenly roughened condition, in accordance with the requirements of Subsection 805-3.02(B).

(209WTR, 12/30/05)

SECTION 207 DUST PALLIATIVE: of the Standard Specifications is hereby deleted.

SECTION 209 FURNISH WATER: is hereby added to the Standard Specifications:

209-1 Description:

Except, as specified below, the work under this section shall consist of furnishing all water required for construction within the project limits. This work shall include securing and transporting water to the project site. All costs, and all labor, equipment, and materials required to secure, transport, and furnish water to the project limits, including, but not limited to, hauling, pumping, and piping water to the project site from canals, rivers, lakes and wells, shall be considered as included in the work.

The work under this section shall also include furnishing all water, as specified above, for the control of dust as considered necessary for public safety and convenience of the traveling public, for the reduction of the dust nuisance to adjacent property, for the allaying of dust in non-commercial crusher and pit operations and on roads used to haul material, and for other purposes as directed by the Engineer.

When included in the contract or approved by the Engineer, this item shall also include furnishing water to the project site for those pre-wetting areas specified in the special provisions, or as approved by the Engineer.

Water used for materials prepared in an onsite mixing or processing plant, such as concrete, lean concrete base, or soil cement, will not be included in this work.

Water used in landscape establishment, as specified in Section 807, will not be included in this work.

209-2 Blank

209-3 Construction Requirements:

The use of pressure pumps and spray bars on all sprinkling equipment used on the project will be required. The use of gravity flow spray bars and splash plates will not be permitted for dust control operations.

Water for use in compaction or for pre-wetting shall be applied in accordance with Section 203, and these special provisions.

Water applied for dust control shall be as approved or directed by the Engineer. The contractor shall provide appropriate equipment for effective control of dust.

Water conservation by using alternative dust control treatments is encouraged. The contractor may propose alternative dust suppressants for subgrades, embankments and other areas within the project, for haul roads, or for controlling dust at equipment yard sites. When the use of chemical dust suppressants is proposed in lieu of water, the contractor's submittal shall be in accordance with the value engineering process as specified in Subsection 104.13.

209-4 Method of Measurement:

The work will be measured by the unit of 1,000 U.S. gallons of water (MGAL). Measurement will be made by means of sealed and certified flowmeters.

For small quantities, or where a sealed flowmeter is not feasible, measurement can be made in tanks or tank trucks of certified capacity, or by other means, if approved by the Engineer.

209-5 Basis of Payment:

The accepted quantity of water used in construction, and for control of dust and, if required, for pre-wetting, secured and transported to the project site, and measured as provided above, will be paid for at the contract unit price, which price shall include all costs, including all labor, equipment, and materials necessary for furnishing water as required.

No payment will be made for the labor, equipment, and materials required for furnishing water from sources located within the project limits.

The contract unit price for Furnish Water will not include payment for application or distribution of the water within the project limits, or for water trucks, hoses, fittings, sprinklers, meters, and any other equipment required to distribute and apply the water, or for the labor involved.

The cost for application and distribution of water required for construction shall be considered as included in other related contract items, such as earthwork, subgrades, base courses, and backfill materials as appropriate.

The costs for distributing and applying water for pre-wetting, if required, including all fittings and equipment, and the labor involved, will be considered as included in the appropriate contract items for earthwork.

The costs for distributing and applying water for dust control, including the water truck and all fittings and equipment, and the labor involved, will be considered as included in other contract items.

Except for mandatory Department-furnished sources, and roads used to haul materials from mandatory Department-furnished sources, no measurement or payment will be made for water or other suppressants used for prevention of dust from any material sources, pit or crusher operations located outside of the project limits, whether contractor-furnished sources, commercial sources, or non-mandatory Department-furnished sources, or for related haul roads, the cost being considered as included in other contract items.

Except for mandatory Department-furnished sources, no measurement or payment will be made for water used for pre-wetting off the project site.

No adjustment to the bid price for furnishing water, as specified in Subsection 104.02, will be allowed as a result of a value engineering proposal for alternative dust suppressants.

Payment for chemical dust suppressants, when approved, shall be in accordance with Subsection 104.13. Other alternative dust suppressants, when approved by the Engineer, will be paid for in accordance with Subsection 109.04.

(303QCAB, 07/15/05)

SECTION 303 AGGREGATE SUBBASES AND AGGREGATE BASES: of the Standard Specifications is modified to add:

303-3.04 Contractor Quality Control:

The contractor shall perform the quality control measures described in Subsection 106.04(C). At the weekly meeting, the contractor shall be prepared to explain and discuss how the following processes will be employed:

- (a) Aggregate production, including crusher methods, pit extraction, and washing.
- (b) Stockpile management, including stacking methods, separation technique, stockpile pad thickness, and segregation prevention.
- (c) Transporting and placing, including transport technique, lift thickness, processing and mixing technique, and compaction methods.

The contractor shall obtain samples and perform the tests specified in the following table:

| CONTRACTOR QUALITY CONTROL TESTING REQUIREMENTS | | | |
|--|----------------------------------|---------------------------|----------------------------------|
| TYPE OF TEST | TEST METHOD | SAMPLING POINT | MINIMUM TESTING FREQUENCY |
| Aggregate Base Class 1, 2, or 3 | | | |
| Fractured Coarse Aggregate Particles | ARIZ 212 | Crusher belt or Stockpile | 1 per 1,200 CY |
| Gradation | ARIZ 201 | Crusher belt or Stockpile | 1 per 600 CY |
| PI | AASHTO T 89 AASHTO T 90 | | |
| Proctor Density | ARIZ 225 ARIZ 226 ARIZ 245 | Crusher belt or Stockpile | 1 per Source and as needed |

| CONTRACTOR QUALITY CONTROL TESTING REQUIREMENTS | | | |
|--|--|---------------------------|----------------------------------|
| TYPE OF TEST | TEST METHOD | SAMPLING POINT | MINIMUM TESTING FREQUENCY |
| Aggregate Base Class 1, 2, or 3 | | | |
| Field Density | ARIZ 227 ARIZ 230 ARIZ 232 ARIZ 235 ARIZ 246 | Roadway | 1 per 600 CY |
| Aggregate Subbase Class 4, 5, or 6 | | | |
| Fractured Coarse Aggregate Particles (Class 4) | ARIZ 212 | Crusher Belt or Stockpile | 1 per 1,200 CY |
| Gradation | ARIZ 201 | Crusher Belt or Stockpile | 1 per 600 CY |
| PI | AASHTO T89 AASHTO T90 | | |
| Proctor Density | ARIZ 225 ARIZ 226 ARIZ 245 | Crusher belt or Stockpile | 1 per Source and as needed |
| Field Density | ARIZ 227 ARIZ 230 ARIZ 232 ARIZ 235 ARIZ 246 | Roadway | 1 per 600 CY |

(303SALV, 5/18/06)

SECTION 303 AGGREGATE SUBBASES AND AGGREGATE BASES:

303-2 Materials: of the Standard Specifications is modified to add:

Aggregate subbase and aggregate base material may be comprised in part of salvaged asphaltic concrete or Portland cement concrete materials.

The source of all salvaged materials shall be approved by the Engineer prior to use. Salvaged asphaltic concrete and Portland cement concrete materials shall not contain hazardous materials. All metal reinforcement materials shall be removed from salvaged Portland cement concrete prior to its use in aggregate subbase and aggregate base material.

Salvaged asphaltic concrete to be used in aggregate subbase and aggregate base material shall be produced by milling, pulverizing, or crushing. Salvaged Portland cement concrete materials shall be produced by crushing.

The contractor shall submit the percentages of salvaged materials and virgin aggregate materials which are intended to be used to the Engineer for approval. The percentages shall be not be adjusted after approval, except to maintain a consistent gradation. Any significant change in the proportions must be approved by the Engineer prior to use.

A maximum of 50 percent salvaged material, by weight or volume, will be allowed. The 50 percent maximum shall include all salvaged materials, including any underlying base material recovered when full depth milling or pulverizing is used to remove the asphaltic concrete. Changes in proportions that result in more than 50 percent salvaged material will not be allowed.

Aggregate subbase and aggregate base material containing salvaged materials shall be thoroughly mixed by means of a mechanical mixing device prior to placement. The mechanical mixing device shall be a pugmill type mixer consisting of at least two motorized shafts with mixing paddles. The mixing device shall be designed such that the mixture of virgin aggregate and salvaged materials is moved in a near horizontal direction by the mixing paddles without the aid of conveyor belts for a distance of at least three feet. The rate of the combined virgin aggregate and salvaged material feed shall not exceed the mixing device's rated capacity in tons per hour.

Aggregate subbase and aggregate base material composed of virgin aggregate and salvaged materials shall conform to the gradation requirements for the class of aggregate specified. Fractured coarse aggregate particles and abrasion requirements shall only apply to the virgin aggregate. The plasticity index of the virgin aggregate material shall be determined and, if the salvaged material contains underlying base material, the determination of the plasticity index of the salvaged material will also be required. Fractured coarse aggregate particles, abrasion, and plasticity index shall conform to the requirements for the class of aggregate specified.

Sampling for gradation of aggregate subbase and aggregate base material composed of virgin aggregate and salvaged materials shall be from the windrow. Sampling for plasticity index, fractured coarse aggregate particles, or abrasion shall be from a stockpile or belt, prior to mixing in the mechanical mixing device.

When determining gradation of aggregate subbase or aggregate base material composed of virgin aggregate and salvaged asphaltic concrete materials, drying to a constant weight shall be performed at a temperature of $140 \pm$ five degrees F.

303-3.02 Compaction: of the Standard Specifications is modified to add:

Aggregate subbase and aggregate base material consisting in part of salvaged asphaltic concrete or Portland cement concrete material shall be compacted to at least 100 percent of the maximum density determined in accordance with the requirements of the applicable test methods of the ADOT Materials Testing Manual, as directed and approved by the Engineer. Arizona Test Method 235, "Field Density and Moisture Content of Soil and Soil-Aggregate

Mixtures by the Nuclear Method", shall not be used to determine the field density or moisture content of aggregate subbase and aggregate base material containing salvaged asphaltic concrete.

When determining maximum density and optimum moisture content for aggregate subbase and aggregate base material composed of virgin aggregate and salvaged asphaltic concrete materials, drying to a constant weight shall be performed at a temperature of 140 ± five degrees F.

(403ACHP, 01/22/07)

SECTION 403 ASPHALTIC CONCRETE HOT PLANT REQUIREMENTS: is hereby added to the Standard Specifications:

403-1 Description:

When referenced in individual specifications, the asphaltic concrete hot plant shall meet the requirements specified herein.

403-2 Requirements:

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

Mineral admixture shall be proportioned by weight.

The mineral admixture shall be added and thoroughly mixed with the mineral aggregate by means of a mechanical mixing device prior to the mineral aggregate and mineral admixture entering the dryer. The moisture content of the combined mineral aggregate shall be a minimum of three percent by weight of the aggregate during the mixing process.

The mineral admixture shall be weighed utilizing an approved weigh system, with a weight totalizer prior to entry into the mechanical mixing device. The mechanical mixing device shall be a pugmill type mixer which is in good working condition and which consists of at least two motorized shafts with mixing paddles. The mixing device shall be designed such that the mixture of aggregate and admixture is moved in a near horizontal direction by the mixing paddles, without the aid of conveyor belts, for a distance of at least three feet. The rate of aggregate feed shall not exceed the mixing device's rated capacity in tons per hour. The mixer shall be constructed to minimize the loss of mineral admixture. The mixer shall be located in the aggregate delivery system at a location where the mixed material can be readily inspected on a belt prior to entry into the dryer. The mixing device shall be capable of effective mixing in the full range of asphaltic concrete production rates.

A positive signal system shall be provided and utilized during production whereby the mixing shall automatically be stopped if the mineral admixture is not being introduced into the mineral aggregate. The plant will not be permitted to operate unless the signal system is in good working condition.

The contractor's plant and equipment shall be constructed and operated so that there is not a significant loss of mineral admixture through the dust collection system of the plant.

For mixing plants other than batch plants, bituminous material and mineral aggregate shall be proportioned by either volume or weight.

When a batch plant is used, bituminous material and mineral aggregate shall be proportioned by weight. Weighing shall be performed with all receptacles and scales insulated against the vibration or movement of the rest of the plant. The insulated receptacles and scales shall be such that the error in weighing, while the entire plant or any part of the plant is operating, shall not exceed two percent for the bituminous material and the individual mineral aggregate components, or 1-1/2 percent for any batch. Weighing of bituminous material shall be done in a heated, insulated bucket suspended from a springless dial scale system.

Mineral aggregate from each individual stockpile/hot bin shall be properly proportioned and introduced into the asphaltic concrete.

A positive signal system shall be provided and utilized during production to indicate the low level of mineral aggregate in the bins. The plant will not be permitted to operate unless the signal system is in good working condition. Each bin shall have an overflow chute or a divider to prevent material from spilling into adjacent bins.

The introduction of bituminous material shall be controlled by an automated system fully integrated with the controls for mineral aggregate and mineral admixture.

The contractor shall provide daily documentation of the proportion of each individual component (mineral aggregate, mineral admixture, and bituminous material) incorporated into the mix.

The production of the plant shall be governed by the rate required to obtain a thorough and uniform mixture of the materials.

Drying and heating shall be accomplished in such a manner as to preclude the mineral aggregate from becoming coated with fuel oil or carbon.

A continuous recording pyrometer sensitive to a rate of temperature change not less than 10 degrees F per minute shall automatically record the temperature of asphaltic concrete or mineral aggregate at the discharge chute of the dryer. A copy of the pyrometer reading shall be provided to the Engineer daily.

If the asphaltic concrete is discharged from the mixer into a hopper, the hopper shall be constructed so that segregation of the asphaltic concrete will be minimized.

403-3 Measurement and Payment:

No measurement or direct payment will be made for providing a hot plant meeting the requirements specified herein, the cost being considered as included in the respective contract items.

(404SLRY, 03/11/99)

SECTION 404 - BITUMINOUS TREATMENTS: of the Standard Specifications is modified to add:

SLURRY SEAL COAT:

404-2 Materials:

Emulsified Asphalt:

The emulsified asphalt shall be anionic quick-set, designation QS-h, conforming to the following requirements:

| Test | AASHTO Test Method | Requirement |
|--|--------------------|--------------------------------------|
| Tests on Emulsion: | | |
| Viscosity at 77 °F , Saybolt Furol, Seconds | T 59 | 20 – 100 |
| Residue by Evaporation, percent | T 59 | 57 minimum |
| Sieve Test, Retained on No. 20, percent | T 59 | 0.10 maximum |
| Particle Charge, Electroplate | T 59 | Negative |
| Tests on Residue from Distillation: | | |
| Penetration at 77 °F, 100 grams, 5 Seconds | T 59 | 40 – 110 |
| Solubility in Trichloroethylene, weight, percent | T 59 | 97.5 minimum |
| Ductility at 77 °F, cm | T 51 | 40 minimum |
| Mixing Properties: | | |
| Slurry Seal Mixing Test, 70 - 80 °F, Seconds | | 120 minimum |
| Slurry Seal Setting Test, 70 - 80 °F, (1 hour cure) | | No brown stain |
| Slurry Seal Water Resistance Test | | No more than slight Discoloration |

Emulsified asphalt shall be used in the amount of approximately 18 percent of the aggregate dry weight.

Aggregate:

The mineral aggregate shall consist of sharp sand and rock dust with a minimum of 50 percent of the material produced by crushing, and shall conform to the following gradation when tested in accordance with the requirements of Arizona Test Method 201:

| Sieve Size | Percent Passing |
|------------|-----------------|
| 3/8 inch | 100 |
| No. 4 | 70 - 90 |
| No. 8 | 45 - 70 |
| No. 16 | 28 - 50 |
| No. 30 | 19 - 34 |
| No. 50 | 12 - 25 |
| No. 100 | 7 - 18 |
| No. 200 | 5.0 - 15.0 |

The sand equivalent shall be a minimum of 45 when tested in accordance with the requirements of AASHTO T 176, and the portion of the material passing the No. 40 sieve shall be nonplastic when tested in accordance with the requirements of AASHTO T 90. The abrasion loss shall be a maximum of 75 grams per square foot when tested in accordance with the requirements of Arizona Test Method 807.

Accelerator:

Portland cement, Type I, shall be added to the slurry mix by an approved method that will assure uniform distribution and proper control. Cement shall be added in the approximate amount of one percent, by weight, of the total mix; however, the exact amount will be determined by the Engineer.

Water:

Water from a domestic source will be satisfactory.

Samples:

Utilizing representative samples, a mix design shall be formulated and submitted by the contractor to the Engineer. The mix design shall be based on the criteria and other requirements hereinbefore specified.

404-3 Construction Requirements:

The slurry mixture shall be placed at the rate of approximately 22 pounds of the dry aggregate per square yard, as directed by the Engineer.

The spreader box shall be equipped with a canvas or burlap drag to provide a rough surface texture. The drag shall be replaced daily.

SECTION 404 BITUMINOUS TREATMENTS:

404-2.02(A) General: the second paragraph of the Standard Specifications is revised to read:

Aggregate material will be sampled for gradation acceptance in the final stockpile before incorporation into the work.

The aggregate material will be deemed to be acceptable when the test values for each specified aggregate characteristic are within the specified limits.

404-3.01 Weather Limitations: of the Standard Specifications is revised to read:

Bituminous material used in chip seal coats shall be applied to an existing bituminous surface only between the dates shown in Subsection 404-3.14 for the average elevation of the project, when the existing bituminous surface is dry, the pavement surface temperature is at least 85 degrees F, and the ambient temperature at the beginning of the application of bituminous material is at least 65 degrees F and rising. The application of bituminous material shall be stopped when the ambient temperature is 70 degrees F or less and falling.

Bituminous material used in prime coats shall normally be applied to an existing aggregate surface only when the ambient air temperature in the shade is at least 70 degrees F and when the existing aggregate surface is slightly damp.

At any time, the Engineer may require that the work cease or that the work day be reduced in the event that weather conditions, either existing or expected, are anticipated to have an adverse effect upon the bituminous treatment.

404-3.02(A) Distributor Truck: the first sentence of the first paragraph of the Standard Specifications is revised to read:

Distributor trucks shall be so designed, equipped, maintained and operated that bituminous material at even heat may be applied uniformly on variable widths of surface at readily determined and controlled rates of from 0.03 to 1.00 gallons per square yard, with uniform pressure, and with an allowable transverse variation from any specified rate not to exceed 10 percent or 0.02 gallons per square yard, whichever is less.

404-3.02(A) Distributor Truck: the second paragraph of the Standard Specifications is revised to read:

Prior to the spreading of bituminous material, all distributor trucks proposed for use shall have been tested for rate of transverse spread, in accordance with the requirements of Arizona Test Method 411, and certified within 12 months from the date of spreading. However, the Engineer may at any time require that each distributor truck be tested to determine the rate of the transverse spread.

404-3.02(A) Distributor Truck: the third paragraph of the Standard Specifications is hereby deleted.

404-3.02(C) Rollers: the first sentence of the first paragraph of the Standard Specifications is revised to read:

Rollers shall be of the oscillating type having a width of not less than four feet with pneumatic tires of equal size and diameter.

404-3.02(D) Aggregate Spreaders: of the Standard Specifications is revised to read:

The application of cover material shall be accomplished by means of a calibrated spreader. The spreader shall be a self-propelled, computerized rate-controlled unit capable of an application width of 14 feet or greater. The spreader shall be in good mechanical condition and capable of applying aggregate uniformly across the spread width.

The application of blotter material shall be accomplished by means of a sand slinger or other equipment approved by the Engineer.

Aggregate application rates are expected to vary from four to 40 pounds per square yard, depending on the type of construction.

404-3.03 Traffic Control: the first sentence of the first paragraph of the Standard Specifications is revised to read:

In the construction or application of a bituminous treatment, the treated roadway surface shall not be used by the contractor, its agents, or others until it has been established to the satisfaction of the Engineer that the treated roadway surface will not be damaged or marred under the action of traffic.

404-3.04 Preparation of the Surface: the first paragraph of the Standard Specifications is revised to read:

The surface to be treated shall be thoroughly cleaned to the satisfaction of the Engineer prior to applying the bituminous material.

404-3.05 Application of Bituminous Material: the last sentence of the second paragraph of the Standard Specifications is revised to read:

The actual bituminous material application shall not vary more than 10 percent from the application rate specified by the Engineer.

404-3.05 Application of Bituminous Material: the fourth paragraph of the Standard Specifications is hereby deleted.

404-3.05 Application of Bituminous Material: the sixth paragraph of the Standard Specifications is hereby deleted.

404-3.06 Application of Cover Material: the first sentence of the first paragraph of the Standard Specifications is revised to read:

Cover material shall be immediately and uniformly spread over the freshly applied bituminous material.

404-3.09 Application of Blotter Material: the second and third paragraphs of the Standard Specifications are revised to read:

Blotter material, at the time of spreading, shall be wet but free of running water.

Blotter material shall be uniformly spread. Any oversize aggregate or foreign material picked up during stockpiling or loading operations shall be eliminated before entering the spreader. Supplemental spreading or smoothing shall be done by hand methods where necessary.

404-3.12 Tack Coat: is revised to read:

Tack coat shall be applied prior to placing a bituminous mixture on a primed surface, an existing bituminous surface, or an existing Portland cement concrete pavement surface. Tack coat shall also be applied between layers of bituminous mixtures.

The contractor shall choose the bituminous material to be used for tack coat. The Engineer must approve the contractor's choice of bituminous material prior to its use.

The bituminous material used for tack coat shall conform to the requirements of Section 1005.

The rate of application for the specific usage will be specified by the Engineer. The following table shows approximate tack coat application rates:

| Type of Bituminous Material | Approximate Tack Coat Application Rates: Gallons / Square Yard | Payment Factor |
|---|---|----------------|
| Emulsified Asphalt (Special Type) - See Note Below. | 0.12 | 0.7 |
| Emulsified Asphalt (Other than Special Type) | 0.08 | 1.0 |
| Asphalt Cement | 0.06 to 0.08 | 1.0 |

Note: Emulsified Asphalt (Special Type) shall consist of Type SS-1 or CSS-1 emulsified asphalt diluted with water to provide an asphalt content of not less than 26 percent.

If emulsified asphalt of any type is used, it shall have broken before asphaltic concrete is placed.

If emulsified asphalt of any type is held over night, it shall be reheated and agitated prior to further application.

The Engineer may either adjust the application rate or, except as specified below, eliminate the use of tack coat in any part of the work if, in the Engineer's judgment, the bituminous mixture to be placed will be effectively bonded to the underlying surface. For asphaltic concrete friction course, asphaltic concrete friction course (asphalt-rubber), or asphaltic concrete (asphalt-rubber), application of the tack coat immediately prior to placing such pavements shall not be eliminated, although the Engineer may adjust the application rate.

Bituminous material shall be applied only as far in advance of the placement of the bituminous mixed materials as is necessary to obtain the proper condition of tackiness. In no event shall more bituminous material be applied in one day than will be covered by bituminous mixed materials during that same day.

404-4 Method of Measurement: the first sentence of the fourth paragraph of the Standard Specifications is deleted.

404-5 Basis of Payment: the first paragraph is revised to read:

The accepted quantities of bituminous treatments, complete in place, measured as provided above, will be paid for at the contract unit price, except the contract unit price for bituminous material will be adjusted for quantities of material represented by the corresponding test results. Adjustments will be made in accordance with Section 1005.

404-5 Basis of Payment: the second paragraph is hereby deleted.

(404BIMAT, 10/06/06)

SECTION 404 BITUMINOUS TREATMENTS:

404-5 Basis of Payment: of the Standard Specifications is modified to add:

The term "bituminous material" as used herein shall include asphalt cement, liquid asphalt, and emulsified asphalt.

The contract unit price for each item of bituminous material will be considered to include all costs for furnishing, hauling, handling, spreading, and mixing of the material as required, including the "initial cost" of bituminous material, but excluding any difference in the cost of bituminous material that occurs between the date of bid opening and the date that the material is used on the project.

A cost for bituminous material will be determined monthly by the Department based on the selling prices of asphalt cement published by the Asphalt Weekly Monitor, a publication of Poten & Partners, Inc. The cost will be the arithmetic average of the high and low selling prices for asphalt cement shown in the previous four reports for the Arizona/Utah and Southern California regions.

This cost will be deemed the "initial cost" (IC) for bituminous material for projects on which bids are opened during the following month. This cost will also be deemed the "current price" (CP) for bituminous material for the following month for projects in construction.

This value will be made known by means of a memorandum issued on the last Wednesday of each month and mailed to those currently receiving copies of the Advertisements for Bids.

This information may also be obtained from Contracts and Specifications Services, (602) 712-7221.

For each item of bituminous material for which there is a specific pay item, and for the bituminous material used in Asphaltic Concrete (Miscellaneous Structural), an adjustment will be made as follows for each month that a quantity of bituminous material was used on the project.

The "initial cost" (IC) for the month in which the project was bid will be compared with the "current price" (CP) as specified above for the appropriate current month. The "current price" (CP) will be as shown in the memorandum issued on the last Wednesday of each month, and will be used to adjust costs for bituminous material incorporated into the job during the following month (for example; bituminous material used in May will be adjusted, as specified herein, based on the "current price" (CP) for May as shown in the memorandum issued on the last Wednesday of April). Any difference in price between these two values will be applied to the quantity of eligible bituminous material incorporated into the work.

Determination of the eligible quantities of bituminous material will be based on contractor-furnished invoices, except as modified below.

The tons of emulsified products to which the adjustment will be applicable will be the tons of the emulsified bituminous asphalt prior to dilution.

Adjustments in compensation for emulsified asphalts will be made at 60 percent of either the increase or decrease.

The tons of Bituminous Material (Asphalt Rubber) to which the adjustment will be applicable will be 0.80 multiplied times the total quantity of the item used. The adjustment will not apply to the 20 percent of the material which constitutes the rubber additive.

The tons of bituminous material incorporated in Asphaltic Concrete (Miscellaneous Structural) to which an adjustment will be applicable will be considered to equal five percent of the quantity, measured in tons, of Asphaltic Concrete (Miscellaneous Structural) placed, regardless of the actual percentage of bituminous material incorporated into the mix. If the quantity of Asphaltic Concrete (Miscellaneous Structural) is measured by volume, the supplemental agreement establishing the method of measurement will specify the manner in which the tons of asphalt cement eligible for the adjustment are determined.

The tons of bituminous materials which are paid for on the basis of testing by nuclear asphalt content gauge, ignition furnace, or other approved methods to which the adjustment will be applicable, are the tons which have been incorporated into the mixture.

No additional compensation will be made for any additional or increased charges, costs, expenses, taxes, etc., which the contractor may have incurred since the time of bidding and which may be the result of any increase in the "initial cost" of bituminous material.

Adjustment in unit prices of items governed by this provision will be made in the next regular monthly progress payment following actual use or application of the bituminous material.

Any adjustment in compensation made for bituminous material incorporated into the work after the expiration of the specified completion time set forth in the contract, or as may be extended in accordance with the provisions of Subsection 108.08, will be on the basis of the price of bituminous material shown in the memorandum applicable on the date of the expiration of the specified completion time, as hereinbefore specified.

(406ASP, 11/21/06)

SECTION 406 ASPHALTIC CONCRETE:

406-1 Description: the first paragraph of the Standard Specifications is revised to read:

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, 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.

406-2 Asphaltic Concrete Mix Design Criteria: Items "2. Effective Voids" and "8. Mineral Aggregate Grading Limits" of the table of the Standard Specifications are revised to read:

| Criteria | Requirements | Arizona Test Method |
|-------------------------------|---------------------|---------------------|
| | <u>3/4 inch Mix</u> | |
| 2. Effective Voids, %, Range | 5.5 ± 0.2 | 815 |
| 8. Mix Design Grading Limits: | | 201 |

| Sieve Size | Percent Passing | |
|------------|-------------------|----------------|
| | 3/4 inch Mix | |
| | Without Admixture | With Admixture |
| 1-1/4 inch | | |
| 1 inch | 100 | 100 |
| 3/4 inch | 90 - 100 | 90 - 100 |
| 3/8 inch | 62 - 77 | 62 - 77 |
| No. 8 | 37 - 46 | 38 - 47 |
| No. 40 | 10 - 18 | 11 - 19 |
| No. 200 | 1.5 - 4.5 | 2.5 - 6.0 |

406-2 Asphaltic Concrete Mix Design Criteria: the last paragraph of the Standard Specifications is revised to read:

The ratio of the mix design composite gradation target for the No. 200 sieve, including mineral admixture, to the effective asphalt content shall be within the range specified below:

$$\frac{\text{Mix Design Composite Gradation Target}}{\text{Effective Asphalt Content}} = 0.8 \text{ to } 1.2$$

406-3 Materials: of the Standard Specifications is modified to add:

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

| | 3/4 inch Mix |
|---------------------------|--------------|
| Unit Weight (lb./cu. ft.) | 148 |
| Asphalt Cement, % | 5.0 |
| Mineral Admixture, % | 1.0 |

406-3.01 Mineral Aggregate: the first paragraph of the Standard Specifications is revised to read:

The contractor shall provide a source in accordance with the requirements of Section 1001, except that sub-paragraph (3) under Subsection 1001-4.01(B) shall not apply.

406-3.01 Mineral Aggregate: the table of the Standard Specifications is revised to read:

| Mineral Aggregate Characteristics | Test Method | Requirement |
|---|--|---|
| Combined Bulk Oven Dry Specific Gravity | Arizona Test Method 251 | 2.350 – 2.850 |
| Combined Water Absorption | Arizona Test Method 251 | 0 - 2.5% |
| Sand Equivalent | AASHTO T 176 (After thoroughly sieving the sample, no additional cleaning of the fines from the plus No. 4 material is required.) | Minimum 55 |
| Abrasion | AASHTO T 96 | 100 Rev., Max 9% 500 Rev., Max 40% |
| Fractured Coarse Aggregate Particles | Arizona Test Method 212 | Minimum 85% with at least two fractured faces and minimum 92% with at least one fractured face (plus No. 4 material) |
| Uncompacted Void Content | Arizona Test Method 247 | Minimum 45.0% |
| Carbonates (Only if the asphaltic concrete is the designed final pavement surface normally used by traffic; detours and temporary paving are excluded.) | Arizona Test Method 238 | Maximum 20% |

406-3.02 Mineral Admixture: the first sentence of the first paragraph of the Standard Specifications is revised to read:

Mineral admixture will be required. The amount used shall be 1.0 percent, by weight of the mineral aggregate, unless testing demonstrates that additional admixture is required in order to meet the mix design criteria for Wet Strength and Index of Retained Strength.

406-3.03 Bituminous Material: of the Standard Specifications is revised to read:

Asphalt cement shall be an asphalt binder performance grade PG 76-16, conforming to the requirements of Section 1005.

The percent of asphalt cement used shall be based on the weight of total mix (asphalt cement, mineral aggregate, and mineral admixture).

The contractor shall provide the laboratory mixing and compaction temperature ranges to the mix design laboratory for each PG asphalt binder used for mix design purposes. The laboratory mixing temperature range is defined as the range of temperatures where the un-aged asphalt binder has a rotational viscosity of 0.17 ± 0.02 Pascal-seconds, measured in accordance with AASHTO T 316. The laboratory compaction temperature range is defined as the range of temperatures where the un-aged asphalt binder has a rotational viscosity of 0.28 ± 0.03 Pascal-seconds, measured in accordance with AASHTO T 316. The testing required in AASHTO T 316 shall be performed at 275 °F and 350 °F, and a viscosity-temperature curve developed in accordance with ASTM D 2493. The viscosity-temperature curve shall be included in the mix design report. For PG asphalt binders that have a maximum laboratory mixing temperature exceeding 325 °F or a maximum laboratory compaction temperature exceeding 300 °F, the laboratory mixing and compaction temperature ranges shall be specified in writing by the asphalt binder supplier. The laboratory mixing and compaction temperature ranges, as well as the actual laboratory mixing and compaction temperatures used, shall be reported on the mix design. The contractor shall ensure that the asphalt binder supplier information required in this paragraph is provided to all appropriate parties in a timely manner, and that copies are included in the mix design report. The laboratory mixing and compaction temperatures are for mix design purposes only. Field mixing and compaction temperatures are specified in Subsections 406-6 and 406-7.

406-4 **Mix Design:** the third through the eighth paragraphs of the Standard Specifications are revised to read:

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 be provided in a format that clearly indicates all the mix design requirements, and shall be sealed, signed, and dated by the mix design engineer.

The mix design shall be prepared by a mix design laboratory that has met the requirements of the Department's "System for the Evaluation of Testing Laboratories". The requirements may be obtained from ADOT Materials Group, 1221 North 21st Avenue, Phoenix, Arizona 85009.

The contractor may propose the use of a mix design that has been developed for a previous project. The proposed mix design shall meet the requirements of these specifications. The contractor shall provide evidence that the asphalt cement and mineral admixture type and source of supply, and the source and methods of producing mineral aggregate, have not changed since the formulation of the previous mix design. The contractor shall also provide current test results for all specified characteristics of the mineral aggregate proposed for use. The Engineer will either approve or disapprove the proposed mix design. Should the Engineer disapprove the use of the previously used mix design, the contractor shall prepare and submit a new mix design proposal in accordance with the requirements of these specifications.

A previously used mix design older than two years from the date it was formulated, sealed, signed, and dated shall not be allowed for use. Any previously used mix design that is older than one year, but less than two years, shall not be allowed for use unless the contractor provides verification testing results. Such testing shall be a one-point verification at the design asphalt content using the proposed mineral aggregate, asphalt cement, and mineral admixture. Once approved for use on a project, a mix design may be used for the duration of the project.

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, type of asphalt cement and any modifiers including polymers. The source and type of mineral admixture. The percentage of asphalt cement and mineral admixture to be used.
- (4) The anticipated mineral aggregate gradation in each stockpile.
- (5) Mix design gradation. The mix design shall contain the mineral aggregate gradation, and also the gradation with mineral admixture.
- (6) The results of all testing, determinations, etc., such as: specific gravity of each component, water absorption, sand equivalent, loss on abrasion, fractured coarse aggregate particles, uncompacted void content, percent carbonates (if required), 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.
- (7) Viscosity-temperature curve along with the laboratory mixing and compaction temperature ranges, as well as the actual laboratory mixing and compaction temperatures used.

Test results used in the formulation of the mix design shall be from testing performed no earlier than 45 days prior to the date the mix design is signed by the mix design engineer. Historical abrasion values may be supplied on sources provided the testing was conducted within the past two years.

The mix design shall be submitted to the Engineer under a cover letter signed by an authorized representative of the contractor.

A copy of the mix design and representative samples of the mineral aggregate, mineral admixture, and asphalt cement used in the mix design shall be submitted to the Engineer for calibration of the ignition furnace, and for the determination of sand equivalent, fractured coarse aggregate particles, and uncompacted void content. The Engineer shall witness the sampling of the mineral aggregate. The mix design and samples shall be submitted to the Engineer at least five working days prior to the start of asphaltic concrete production.

The sand equivalent, fractured coarse aggregate particles, and uncompacted void content shall meet the requirements specified in Subsection 406-3.01. Additional testing of the uncrushed and crushed fine aggregate for uncompacted void content will be required if the method of producing either fine aggregate is modified.

If the mineral aggregate fails to meet the requirements specified herein, asphaltic concrete production shall not commence, and the contractor shall either submit a revised mix design which is representative of the materials produced or correct the deficiencies in the aggregate stockpiles.

406-5 Contractor Quality Control: of the Standard Specifications is revised to read:

The contractor shall perform the quality control measures described in Subsection 106.04(C). At the weekly meeting, the contractor shall be prepared to explain and discuss how the following processes will be employed.

- (a) Aggregate production, including crusher methods, pit extraction, and washing.
- (b) Stockpile management, including stacking methods, separation technique, plant feed technique, stockpile pad thickness, and segregation prevention.
- (c) Proportioning and plant control, including plant scale calibration, mix temperature control, storing method, and addition of admixture.
- (d) Transporting and placing, including hauling distance and temperature control, segregation and non-uniform placement control, and joint placement and technique.
- (e) Compaction, including types and weight of rollers, establishing and monitoring of roller patterns, and temperature controls.

The contractor shall obtain samples and perform the tests specified in the following table:

| CONTRACTOR QUALITY CONTROL TESTING REQUIREMENTS | | | |
|--|--------------------|---------------------------|--|
| TYPE OF TEST | TEST METHOD | SAMPLING POINT | MINIMUM TESTING FREQUENCY |
| Mineral Aggregate for Asphaltic Concrete | | | |
| Gradation | ARIZ 201 | Crusher Belt or Stockpile | 1 per stockpile per day |
| Sand Equivalent | AASHTO T 176 | Crusher Belt or Stockpile | 1 per 2000 Tons of total aggregate (1) |
| Fractured Coarse Aggregate Particles | ARIZ 212 | | |
| Uncompacted Void Content | ARIZ 247 | | |

| CONTRACTOR QUALITY CONTROL TESTING REQUIREMENTS (CON'T.) | | | |
|---|--|--|---|
| TYPE OF TEST | TEST METHOD | SAMPLING POINT | MINIMUM TESTING FREQUENCY |
| Asphaltic Concrete | | | |
| Gradation | ARIZ 201 or 427 | Cold Feed, Hot Bins, Roadway, or Plant | 1 per 1000 Tons |
| Asphalt Content | ARIZ 421, 427, or other approved methods | Roadway or Plant | 1 per 1000 Tons |
| Voids | ARIZ 415, 417, 424 | Roadway or Plant | 1 per 1000 Tons each day. Maximum of 4 per day. |
| Compaction | ARIZ 412 | Roadway | 1 per 300 Tons |
| <p>Note:</p> <p>(1) Prior to the completion of the mix design, quality control tests on mineral aggregate shall be performed based on the anticipated percent use of each stockpile. Samples taken from individual stockpiles may be composited prior to performing the required tests, or testing may be performed on material from each stockpile and the composite test result for each required test determined mathematically.</p> | | | |

406-6 Construction Requirements: the third through the twelfth paragraphs of the Standard Specifications are revised to read:

The asphaltic concrete hot plant shall conform to the requirements of Section 403 of the Specifications.

The temperature of asphaltic concrete or mineral aggregate upon discharge from the drier shall not exceed 325 °F unless a higher temperature is recommended in writing by the asphalt binder supplier and approved by the Engineer.

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 impractical.

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

406-6 Construction Requirements: the seventeenth paragraph of the Standard Specifications is revised to read:

All wheels and tires of compactors and other equipment surfaces shall be treated when necessary with a product approved by the Engineer in order to prevent the sticking of asphaltic concrete.

406-6 Construction Requirements: the last sentence of the last paragraph of the Standard Specifications is hereby deleted.

406-7.02 Sand Equivalent, Fractured Coarse Aggregate Particles, and Uncompacted Void Content of Mineral Aggregate: of the Standard Specifications is revised to read:

During asphaltic concrete production, the Engineer shall obtain and test samples of mineral aggregate for the determination of the sand equivalent, fractured coarse aggregate particles, and uncompacted void content. Samples shall be obtained from the cold feed belt prior to the addition of mineral admixture, or from the stockpiles when sampling from the cold feed belt is not possible.

Mineral aggregate will be acceptable for sand equivalent if it meets the minimum requirements specified in Subsection 406-3.01 and the running average of three sand equivalent tests is at least 90 percent and no single test is less than 80 percent of the sand equivalent result contained in the contractor's mix design.

The fractured coarse aggregate particles shall meet the minimum requirements specified in Subsection 406-3.01.

The uncompacted void content shall meet the minimum requirements specified in Subsection 406-3.01. Additional testing of the uncrushed and crushed fine aggregate for uncompacted void content will be required if the method of producing either fine aggregate is modified.

If the mineral aggregate fails to meet these requirements, operations shall cease and the contractor shall have the option of submitting a revised mix design conforming to the requirements of Subsection 406-4 or correcting deficiencies in the aggregate stockpiles.

406-7.04 Gradation, Asphalt Cement Content, Effective Voids, and Stability: the second and third paragraphs of the Standard Specifications are revised to read:

Four samples of the asphaltic concrete 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 immediately after being taken. The minimum weight of the sample shall be 75 pounds. The Engineer will split the sample and save one-half for 15 days after written notification to the contractor of test results for that lot has been made. The material will be tested by the Engineer for asphalt cement content, gradation, Marshall density and stability, and maximum theoretical density. Asphalt cement content and gradation shall be tested in accordance with Arizona Test Method 427 using an ignition furnace. A new calibration of the ignition furnace shall be performed for each mix design, and at any other time the Engineer directs. Marshall density and stability, and maximum theoretical density shall be tested in accordance with the requirements of Arizona Test Methods 410 and 417 respectively. Effective voids will be determined in accordance with the requirements of Arizona Test Method 424.

For plants providing asphaltic concrete exclusively for this project, the difference between the asphalt cement content as measured by ignition furnace testing and the actual asphalt cement content shall be determined for the first five lots of asphaltic concrete produced for each mix design. If approved by the Engineer, a plant may be considered exclusive to the project if an asphalt cement tank is dedicated for the shift of asphaltic concrete production. The determination of the actual asphalt cement content may include weighing of asphalt cement deliveries, invoice quantities, volumetric tank measurements using a calibrated rod (tank stickings) corrected for temperature, computerized mass-flow meter, and accounting for wasted materials. If a computerized mass-flow meter is used, documentation of its calibration shall be submitted to the Engineer prior to asphaltic concrete production. At any time during asphaltic concrete production, the Engineer may require that a new calibration of the mass-flow meter be performed. If there is a difference of greater than 0.1 percent asphalt cement content between the asphalt cement content measured by ignition furnace testing and the actual asphalt cement content, the contractor may request that a correction to the asphalt cement content by ignition furnace testing be made. The contractor must make such a request in writing within two working days after receiving the test results for the fifth lot of asphaltic concrete production. If referee testing is performed on a lot of asphaltic concrete for which a correction, based on the actual asphalt cement content, was made to the asphalt cement content by ignition furnace testing, referee testing shall not apply to the determination of asphalt cement content. The correction, once documented and approved by the Engineer, shall be applied to test results from the beginning of asphaltic concrete production through the remainder of asphaltic concrete production using that mix design. If the contractor submits a new mix design, a new correction must be established and applied as specified above. For other plants, no correction will be made to asphalt cement content values measured by ignition furnace testing.

406-7.04 Gradation, Asphalt Cement Content, Effective Voids, and Stability:
the fifth paragraph of the Standard Specifications is revised to read:

In the event the contractor elects to question the test results obtained for a particular lot, within 15 days after written notification to the contractor of test results for that lot has been made, the contractor may make a written request for referee testing of that lot. The referee testing shall be performed in an independent approved laboratory designated by the Engineer. The testing of the samples will be performed by the independent testing laboratory without knowledge of the specific project conditions such as the identity of the contractor or mix design laboratory, the tests results by the Department, or the mix design targets for gradation and effective voids. The asphaltic concrete samples previously saved will be tested for Marshall density and stability, and maximum theoretical density in accordance with the requirements of Arizona Test Methods 410 and 417 respectively. Effective voids will be determined in accordance with the requirements of Arizona Test Method 424. The samples shall also be tested in accordance with Arizona Test Method 427 for asphalt cement content by ignition furnace and gradation of the mineral aggregate. New PT's, will be determined for all characteristics, with the exception of asphalt cement content if a correction to the ignition furnace test value was made as specified above. When referee testing is performed on a mixture-properties lot, the referee test result for the average maximum theoretical density will be used to determine a new PT for compaction. The results of these determinations will be binding on both the contractor and the Department. The Department will pay for this testing; however, if the total pay factor of the lot does not

improve or is reduced, or the lot remains in reject, payment to the contractor for asphaltic concrete shall be reduced by the amount of the cost of this testing.

406-7.04 Gradation, Asphalt Cement Content, Effective Voids, and Stability: the seventh paragraph of the Standard Specifications is revised to read:

The target values for gradation, asphalt cement content, and effective voids are given in the contractor's mix design. The Upper Limits (UL) and Lower Limits (LL) of acceptable production of each of the measured characteristics are as follows:

406-7.04 Gradation, Asphalt Cement Content, Effective Voids, and Stability: in the table of the seventh paragraph of the Standard Specifications, "Effective Voids" is revised to read:

| Measured Characteristics | LL | UL |
|--------------------------|----------|----------|
| Effective Voids | TV - 2.0 | TV + 1.5 |

406-7.04 Gradation, Asphalt Cement Content, Effective Voids, and Stability: the last paragraph of the Standard Specifications is revised to read:

The Engineer will determine the PT of each measured characteristic in accordance with Subsection 406-9(l) and, utilizing Table 406-1, will determine pay factors for each measured characteristic.

406-7.05(A)(1) General Requirements: the first paragraph of the Standard Specifications is revised to read:

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 and the ambient temperature at the beginning of placement is at least 65 degrees F and rising. The placement shall be stopped when the ambient temperature is 70 degrees F or less and falling.

Asphaltic concrete immediately behind the laydown machine shall be a minimum of 250 degrees F.

406-7.05(B) Courses Greater than 1-1/2 Inches in Nominal Thickness: the fourth, fifth, and sixth paragraphs of the Standard Specifications are revised to read:

Twenty cores shall be taken for each lot by the contractor, under the observation of the Engineer. The Engineer will designate 10 random locations within the lot and the contractor shall take two cores at each location; however, if more than one shift constitutes a lot, two cores shall be taken from a minimum of two random locations each shift, or as directed by the Engineer. The Engineer will save one core from each location for 15 days after written notification to the contractor of test results for that lot has been made. Randomly selected locations will be determined to the nearest one-half foot in the transverse direction and to

the nearest one foot in the longitudinal direction of the pavement course; however, the outside one foot of the 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. Areas excluded from testing will be compacted in accordance with Subsection 406-705(A). Cores 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 not later than two working days after the lot or subplot placement. The cores shall be delivered to the Engineer immediately upon being taken. The cores 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 four working days of receipt of cores by the Engineer. In areas where more than one lift is placed in the same lot, coring shall be accomplished through the full depth of the lifts after the final lift is placed, and the compaction density shall be based on the full depth of the lifts.

The target value for compaction shall be 7.0 percent in-place air voids. In-place air voids shall be determined using Arizona Test Method 424. The maximum theoretical density used in determination of air voids will be the average of the four maximum theoretical densities determined in Subsection 406-7.04.

The Upper Limit (UL) is 9.0 percent in-place air voids and the Lower Limit (LL) is 4.0 percent in-place air voids. The Engineer will determine the PT for compaction in accordance with Subsection 406-9(I), and utilizing Table 406-1 will determine the compaction pay factor.

In the event the contractor elects to question the core test results obtained for a particular lot, within 15 days after written notification to the contractor of test results for that lot has been made, the contractor may make a written request for referee testing of that lot. The cores previously saved will be tested in accordance with the requirements of Arizona Test Method 415 in an independent testing laboratory designated by the Engineer. The testing of the cores will be performed by the independent testing laboratory without knowledge of the specific project conditions, such as the identity of the contractor or mix design laboratory, the test results by the Department, or the density target. Using the referee test results, the Engineer will determine a new PT for compaction. The result of this determination will be binding on both the contractor and the Department. The Department will pay for this testing; however, if the compaction pay factor of the lot does not improve, is reduced, or the lot remains in reject, payment to the contractor for asphaltic concrete shall be reduced by the amount of the cost of this testing.

406-7.06 Smoothness: the title and text of the Standard Specifications are revised to read:

406-7.06 Smoothness and Surface Tolerances:

Asphaltic concrete shall be compacted as required, smooth and true to the required lines, grades, and dimensions.

The Special Provisions may require the smoothness of the final pavement surface to be tested in accordance with Subsection 109.13.

Regardless of whether testing in accordance with Subsection 109.13 is specified or not, the following requirements shall be met:

- (1) The surface of the final lift of asphaltic concrete placed under this section of the specifications shall be tested and shall not vary by more than 1/8 inch from the lower edge of a ten-foot straightedge when it is placed in the longitudinal direction (including across transverse joints), and when it is placed in the transverse direction across longitudinal joints.
- (2) The surface of any lift of asphaltic concrete placed under this section of the specifications, other than the final lift, shall be tested and shall not vary by more than 1/4 inch from the lower edge of a ten-foot straightedge when it is placed in the longitudinal direction (including across transverse joints), and when it is placed in the transverse direction across longitudinal joints.
- (3) All deviations exceeding the specified tolerances above shall be corrected by the contractor, to the satisfaction of the Engineer.

406-8 Method of Measurement: the first and second paragraphs of the Standard Specifications are revised to read:

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 quantity 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 406-7.04 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, unless a correction, based on the actual asphalt cement content, was made to the ignition furnace test value as allowed in Subsection 406-7.04. If a correction, based on the actual asphalt cement content, was made to the ignition furnace test value, the average asphalt cement content determined from the Department's acceptance testing will be used. At the discretion of the Engineer, asphalt cement may be measured by invoice quantities, adjusted as necessary for waste. In no case shall the measured amount of asphalt cement for payment be greater than the total of the invoice quantities, adjusted for waste.

406-9 Basis of Payment: the third paragraph of the Standard Specifications is revised to read:

The Engineer may exclude certain locations from the mixture properties lot quantity and/or the compaction lot quantity and from the random sampling used in determining the mixture properties lot pay factor and/or the compaction lot pay factor should the Engineer determine that the location of the work precludes normal construction operations.

406-9(E) Acceptability: the second paragraph of the Standard Specifications is revised to read:

Within 15 days after receiving notice that a mixture properties lot or a compaction 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 applicable maximum negative pay factor(s). Maximum negative pay factors are defined as a minus \$5.00 per ton each for mixture properties lots and compaction lots. Positive mixture properties lot pay factors become zero when the compaction lot is in reject and the material is allowed to be left in place. Positive compaction lot pay factors become zero when the mixture properties lot is in reject and the material is allowed to remain in place. In addition, for any mixture properties lot that is in reject due to asphalt cement content but allowed to remain in place, payment shall not be made for asphalt cement quantities in excess of the upper limit (UL).

406-9(E) Acceptability: the last sentence of the third paragraph of the Standard Specifications is revised to read:

If a rejected lot is submitted for referee testing by the contractor, the 15 days allowed to prepare an engineering analysis will begin upon notification of referee test results.

406-9(E) Acceptability: the second sentence of the fourth paragraph of the Standard Specifications is revised to read:

If the proposal is not accepted, the asphaltic concrete shall be removed at no additional cost to the Department and replaced with asphaltic concrete meeting the requirements of these specifications.

406-9(E) Acceptability: items (1), (2), and (3) of the fifth paragraph of the Standard Specifications are revised to read:

- (1) The occurrence of two or more rejected lots within any ten consecutive production lots.
- (2) The occurrence of three consecutive negative mixture properties lot pay factors or three consecutive negative compaction lot pay factors.
- (3) The occurrence of five or more pay factors that are negative either for a mixture properties lot or for a compaction lot within any ten consecutive production lots.

406-9(G) Mineral Admixture: of the Standard Specifications is revised to read:

Mineral admixture will be paid for at the predetermined price established in the Bidding Schedule.

406-9 Basis of Payment: of the Standard Specifications is modified to add:

(H) Smoothness:

When required in the Special Provisions, payment for smoothness shall be made in accordance with the requirements of Subsection 109.13.

406-9 Basis of Payment: of the Standard Specifications is modified to add:

(I) Statistical Acceptance:

The "Total Percentage of Lot Within UL and LL (PT)" shall be determined in accordance with Subsection 109.11 of the Specifications.

Pay Factors (PF) shall be determined by entering Table 406-1 with PT.

DEFINITIONS, ABBREVIATIONS AND FORMULAS FOR ACCEPTANCE: of the Standard Specifications is hereby deleted.

TABLE 406-1a and TABLE 406-1b: of the Standard Specifications are hereby deleted.

TABLE 406-2: of the Standard Specifications is re-numbered as Table 406-1, and is revised to read:

| TABLE 406-1 | | | |
|--|--------------------------------------|------------------------|-------------------|
| MIXTURE PROPERTIES AND COMPACTION PAY FACTORS | | | |
| PT | Pay Factors (Dollars per Ton) | | |
| | Gradation and Asphalt Content | Effective Voids | Compaction |
| 100 | 0.00 | +1.00 | +1.00 |
| 95-99 | 0.00 | +0.50 | +0.50 |
| 90-94 | 0.00 | 0.00 | 0.00 |
| 85-89 | 0.00 | -0.25 | -0.25 |
| 80-84 | -0.25 | -0.50 | -0.50 |
| 75-79 | -0.50 | -0.75 | -0.75 |
| 70-74 | -0.75 | -1.00 | -1.00 |
| 65-69 | -1.00 | -1.25 | -1.30 |
| 60-64 | -1.50 | -1.50 | -1.75 |
| 55-59 | -2.00 | -2.00 | -2.25 |
| 50-54 | -2.50 | -2.50 | -3.00 |
| Less Than 50 | Reject – See Subsection 406-9(E) | | |

SECTION 414 ASPHALTIC CONCRETE FRICTION COURSE (ASPHALT-RUBBER):
of the Standard Specifications is revised to read:

414-1 Description:

Asphaltic Concrete Friction Course (Asphalt-Rubber), hereinafter asphaltic concrete, shall consist of furnishing all materials, mixing at a plant, hauling, and placing a mixture of aggregate materials, mineral admixture, and bituminous material (asphalt-rubber) 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, and as directed by the Engineer.

The contractor shall be responsible for all adjustments to its equipment necessary to properly accommodate the use of asphalt-rubber as a bituminous material.

414-2 Asphaltic Concrete Mix Design Criteria:

Mix designs will be performed in accordance with Arizona Test Method 814, modified as necessary for Asphaltic Concrete Friction Course (Asphalt-Rubber). The allowable range of percent absorbed asphalt-rubber shall be 0-1.0, when tested in accordance with Arizona Test Method 806.

414-3 Materials:

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

| | |
|---------------------------|-----|
| Spread Rate (lb./sq. yd.) | 59 |
| Asphalt-Rubber, % | 9.0 |
| Mineral Admixture, % | 1.0 |

The spread rate specified includes 25 percent for leveling to provide a minimum 1/2-inch thickness above the leveling thickness. The exact spread rate will be determined by the Engineer.

414-3.01 Mineral Aggregate:

There is no Department-furnished source of mineral aggregate. The contractor shall provide a source in accordance with the requirements of Section 1001 of the specifications.

When the contractor selects a source or sources, it shall notify the Engineer. The contractor shall be solely responsible for assuring that the mineral aggregate meets all requirements and, when processed, is fully capable of providing asphaltic concrete which meets all the requirements of these specifications.

Mineral aggregate shall be separated into at least two stockpiles. No individual stockpile or hot bin usage shall be less than three percent of the total mineral aggregate.

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

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

Mineral aggregate furnished for mix designs shall be representative of the source(s) and sampled from the material stockpiles to be utilized in asphaltic concrete production. Mix designs shall conform to the grading limits in Table 414-1, when tested in accordance with Arizona Test Method 201.

| TABLE 414-1 MIX DESIGN GRADING LIMITS | | |
|--|--------------------------|-----------------------|
| Sieve Size | Percent Passing | |
| | Without Admixture | With Admixture |
| 3/8 Inch | 100 | 100 |
| No. 4 | 30 - 45 | 31 - 46 |
| No. 8 | 4 - 8 | 5 - 9 |
| No. 200 | 0 - 2.0 | 0 - 3.0 |

Mineral aggregate shall conform to the requirements in Table 414-2 when tested in accordance with the applicable test methods.

Tests on aggregates outlined in Table 414-2, other than abrasion, shall be performed on materials furnished for mix design purposes and composited to the mix design gradation. Abrasion shall be performed separately on samples from each source of mineral aggregate. All sources shall meet the requirements for abrasion.

| TABLE 414-2 MINERAL AGGREGATE CHARACTERISTICS | | |
|--|--|--------------------|
| Characteristic | Test Method | Requirement |
| Combined Bulk Oven Dry Specific Gravity | Arizona Test Method 251 | 2.350 – 2.850 |
| Combined Water Absorption | Arizona Test Method 251 | 0 – 2.5% |
| Sand Equivalent | Arizona Test Method 242 (After thoroughly sieving the sample, no additional cleaning of the fines from the plus No. 8 material is required.) | Minimum 55 |

| TABLE 414-2 (CON'T.) MINERAL AGGREGATE CHARACTERISTICS | | |
|---|-------------------------|--|
| Characteristic | Test Method | Requirement |
| Fractured Coarse Aggregate Particles | Arizona Test Method 212 | Minimum 85% (at least two fractured faces) and minimum 92% (at least one fractured face) |
| Flakiness Index | Arizona Test Method 233 | Maximum 25% |
| Carbonates | Arizona Test Method 238 | Maximum 20% |
| Abrasion | AASHTO T 96 | 100 Rev., Max. 9% 500 Rev., Max. 40% |

414-3.02 Mineral Admixture:

Mineral admixture will be required. The amount shall be 1.0 percent, by weight of the mineral aggregate. Mineral admixture shall be either Portland cement, blended hydraulic cement, or hydrated lime conforming to the requirements of Table 414-3.

| TABLE 414-3 MINERAL ADMIXTURE | |
|--|--------------------|
| Material | Requirement |
| Portland Cement, Type I or II | ASTM C 150 |
| Blended Hydraulic Cement, Type IP | ASTM C 595 |
| Hydrated Lime | ASTM C 1097 |

A Certificate of Analysis conforming to the requirements of Subsection 106.05 shall be submitted to the Engineer.

414-3.03 Bituminous Material:

Bituminous material shall be asphalt-rubber conforming to the requirements of Section 1009 of the specifications. The asphalt-rubber shall be Type 1. The crumb rubber gradation shall be Type B conforming to the requirements of Section 1009.

The percent of asphalt-rubber used shall be based on the weight of total mix (asphalt-rubber, mineral aggregate, and mineral admixture).

The percent of asphalt-rubber to be used will be specified by the Engineer.

In no case shall the asphalt-rubber be diluted with extender oil, kerosene, or other solvents. Any asphalt-rubber so contaminated will be rejected.

Any kerosene or other solvents used in the cleaning of equipment shall be purged from the system prior to any subsequent use of that equipment.

414-4 Mix Design:

Approximately 300 pounds of produced mineral aggregate, in proportion to the anticipated percent usage, shall be obtained by the contractor and witnessed by the Engineer so that both parties are satisfied that samples are representative of the mineral aggregate to be utilized in the asphaltic concrete production.

In addition to the mineral aggregate samples, the contractor shall also furnish the Engineer with representative samples of the following materials: a five-pound sample of the crumb rubber proposed for use, one gallon of asphalt cement from the intended supplier, three gallons of the proposed mixture of asphalt and rubber, and a one-gallon can of the proposed mineral admixture. These materials must be representative of the material which will subsequently be used in the production of asphaltic concrete.

If the mineral aggregate does not meet the requirements of Subsection 414-3.01, no mix design will be prepared. The contractor shall take the necessary steps to provide material meeting the specified requirements.

Along with the samples furnished for mix design testing, the contractor shall submit a letter explaining in detail its methods of producing mineral aggregate including wasting, washing, blending, proportioning, etc., and any special or limiting conditions it may propose. The contractor's letter shall also state the source(s) of mineral aggregate, the source and type of asphalt cement, the source and type of crumb rubber, and the source and type of mineral admixture.

Within 10 working days of receipt of all samples and the contractor's letter in the Central Laboratory, the Department will provide the contractor with a mix design containing the type and percentage of asphalt-rubber; the type and source of asphalt cement; the type and source of crumb rubber; the type, source, and percentage of mineral admixture; the source(s) of mineral aggregate and the percentage from each stockpile; the composite mineral aggregate gradation; the combined mineral aggregate and mineral admixture gradation; and any special or limiting conditions.

The contract time established for the completion of the work includes 10 working days for the required testing and the developing of the approved mix design.

Asphaltic concrete friction course production shall not begin until there is an approved mix design.

414-5 Mix Design Revisions:

At any time after production of asphaltic concrete has been started using the approved mix design, changes may be proposed by the contractor or directed by the Engineer.

The contractor shall not change its methods of crushing, screening, washing, or stockpiling from those used during production of material used for mix design purposes without approval of the Engineer, or without requesting a new mix design.

If changes are made in the source or type of bituminous material or the source(s) of mineral aggregate, or changes are made in the proportions of mineral aggregate equal to or greater than five percentage points, additional testing to the extent deemed necessary by the Engineer will be performed in order that the Engineer may be satisfied that the mix design criteria will be met.

During production of asphaltic concrete, the contractor, on the basis of field test results, may request a change to the approved mix design. The Engineer will evaluate the proposed changes and notify the contractor of the Engineer's decision within two working days of the receipt of the request.

If, at any time, unapproved changes are made by the contractor in the source or type of bituminous material, source(s) of mineral aggregate, production methods, or proportional changes in violation of approved mix design stipulations, production shall cease until a new mix design is developed at no additional cost to the Department, or the contractor complies with the approved mix design.

At any time after the mix design has been approved, the contractor may request a new mix design. The costs associated with the testing of materials in the developing of mix designs requested by the contractor after a mix design acceptable to the Department has been developed shall be borne by the contractor.

If the Engineer determines that a new mix design is necessary due to changes in mineral aggregate characteristics or gradation, costs associated with the development of the new mix design shall be borne by the contractor.

A new mix design can be developed by the Engineer at any time the Engineer deems necessary. Should such a new mix design require revisions to the contractor's operations which result in additional cost to the contractor, it will be reimbursed for these costs. However, the Engineer reserves the right to modify the asphalt-rubber content without compensation being made to the contractor involving additional operation costs.

414-6 Acceptance of Materials:

414-6.01 General:

The contractor's attention is directed to the requirements of Subsection 105.13, Removal of Unacceptable and Unauthorized Work.

If the production of asphaltic concrete is stopped either for failure to meet the requirements specified in Subsection 414-6.03 or because changes are made in the mix design, samples will be taken for calculating new consecutive averages either after production resumes or after the changes in the mix design have been made. The acceptance of the mineral aggregate gradation and the bituminous material content will be determined on the basis of the tests specified in Subsection 414-6.03. The Engineer reserves the right to increase the frequency of sampling and testing upon the resumption of asphaltic concrete production.

414-6.02 Mineral Aggregate:

Aggregate shall be free of deleterious materials, clay balls, and adhering films or other material that prevent thorough coating of the aggregate with the bituminous material.

Prior to and during asphaltic concrete production, the Engineer shall obtain and test samples of mineral aggregate for the determination of the sand equivalent, fractured coarse aggregate particles, and flakiness index. Samples shall be obtained from the cold feed belt prior to the addition of mineral admixture, or from the stockpiles when sampling from the cold feed belt is not possible. Should such testing indicate results not meeting the requirements of Table 414-2 for sand equivalent, fractured coarse aggregate particles, and flakiness index, operations shall cease and the contractor shall have the option of requesting a new mix design or correcting deficiencies in the aggregate stockpiles.

414-6.03 Asphaltic Concrete:

(A) Mineral Aggregate Gradation:

Prior to the initial startup of asphaltic concrete production, and prior to startup after any subsequent mix design revisions affecting gradation, a sample of the combined mineral aggregate shall be tested. The mineral aggregate shall meet the gradation requirements for the 3-consecutive test limits indicated below. If the mineral aggregate does not meet these requirements, production shall not begin until the mineral aggregate is in compliance with this requirement.

For each approximate 500 tons of asphaltic concrete produced, at least one sample of mineral aggregate will be taken. Samples will be taken in accordance with the requirements of Arizona Test Method 105 on a random basis. For batch plants, the sample shall be taken from the hot bins. For plants other than batch plants, the sample shall be taken from the cold feed belt. Samples will be taken by means of a sampling device which is capable of obtaining representative samples. The device, which shall be approved by the Engineer, shall be furnished by the contractor. In any shift that the production of asphaltic concrete is less than 500 tons, at least one sample will be taken.

Samples will be tested for conformance to the mix design gradation, with or without mineral admixture as appropriate, in accordance with the requirements of Arizona Test Method 201.

The gradation will be considered to be acceptable unless the average of any three consecutive tests or the result of any single test varies from the mix design gradation percentages as follows:

| Passing Sieve | Number of Tests | |
|---------------|-----------------|-------|
| | 3 Consecutive | One |
| No. 4 | ± 4 | ± 6 |
| No. 8 | ± 3 | ± 4 |
| No. 200 | ± 1.0 | ± 1.5 |

One hundred percent of the material shall pass the 3/8-inch sieve.

At any time that test results indicate that the gradation does not fall within all of the limits indicated, the production of asphaltic concrete shall cease immediately and shall not begin again until a calibration test indicates that the gradation is within the 3-consecutive test limits indicated.

(B) Asphalt-Rubber Content:

During production of asphaltic concrete, the contractor shall maintain at the plant site a nuclear asphalt content gauge calibrated and operated in accordance with Arizona Test Method 421. At the discretion of the Engineer, the Department may choose to prepare the calibration samples for use by the contractor. Under the observation of the Engineer, the contractor shall determine the asphalt-rubber content by means of the nuclear asphalt content gauge a minimum of four times per full shift. The Engineer shall determine the times that the samples are taken. The contractor's technicians performing the testing, including the calibration of the nuclear gauge, shall meet the technician requirements given in the Department's System for the Evaluation of Testing Laboratories. The requirements may be obtained from ADOT Materials Group, 1221 North 21st Avenue, Phoenix, AZ 85009.

Production of asphaltic concrete shall cease immediately and the plant and/or the nuclear asphalt content gauge re-calibrated if any single test result varies by an amount greater than ± 0.60 , or the average of three consecutive test results varies by an amount greater than ± 0.40 , from the amount directed by the Engineer. Material that has already been produced may be used on the project if the single test value representative of that material varies by an amount from ± 0.61 to ± 0.75 , inclusive, from the amount directed by the Engineer. Material that has already been produced may not be used on the project if the single test value representative of that material varies by an amount greater than ± 0.75 from the amount directed by the Engineer unless, by retesting, the material is found to be acceptable.

414-7 Construction Requirements:

414-7.01 Quality Control:

Quality control of mineral aggregate production and asphaltic concrete production shall be the responsibility of the contractor. The contractor shall perform sufficient testing to assure that mineral aggregate and asphaltic concrete are produced which meet all specified requirements. The Engineer reserves the right to obtain samples of any portion of any material at any point of the operations for the Engineer's own use.

414-7.02 Stockpiling:

The contractor will not be allowed to feed the hot plant from stockpiles containing less than two full days of production unless only two days production remain to be done or special conditions exist where the Engineer deems this requirement waived.

Mineral aggregate shall be separated and stockpiled so that segregation is minimized. An approved divider of sufficient size to prevent intermingling of stockpiles shall be provided.

414-7.03 Proportioning, Drying, Heating, and Mixing:

The asphaltic concrete hot plant shall conform to the requirements of Section 403 of the Specifications.

Unless approved by the Engineer, no individual mineral aggregate stockpile or hot bin usage shall be less than three percent of the total mineral aggregate.

Changes in stockpile or hot bin use in excess of five percent from the approved mix design will not be permitted without the approval of the Engineer.

No fine material which has been collected in the dust collection system shall be returned to the mixture unless the collected fines are uniformly metered into the mixture.

The moisture content of the asphaltic concrete shall not exceed 0.5 percent. The moisture content will be determined in accordance with Arizona Test Method 406.

The temperature of asphaltic concrete or mineral aggregate upon discharge from the dryer shall not exceed 350 degrees F.

414-7.04 Placing and Finishing:

(A) General Requirements:

The handling of asphaltic concrete shall at all times be such as to minimize segregation. Any asphaltic concrete which displays segregation shall be removed and replaced.

All equipment surfaces shall be treated when necessary with a product approved by the Engineer in order to prevent the sticking of asphaltic concrete.

Before asphaltic concrete is placed, the surface to be paved shall be cleaned of all objectionable material and tacked in accordance with the requirements of Section 404. The cleaning of the surface, the tacking of the surface, and the type of bituminous material used shall be acceptable to the Engineer. The amount of bituminous material used shall be as directed by the Engineer.

Unless otherwise specified on the project plans, asphaltic concrete shall not be placed on the two-foot widened section where guardrail is to be installed.

(1) Placement Dates and Weather Requirements:

Asphaltic concrete shall be placed between the dates shown below for the average elevation of the project, and only when the temperature of the surface on which the asphaltic concrete is to be placed is at least 85 degrees F and the ambient temperature at the beginning of placement is at least 70 degrees F and rising. The placement shall be stopped when the ambient temperature is 75 degrees F or less and falling.

| Average Elevation of Project, Feet | Beginning and Ending Dates |
|------------------------------------|----------------------------|
| 0 – 3499 | March 15 – May 31 |
| 0 – 3499 | September 1 – October 31 |
| 3500 – 4999 | April 15 – October 15 |
| 5000 and over | June 1 – September 15 |

At any time, the Engineer may require that the work 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.

Prior to opening to any traffic, the Engineer may require up to three applications of lime water (a minimum of 50 pounds of lime per 2,000 gallons of water). Lime water shall be applied in a manner that uniformly covers the entire surface of the paving pass. No separate payment will be made for lime water or its application, the cost being considered as included in this contract item.

(2) Delivery to Screed Unit:

Asphaltic concrete delivered to the screed unit shall be a free flowing, homogeneous mass in which there is no segregation, crusts, lumps, or migration of the asphalt-rubber.

Should any one or more of such conditions be evident in the material delivered to the screed unit, and which cannot be eliminated by one or more of the following methods, the Engineer will order the work to be stopped until conditions are conducive to the delivery of the material in the condition as hereinbefore required:

- (a) Covering hauling units with tarpaulins.
- (b) Dumping material directly into the paver.
- (c) Moving the hot plant nearer to the point of delivery.

Other measures proposed by the contractor which will deliver asphaltic concrete meeting the above requirements will be considered by the Engineer.

(B) Loading Asphaltic Concrete into the Paving Machine:

If the asphaltic concrete is dumped directly into the paving machine from the hauling trucks, care shall be taken to avoid jarring the machine or moving it out of alignment. No vertical load shall be exerted on the paving machine by the trucks. Trucks, while dumping, shall be securely attached to the paving machine.

If the asphaltic concrete is dumped upon the surface being paved and subsequently loaded into the paving machine, it shall not be dumped at a distance greater than 150 feet in front of the paving machine. The loading equipment shall be self-supporting and shall not exert any vertical load on the paving machine. Substantially all of the asphaltic concrete shall be picked up and loaded into the paving machine.

(C) Placing and Finishing Asphaltic Concrete by Means of Self-Propelled Paving Machines:

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 impractical.

In order to achieve, as far as practical, a continuous operation, the speed of the paving machine shall be coordinated with the production of the plant.

Self-propelled paving machines shall spread the mixture without segregation or tearing within the specified tolerances, true to the line, grade, and crown indicated on the project plans. Pavers shall be equipped with hoppers and augers which will distribute the mixture uniformly in front of adjustable screeds.

Screeds shall include any strike-off device operated by tamping or vibrating action which is effective without tearing, shoving or gouging the mixture and which produces a course with a uniform texture and density for the full width being paved. Screeds shall be adjustable as to height and crown and shall be equipped with a controlled heating device for use when required.

Tapered sections not exceeding eight feet in width, or widened sections not exceeding four feet in width may be placed and finished by other means approved by the Engineer.

(D) Automatically Actuated Control System:

Except under certain conditions or at certain locations where the Engineer deems the use of automatic controls impractical, asphaltic concrete shall be placed and finished by means of self-propelled paving machines equipped with an automatically actuated control system.

The control system shall control the elevation of the screed at each end by controlling the elevation of one end directly and the other end indirectly, either through controlling the transverse slope or, alternately when directed, by controlling the elevation of each end independently.

The control system shall be capable of working with the following devices which shall be furnished with the machine:

Ski-type device at least 30 feet in length, supported throughout its entire length.

Short ski.

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

414-7.05 Joints:

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

The contractor shall schedule its paving operations to minimize exposed longitudinal edges. Unless otherwise approved by the Engineer, the contractor shall limit the placement of asphaltic concrete courses, in advance of adjacent courses, to one shift of asphaltic concrete production. The contractor shall schedule its paving operations in such a manner to eliminate exposed longitudinal edges over weekends or holidays.

Longitudinal joints shall be located within one foot of the centerline between two adjacent lanes.

414-7.06 Compaction:

(A) General Requirements:

The temperature of asphaltic concrete just prior to compaction shall be at least 275 degrees F.

The wheels of compactors shall be wetted with water, or if necessary soapy water, or a product approved by the Engineer to prevent the asphaltic concrete from sticking to the steel wheels during rolling. The Engineer may change the rolling procedure if in the Engineer's judgment the change is necessary to prevent picking up of the asphaltic concrete.

(B) Equipment:

Compacting and smoothing shall be accomplished by the use of static steel wheel compactors. Vibrator compactors may be used in the static mode only. The compactors shall be self-propelled and shall be operated with the drive wheel in the forward position. A minimum of three compactors shall be provided; however, sufficient compactors shall be provided so that the drums of the compactors when staggered will cover the entire width of the paving machine during initial breakdown.

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.

The compactors shall weigh not less than eight tons.

(C) Rolling Procedure:

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.

Compaction shall consist of the following rolling sequence:

| Rolling Sequence | Number of Coverages |
|------------------|---------------------|
| Initial | 1 |
| Finish | 1 - 2 |

A sufficient number of compactors shall be used for initial breakdown so that when the compactors are staggered the entire width of the mat being laid is compacted with one forward pass of the compactors. The distance between the paving machine and the initial rolling shall not exceed 300 feet.

A separate roller(s) shall be used for final compaction. The roller(s) used for final compaction shall follow as closely behind the initial breakdown rollers as possible.

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 in accordance with the manufacturer's recommendations, and with the number of coverages of the compactors as specified.

414 -7.07 Compacting Miscellaneous Items and Surfaces:

Asphaltic concrete used in the construction of miscellaneous items and surfaces shall be compacted using compactors, hot-hand tampers, smoothing irons, mechanical vibrating hand tampers, or with other devices to the extent considered necessary by the Engineer.

414-7.08 Smoothness and Surface Tolerances:

Asphaltic concrete shall be compacted as required, smooth and true to the required lines, grades, and dimensions.

The Special Provisions may require the smoothness of the final pavement surface to be tested in accordance with Subsection 109.13.

Regardless of whether testing in accordance with Subsection 109.13 is specified or not, the following requirements shall be met:

- (1) The finished asphaltic concrete surface shall be tested and shall not vary by more than 1/8 inch from the lower edge of a ten-foot straightedge when it is placed in the longitudinal direction (including across transverse joints), and when it is placed in the transverse direction across longitudinal joints.
- (2) All deviations exceeding the specified tolerances above shall be corrected by the contractor, to the satisfaction of the Engineer.

414-7.09 Acceptance:

Asphaltic concrete will be accepted complete in place, if, in the judgment of the Engineer, the asphaltic concrete reasonably conforms to the requirements specified herein. Asphaltic concrete that is not acceptable and is rejected shall be replaced to the satisfaction of the Engineer and at no additional cost to the Department.

414-8 Method of Measurement:

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

Asphalt-rubber will be measured by the ton.

The weight of the asphalt-rubber material shall either be determined by weighing directly enroute from the reaction vessel to the point of delivery or be determined from the weight of the asphalt cement and the weight of the rubber minus wastage.

Mineral admixture will be measured by the ton.

414-9 Basis of Payment:

The accepted quantities of asphaltic concrete, measured as provided above, will be paid for at the contract unit price per ton, which price shall be full compensation for the work, complete in place, as specified herein.

Payment for the asphalt-rubber will be made by the ton, including asphalt cement and crumb rubber. The results of a nuclear asphalt content gauge shall not be used to determine the weight of asphalt-rubber material as the basis of payment. Adjustments in payment shall be made in accordance with the requirements of Subsection 1009-2.03.

Mineral admixture will be paid for at the predetermined price established in the Bidding Schedule.

When required in the Special Provisions, payment for smoothness shall be made in accordance with the requirements of Subsection 109.13.

When lime water is used, no separate payment will be made for the lime water or its application, the cost being considered as included in this contract item.

(501QCDRN, 07/15/05)

SECTION 501 PIPE CULVERT AND STORM DRAINS:

501-3 Construction Requirements: of the Standard Specifications is modified to add:

501-3.01(A) Contractor Quality Control:

The contractor shall perform the quality control measures described in Subsection 106.04(C). At the weekly meeting, the contractor shall be prepared to explain and discuss how the following processes will be employed:

- (a) Bedding and backfill production, including crusher methods, pit extraction, and washing.
- (b) Stockpile management, including stacking methods, separation techniques, stockpile pad thickness, and segregation prevention.
- (c) Transporting and placing, including transport technique, lift thickness, processing and mixing technique, and compaction methods.

The contractor shall obtain samples and perform the tests specified in the following table:

| CONTRACTOR QUALITY CONTROL TESTING REQUIREMENTS | | | |
|--|--|-----------------------|----------------------------------|
| TYPE OF TEST | TEST METHOD | SAMPLING POINT | MINIMUM TESTING FREQUENCY |
| Backfill Material | | | |
| Gradation | ARIZ 201 | Stockpile | 1 per 500 CY per Source |
| PI | AASHTO T 89 AASHTO T 90 | | |
| Proctor Density | ARIZ 225 ARIZ 226 ARIZ 245 | Stockpile | 1 per Source and as needed |
| Field Density | ARIZ 227 ARIZ 230 ARIZ 232 ARIZ 235 ARIZ 246 | In-place | 1 per 200 CY, minimum 1 per lift |

| CONTRACTOR QUALITY CONTROL TESTING REQUIREMENTS (CON'T.) | | | |
|---|--|-----------------------|----------------------------------|
| TYPE OF TEST | TEST METHOD | SAMPLING POINT | MINIMUM TESTING FREQUENCY |
| Bedding Material | | | |
| Gradation | ARIZ 201 | Stockpile | 1 per 300 CY per Source |
| PI | AASHTO T 89 AASHTO T 90 | | |
| Proctor Density | ARIZ 225 ARIZ 226 ARIZ 245 | Stockpile | 1 per Source and as needed |
| Field Density | ARIZ 227 ARIZ 230 ARIZ 232 ARIZ 235 ARIZ 246 | In-place | 1 per 50 CY |

(501RESIS, 6/10/03)

SECTION 501 - PIPE CULVERT AND STORM DRAINS:

501-3.02(A)(2) Standard Aggregate Bedding Material: the first paragraph of the Standard Specifications is revised to read:

Standard aggregate bedding material shall conform to the requirements specified in Subsection 501-3.02(A)(1) and may be compacted, jetted, or placed as an aggregate slurry as herein specified.

501-3.02(A)(3) Cement-Treated Slurry Bedding Material: of the Standard Specifications is revised to read:

Aggregate for cement-treated slurry bedding material, prior to the addition of cement and water, shall conform to the requirements specified in Subsection 501-3.02(A)(1). One sack of cement shall be added to each cubic yard of aggregate. Cement-treated slurry shall be thoroughly mixed in a mixer or at a central batch plant as approved by the Engineer and shall have a slump of eight to 11 inches.

501-3.02(B)(1) General: the second paragraph of the Standard Specifications is revised to read:

Bedding material shall be placed under and around the pipe from the bottom of the trench or bedding limits to the elevation at the point of maximum width of the pipe (springline), as shown on the plans. At the contractor's option, bedding material may be placed above the springline of the pipe, at no additional cost to the Department.

For pipes placed in a non-trench condition, as shown on the plans, standard aggregate bedding material shall be used from six inches below the pipe to the springline.

For pipes placed in trench condition, a six-inch layer of standard aggregate bedding material shall be placed, in accordance with the plans, between the bottom of the trench and the bottom of the pipe. The remainder of the bedding, from the bottom of the pipe to the springline, shall be either standard aggregate bedding material or cement-treated slurry as tabulated below:

For pipe culverts or storm drains 36 inches or larger, cement-treated slurry shall be used as bedding material from the bottom of the pipe to springline.

For pipe culverts or storm drains less than 36 inches in diameter, cement-treated slurry may be substituted for standard aggregate bedding material from the bottom of the pipe to springline.

501-3.07(A) General Requirements: the second paragraph of the Standard Specifications is revised to read:

When the project plans include cast-in-place concrete pipe as an alternate, the contractor shall review the geotechnical investigation report. The report will be available at Contracts and Specifications Section, 1651 W. Jackson, Phoenix, Arizona 85007, phone (602) 712-7221. The contractor shall be responsible to determine if the in-place soil conditions will allow the specified trench to be constructed.

(503CBGRT, 07/21/05)

SECTION 503 - CONCRETE CATCH BASINS:

503-3.01 Catch Basins: the second paragraph of the Standard Specifications is revised to read:

Catch basins shall be cast-in-place or, at the option of the contractor, may be precast units. A list of approved precast units may be found on the Department's Approved Products List (APL), available on the internet from the Arizona Transportation Research Center (ATRC), through its PRIDE program.

The "H" dimension for catch basins shall be determined in the field prior to casting. The contractor is advised to acquaint itself with conditions peculiar to the project which might limit the use of precast items.

503-3.01 Catch Basins: the last sentence of the third paragraph of the Standard Specifications is revised to read:

Catch basin grates and frames shall be fabricated and installed so that the bearing surfaces of the grate rest securely on the bearing surfaces of the frame.

503-3.03 Frame and Grate: of the Standard Specifications is revised to read:

The fabrication of frame and grate units shall conform to the requirements of Subsection 604-3.06.

When reconstruct catch basin is specified, in accordance with Subsection 503-3.02, and when an existing frame and grate is unsuitable for further use, a new frame and grate shall be furnished and installed. Where an existing frame and grate is suitable for reuse, but is either lost or damaged by the contractor's operations to the extent that it is unacceptable for reuse, it shall be replaced at no additional cost to the Department.

(505MNHL, 05/20/05)

SECTION 505 - MANHOLES:

505-2.05 Frames and Covers: of the Standard Specifications is modified to add:

At the option of the manufacturer, manhole covers may be supplied from the foundry with the ADOT logo embossed in the center, at no additional cost to the Department. The current ADOT logo design at the time of cover installation shall be used. Manhole covers with out-dated logo designs will not be accepted for installation or payment.

505-3.01 Manhole: the first paragraph of the Standard Specifications is revised to read:

Excavation and backfill for the manhole shall be performed in accordance with the requirements of Subsection 203-5.

(601CONC, 01/23/07)

SECTION 601 - CONCRETE STRUCTURES:

601-3.02(C)(4) Internal Cells: of the Standard Specifications is revised to read:

Internal cells or voids in pre-cast box beams shall be constructed with either wood forms conforming to Subsection 601-3.02(C)(2), or with solid expanded polystyrene.

When solid expanded polystyrene is used, the entire top surface of the polystyrene of the internal void shall be covered with 3/8 inch thick, exterior-grade plywood. Butt joints of the plywood sections shall be at least two feet away from any joined section of polystyrene. Polystyrene sections shall be securely held together by an adhesive recommended by the manufacturer of the polystyrene.

All wood forms or polystyrene/plywood sections shall be securely held in place by nails, waterproof adhesive, or other means approved by the Engineer. Internal cells shall be completely sealed so no plastic concrete is allowed to enter the formed cell.

601-3.03(G) Pedestrian Rail and Fence: of the Standard Specifications is revised to read:

This work shall consist of furnishing and constructing Combination Pedestrian-Traffic Bridge Railing, Pedestrian Fence for Bridge Railing, and Two-Tube Bridge Rail, including all hardware and materials, in accordance with the requirements of the project plans.

601-3.03(H) Bridge Barrier and Transitions: of the Standard Specifications is revised to read:

This work shall consist of furnishing and constructing Bridge Concrete Barrier and Transition, including all hardware and materials, in accordance with the requirements of the project plans.

601-4.03 Compressive Strength and Acceptance: of the Standard Specifications is revised to read:

Sampling and testing for compressive strength and acceptance for compressive strength will be in accordance with the requirements of this section and Subsection 1006-7.

601-5 Method of Measurement: the fifth and sixth paragraphs of the Standard Specifications are revised to read:

Combination Pedestrian-Traffic Bridge Railing will be measured to the nearest linear foot from the outside dimensions of the parapet. Pedestrian Fence for Bridge Railing and Two-Tube Bridge Rail will be measured to the nearest linear foot from end-post to end-post.

Bridge Concrete Barrier and Transition will be measured to the nearest linear foot.

601-6 Basis of Payment: the first two paragraphs of the Standard Specifications are revised to read:

Class S or Class B concrete, measured as provided above, will be paid for in accordance with the provisions of Subsection 1006-7.06(B).

The contract price paid for Class S or Class B concrete shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all work involved in furnishing, placing, and curing concrete and transporting and erecting falsework, forms, precast concrete items, water stops, roadway drains, scuppers, metal hinges, and bearing pads to provide a concrete structure complete in place as shown on the project plans, as specified herein, and as directed by the Engineer.

601-6 **Basis of Payment:** the sixth and seventh paragraphs of the Standard Specifications are revised to read:

The accepted quantities of Combination Pedestrian-Traffic Bridge Railing, Pedestrian Fence for Bridge Railing, and Two-Tube Bridge Rail, measured as provided above, will be paid at the contract unit price, complete in place, including all concrete, reinforcing steel, rail, other materials, and labor. Reinforcing steel embedded below the parapet shall be included in the bridge railing.

The accepted quantities of Bridge Concrete Barrier and Transition, measured as provided above, will be paid at the contract unit price, complete in place, including all concrete, reinforcing steel, rail, other materials, and labor. Reinforcing steel embedded below the barrier or transition shall be included in the barrier and transition.

(601PRCST, 03/31/05)

SECTION 601 - CONCRETE STRUCTURES:

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

Pre-cast minor structures shown on the Department's Approved Products List (APL) may be used as alternatives to cast-in-place minor structures. The current list of such pre-cast structures is available on the internet from the Arizona Transportation Research Center (ATRC), through its PRIDE program.

The "H" dimension for catch basins shall be determined in the field prior to casting. The contractor is advised to acquaint itself with conditions peculiar to the project, which might limit the use of precast items.

The use of precast cattle guards for either H-10 or H-20 loading shall be limited to roadway locations with maximum longitudinal grades of six percent.

Pre-cast minor structures not appearing on the APL may be considered for use in accordance with the requirements of Subsection 106.14.

(602PRSTR, 10/13/06)

SECTION 602 PRESTRESSING CONCRETE:

602-2.03 **Grout:** the first paragraph of the Standard Specifications is revised to read:

Cement grout for bonding post-tensioning tendons shall consist of not more than five gallons of water to one 94-pound bag of Portland cement and may contain chemical admixtures if approved by the Engineer. Chemical admixtures shall conform to the requirements of Subsection 1006-2.04, except no admixtures containing chlorides or nitrates shall be used.

(608PANEL, 01/23/07)

SECTION 608 - SIGN PANELS:

608-1 Description: of the Standard Specifications is revised to read:

The work under this section shall consist of furnishing and installing sign panels in accordance with the details shown on the plans and the requirements set forth herein.

The sign panels shall be of the following types:

- Extruded Aluminum Sign Panels With Demountable Characters
- Flat Sheet Aluminum Sign Panels With Direct-Applied or Silk-Screened Characters
- Warning, Marker, and Regulatory Sign Panels
- Route Shields for Installation on Sign Panels
- EXIT ONLY for Installation on Sign Panels

608-2.01 General: the last paragraph of the Standard Specifications is hereby deleted.

608-2.04 Overhead Sign Panels: the title and text of the Standard Specifications are revised to read:

608-2.04 Blank

608-2.05 Overlaid Sign Panels: the title and text of the Standard Specifications are revised to read:

608-2.05 Blank

608-2.06 Flat Sheet Aluminum Sign Panels With Demountable Characters: the title and text of the Standard Specifications are revised to read:

608-2.06 Blank

608-2.08 Overlaid Plywood Sign Panels With Direct-Applied or Silk-Screened Characters: the title and text of the Standard Specifications are revised to read:

608-2.08 Blank

608-2.13 Retroreflective Sheeting: the title and text of the Standard Specifications are revised to read:

608-2.13 Retroreflective Sheeting, Inks and Opaque Film:

Retroreflective sheeting, sign-making inks, and opaque films shall conform to the requirements of Section 1007.

Signs shall be fabricated in accordance with the recommendations established by the manufacturer of the sign sheeting. All processes and materials used to make a sign shall in no way impact the performance, uniform appearance (day and night), or durability of the sheeting, or invalidate the sign sheeting manufacturers' warranty.

All sheeting used for letter and number text shall be of the same type and brand, and shall be installed at a zero-degree orientation.

608-2.14 Demountable Characters: of the Standard Specifications is revised to read:

(A) General:

Letters, numerals, symbols, route shields, borders, and other features of the sign message shall consist of cut-out, flat sheet aluminum legends, with direct-applied sign sheeting or other finishes, that are mounted to the sign panel with rivets as described herein. All characters shall be placed on the signs in a straight and true fashion.

Flat sheet aluminum substrates used for characters and borders shall be either aluminum alloy 3105-H14, 3003-H14, or 5052 as specified in ASTM B 209. Characters produced from the flat sheet aluminum alloy shall sit flat on the face of the sign panel without visible gap or deformation.

The thickness for letters and numbers shall be 0.032 inches. The thickness for symbols, route shields, and borders shall be 0.063 inches.

All aluminum shall be chemically treated with a chromate acid conversion type coating, or equivalent, to form an oxidation resistant barrier film that is suitable for long term outdoor application. The coating shall prevent the occurrence of oxidation that may cause streaking or discoloration on the sign. The coating shall be applied in accordance with the manufacturer's specifications, and shall have a minimum thickness of 0.002 inches.

All corners and edges of the characters shall be clean and well-defined with no apparent waviness, tears, delamination, deformation or flaws. Burrs and waste material generated from the cutting process shall be removed so characters have a clean, flat, and correct appearance.

Design of letters and numbers shall be in accordance with the project plans.

Splicing of aluminum panels will be acceptable for diagrammatic arrows or other large symbols and shields exceeding 48 inches in more than one direction. Splices, when required, shall include a continuous four- to six-inch wide aluminum back plate that overlaps the joint. The back plate shall ensure no gap at the splice joint when the symbol is assembled and attached to the sign.

Borders on signs with demountable characters shall also be made of aluminum substrate panels, unless otherwise specified. However, in all cases borders on signs with demountable characters shall be made of the same material as the legend.

(B) Sheeting and Colors:

Sheeting or film applied to demountable characters shall be a continuous monolithic piece, without splice or patch, that covers the entire front face of the character. Splicing of the sheeting for demountable borders or characters which have a dimension larger than 48 inches in more than one direction will be allowed. Only one splice shall be allowed every four feet. When a splice is necessary, the adjoining edges shall be placed so there is no visible gap between the two pieces.

The adhesive system for sheeting and opaque films shall form a durable bond which tightly adheres to the aluminum or sign background. After attachment, the sheeting and opaque films shall not discolor, crack, craze, blister, bubble or delaminate. Sheeting and film adhesives must be warranted by the manufacturer against such defects as specified in Section 1007. Only those sheeting and film products which provide the specified warranty will be acceptable.

The color for demountable letters, numbers, symbols, and route shields on green, blue, and brown background signs shall be white, and shall conform to the requirements of Section 1007. Demountable legends on white and yellow background signs shall be black, and shall be opaque and non-reflective. Acceptable finishes for black characters shall be porcelain-enameled black, powder-coated black, or laminated black opaque acrylic film.

When borders are used with demountable characters, white legend and border shall be used on green, blue, or brown sign backgrounds, and black legend and border shall be used on white or yellow sign backgrounds. Sign sheeting conforming to Section 1007 shall be used for white borders. Black borders shall be porcelain-enameled black, powder-coated black, or laminated black opaque acrylic film.

Black porcelain enameling, black powder-coatings, or laminated black opaque acrylic film to be used for characters or borders, as specified above, shall be applied in accordance with the coating manufacturer's recommendations. The contractor shall provide copies of any warranties provided by the manufacturer for such coatings to the Engineer.

On combination signs, such as a green background sign with white characters that also includes a smaller panel with yellow background and black characters, the color scheme used for the characters and border for each portion of the sign shall be as specified above, i.e. white legend and border shall be used on the green background portion of the sign and black legend and border shall be used on the yellow background portion.

(C) Attachment of Characters and Borders:

Self plugging aluminum, protruding, regular head blind rivets shall be used to secure all demountable characters. The rivets shall conform to the applicable requirements of International Fasteners Institute (IFI) 114 standard for break mandrel blind rivets. All rivets shall be 5/32 inch in diameter with the appropriate grip range.

Rivets shall be either IFI 114 Grade 10 or 11 aluminum alloy rivets. The rivets shall have an ultimate shear and tensile strength that has been determined by IFI 135 Specification 2.1 and 2.2. The ultimate shear and tensile strength shall meet or exceed those values specified for a 5/32 inch (0.1562) nominal rivet diameter per IFI 114 Table 6 for Grades 10 or 11. A higher strength and grade aluminum rivet can be used at the option of the sign fabricator.

Rivets securing the characters to the back panel shall be of sufficient length to ensure a secure attachment and conform to the grip length specifications of the rivet manufacturer. The determination of rivet grip length shall include the total thickness of the joint. This thickness shall include the character (sheeting and aluminum sheet), spacer (if applicable) and the sign back panel (sheeting and aluminum extrusion).

The hole size used to install the rivets shall conform to the recommendation of the rivet manufacturer and Table 2 of IFI 114. Rivets shall be placed a minimum of four times the diameter of the rivet from the edge of the character being attached, e.g., 5/8 inch clearance for a 5/32 inch diameter rivet. Clearance shall be measured to the outside of the rivet head.

Minimum requirements for attaching demountable characters shall be as follows:

Straight numerals and letters such as "1" shall have three rivets, one at the top, middle and bottom. The more complex numerals and letters shall have from four to seven rivets. Letters such as "W" and "M" typically require seven rivets. Letters and numerals such as "P", "H" and "9" typically require six rivets. Letters and numerals such as "G", "S", "2", "3" and "7" typically require five rivets. A rivet shall secure each corner of the letter or numeral. For shields and symbols, rivets shall be spaced evenly around the entire perimeter. Additional rivets shall be added in the middle of the shield or symbol as necessary to eliminate bowing. Rivets for borders shall be spaced evenly around the border.

The actual number of rivets used will depend on the thickness, configuration, weight, position (with or without spacers), size of the character being attached, and the recommendations of the rivet manufacturer. The number and location of rivets shall be sufficient to secure the character to the panel so it shall not miss-align, bend or move when subjected to wind loading. Additionally, the number of rivets used shall ensure that the character does not bow or pull away from the back panel for the life of the sign. Rivets shall be placed in a defined, evenly spaced pattern which is consistent from character to character. The placement and pattern of rivets shall not interfere with the appearance of the sign from normal drive-by viewing distances. The contractor shall supply standard punch details prior to fabrication.

The protruding head and shaft of the rivets shall closely match the color of the character on which they are being applied, e.g., black characters shall be applied with black rivets. Aluminum colored rivets are acceptable for mounting white characters.

The coating used to color the rivets shall be a factory-applied anodized type finish, or equivalent, that is suitable for long term outdoor application. The coating shall have durable colorfastness and shall be capable of preventing the occurrence of oxidation that may cause streaking or discoloration on the sign. Non-factory painting of the protruding heads of the rivets is not acceptable.

608-3.01 Fabrication: the first sentence of the third paragraph of the Standard Specifications is revised to read:

Fabricated signs shall be stored indoors and kept dry during storage.

608-3.02 Installation of Sign Panels: of the Standard Specifications is modified to add:

The contractor shall provide two copies of a detailed list of all new signs installed on the project to the Engineer. The list shall include the sign identification code, the date each sign was installed (month and year), the fabricator of the sign, and the materials used to make the sign (manufacturer, type of sheeting, ink and film). The list shall be provided in a commonly used electronic spreadsheet format, such as EXCEL, and the two copies shall be submitted on either CD-ROM disks or IBM-formatted 3.5-inch floppy diskettes. Signs shall be listed in numerical order by route, direction, and milepost and, where more than one sign is installed at the same general location, a letter subscript.

Signs shall be placed at the same orientation along the roadway so that the entire legend of the signs appear uniform under normal viewing conditions, both day and night.

Upon the installation of each finished sign, the contractor shall place information on the back of the sign showing the sign identification code, the sign fabricator, the manufacturer of the sheeting used, and the month and year of the installation. The formatting of the required information shall be as shown on the plans. The information shall be positioned to be readily visible from a vantage point outside the flow of traffic and not obstructed by sign posts, extrusions, stringers or brackets. All letters shall be made of a long life material such as a black opaque acrylic film. Signs not marked as required will not be eligible for payment.

Construction signs are exempt from the installation information requirement unless noted otherwise on the project plans.

Bolts shall be tightened from the back of the sign by holding the bolt head stationary on the face of the panel to prevent damage to the sheeting surface.

(609DRSFD, 07/21/05)

SECTION 609 - DRILLED SHAFT FOUNDATIONS:

- 609-1.03 Installation Plan:** sub-item (6) of the Standard Specifications is revised to read:
- (6) Details of reinforcement placement, including support and centralization methods, lifting equipment, and staging location for tied steel reinforcement cages prior to placement.
- 609-1.03 Installation Plan:** sub-item (7) of the Standard Specifications is revised to read:
- (7) Details of concrete placement, including concrete volumetric charts.
- 609-1.03 Installation Plan:** sub-item (12) of the Standard Specifications is revised to read:
- (12) Emergency horizontal construction joint method if unforeseen stoppage of work or interruption in concrete delivery occurs.
- 609-1.03 Installation Plan:** the item list of the Standard Specifications is modified to add:
- (13) Details of any special access or setup requirements needed to position the drill equipment to advance excavations.
- 609-1.03 Installation Plan:** the last paragraph of the Standard Specifications is revised to read:

The contractor's installation plan shall be developed with input from subcontractors, material suppliers, and all others with drilled shaft responsibility. The installation plan shall also identify which portion of the drilled shaft construction the contractor and each of the subcontractors will be performing. The documentation required above shall be submitted to the Engineer not later than four weeks before work on shafts is to begin. The Engineer will review the initial submittal within ten working days, and subsequent submittals, as necessary, within five working days. A drilled shaft preconstruction meeting will be scheduled following the final approval of the installation plan and prior to commencement of drilling activity. All parties named in the installation plan shall be represented at the preconstruction meeting. No drilled shaft work shall be performed until the contractor's final submittal has been approved by the Engineer and the preconstruction meeting concluded. Such approval will not relieve the contractor of responsibility for results obtained by use of the installation plan, or any of its other responsibilities under the contract. The contractor shall be responsible to submit a modified installation plan each time a change is made to facilitate construction.

Unless otherwise specified in the Special Provisions, light standard and sign post foundations of less than four feet in diameter and 20 feet in length shall be exempt from the requirement to submit an installation plan, conduct a drilled shaft preconstruction meeting, and construct a confirmation shaft.

609-2.01 Concrete: of the Standard Specifications is revised to read:

Concrete shall conform to the requirements of Section 1006 for the design criteria shown on the plans, with the following additions or modifications:

(A) Cement:

Where concrete is placed in drilled shaft excavations containing slurry or water, the cement content of the concrete shall be between 660 and 750 pounds per cubic yard.

(B) Aggregate:

Maximum aggregate size shall be limited to 1/5 of minimum clear bar spacing (vertical and horizontal), not to exceed 3/4 inch for drilled shafts constructed with a wet method or with temporary casing (excluding collar-only casings), and one inch for drilled shafts constructed with a dry method.

(C) Air-Entraining Admixtures:

Air-entraining admixtures will be required for concrete drilled shafts in all areas where scour is anticipated, as indicated in the geotechnical report. In non-water environments, air-entraining admixtures will be required for concrete drilled shafts when the top of the shaft is less than three feet below finished grade. In either case, when air-entraining admixtures are required, as specified above, the entire drilled shaft shall contain the admixture.

609-2.02 Reinforcing Steel: of the Standard Specifications is revised to read:

Reinforcing steel shall conform to the requirements of Section 1003. If approved in writing by the Engineer, Grade 75 steel bars meeting all requirements of these Specifications may also be allowed, at no additional cost to the Department. The contractor's request shall specify whether all bars are to be Grade 75, or mixed with other grades. Welded splices will not be allowed except as shown on the plans.

609-3.01 General: the first paragraph of the Standard Specifications is revised to read:

The methods and equipment used shall be appropriate for the intended purpose and materials encountered. The allowable methods are the dry method, wet method, temporary casing method or permanent casing method, as defined by AASHTO Standard Specifications for Highway Bridges, Division II, Section 5. The most suitable of the listed methods for the conditions recorded in the geotechnical investigation report, or a combination of these methods, shall be used, subject to approval of the Engineer, to produce sound, durable concrete foundation shafts free of defects. The permanent casing method shall be used only when required by the plans or authorized by the Engineer.

609-3.02 Confirmation Shafts: the first and second paragraphs of the Standard Specifications are revised to read:

Unless otherwise specified in the Special Provisions, the contractor shall construct a confirmation shaft to determine the adequacy of the contractor's equipment, materials, employees, and procedures for completion of the drilled shaft foundations in accordance with the requirements of the plans, specifications, and installation plan. Confirmation shafts may also be waived if directed in writing by the Engineer.

Unless otherwise directed by the Engineer, the confirmation shaft shall be the first drilled shaft foundation to be developed. The Engineer will specify the location of the confirmation shaft, unless shown on the plans. The confirmation shaft holes shall be completed in the same manner as other production shafts. The contractor shall revise its methods and equipment as necessary at any time during the construction of the confirmation shaft hole to satisfactorily complete the excavation. When the contractor fails to satisfactorily demonstrate the adequacy of its methods, procedures, or equipment; or when unforeseen conditions require revision, such as the need for slurry; the installation plan shall be revised and the adjacent shaft shall be designated as the confirmation shaft for the revised installation plan, as approved by the Engineer.

609-3.03 Excavation: the third sentence of the second paragraph of the Standard Specifications is revised to read:

Reinforcing steel and concrete shall not be placed in the shaft until this final elevation has been established and the Engineer is satisfied with the completed excavation.

609-3.03 Excavation: the fourth paragraph of the Standard Specifications is revised to read:

Adjacent shafts, unless separated by a minimum of three shaft diameters, shall not be drilled until the concrete in the first shaft has been in place for a minimum of 48 hours.

Temporary surface casings may be used to aid shaft alignment and position, and to prevent sloughing of the top of the shaft excavation, if approved by the Engineer. Where temporary casing is used to stabilize excavations that include rock sockets, the temporary casing shall be 6 to 12 inches larger than the rock socket diameter and centered on the rock socket.

609-3.04(A) General Requirements: of the Standard specifications is revised to read:

The contractor shall provide a manufacturer's representative with experience in the slurry drilling process to design and monitor the slurry. The manufacturer's representative shall be present at all times while the slurry method is under development, and shall supervise the testing required in Subsection 609-3.04(B). Once a method that consistently produces acceptable excavations has been developed and accepted by the Engineer, the contractor may substitute one of its employees for the representative provided that the employee has been suitably trained in the procedure. The contractor shall also ensure that the manufacturer's representative remains available to return to the site and supervise changes to the drilling slurry if needed.

Only commercially prepared mineral slurries or synthetic slurries listed on the Department's Approved Products List shall be employed when slurry is used in the drilling process. Mineral slurry shall have both a mineral grain size that will remain in suspension and sufficient viscosity and gel characteristics to transport excavated material to a suitable screening system. For all slurries the percentage and specific gravity of the material used to make the suspension shall be sufficient to maintain the stability of the excavation and to allow proper concrete placement. During construction, the level of the mineral slurry in the shaft excavation shall be maintained at a level not less than five feet above the highest expected piezometric pressure head along the depth of the shaft. The level of polymer slurry shall be maintained at or near the ground surface or higher, if required to maintain boring stability. Unless otherwise approved in advance by the Engineer, slurry shall be injected into the excavation immediately upon encountering ground water. No further excavation shall be completed until slurry has been introduced into the boring. In the event of a sudden significant loss of slurry to the hole, the construction of that foundation shall be stopped until either a method to stop slurry loss or an alternative construction procedure has been approved by the Engineer.

The slurry shall be premixed thoroughly with clean, fresh water. Adequate time, as prescribed by the slurry manufacturer, shall be allotted for hydration prior to introduction into the shaft excavation. Slurry tanks of adequate capacity shall be required for slurry circulation, storage, and treatment. No excavated slurry pits shall be allowed in lieu of slurry tanks. No mixing of slurry shall be allowed in the drilled shaft excavation. Slurry shall not stand for more than four hours in the excavation without agitation. If this is not possible, excavation sidewalls shall be cleaned to remove filter cake and the slurry tested for compliance with Table 609-3.04(A). Mineral slurry density shall be increased by adding barite only when sodium bentonite is the mineral.

Desanding equipment shall be provided by the contractor as necessary to control slurry sand content within the acceptable values shown in Table 609-3.04(A) at any point in the bore hole. Desanding will not be required for setting casing. The contractor shall take all steps necessary to prevent the slurry from "setting up" in the shaft. Such methods may include agitation, circulation and/or adjusting the properties of the slurry. The contractor shall dispose of all slurry off site at an approved disposal site.

| TABLE 609-3.04(A) (Sodium Bentonite in Fresh Water) | | | |
|--|--|--|-----------------------------|
| Property; units | Range of Values* | | Test Method |
| | At Time of Introduction of Slurry | In Hole at Time of Concreting | |
| Density; (pcf) | 64.3 – 69.1 | 64.3 - 75.0** | Density Balance |
| Yield Point; pascals Or Viscosity; seconds/quart | Bentonite 1.25 - 10 28 – 50 | 10 Maximum 28 – 50 | Rheometer Marsh Cone |
| PH | 7-12 | 7-12 | pH Paper or pH Meter |
| Sand Content; % by volume | 0 – 4 | 0 – 2 | API Sand Content Kit |
| *Above 68 degrees F **85 pcf maximum when using Barite. | | | |

609-3.04(B) Slurry Inspection and Testing: the fifth paragraph of the Standard specifications is revised to read:

When any slurry samples are found to be unacceptable, the contractor shall take whatever action is necessary to bring the slurry within specification requirements. Concrete shall not be placed until resampling and testing results produce acceptable values.

609-3.05 Integrity Testing: of the Standard specifications is revised to read:

Drilled shaft integrity testing shall be performed by the contractor and will be reviewed by the Engineer.

Each drilled shaft foundation completed by a wet excavation method shall be inspected by means of a cross-hole sonic logging survey. The drilled shaft contractor shall furnish and install 2-inch Schedule 80 PVC pipes for cross-hole sonic logging. The minimum number of PVC-pipe inspection tubes shall be equal to the diameter of the drilled shaft, measured in feet, and rounded-up to the next whole integer, but not less than four, or as specified in the plans. The inspection tubes shall be uniformly distributed along the inside circumference of the reinforcing steel cage. The pipes shall be joined to provide a clean, watertight, and unobstructed opening from the top of the drilled shaft foundation to within one foot of the tip in accordance with the details shown on the plans. The PVC pipes shall be capped on the bottom and filled with water prior to concrete placement. The pipes shall be securely tied to

the reinforcing steel in a straight line to prevent displacement during handling and concrete placement, and to permit the logging device to pass from top to bottom.

The contractor shall provide the testing equipment, perform the inspection, and furnish test results to the Engineer. The contractor shall also provide documentation that the testing equipment has been calibrated and is functioning properly. Integrity testing shall be performed no sooner than 48 hours after placement of the concrete, and all testing shall be finalized within seven days of placement.

Readings from the cross-hole sonic logging shall be taken with a maximum interval of two inches, and shall include all possible ray paths. The contractor shall provide an inspection report that contains the acquired raw data, and an evaluation report prepared and sealed by a registered professional engineer. Graphs of acoustic pulse arrival time versus depth and power of the arriving signal versus depth in each pair of tubes shall be provided. All reports shall be provided to the Engineer within three days of test completion.

If the testing indicates the presence of voids, intrusions or zones of unconsolidated concrete in the drilled shaft foundation, or if the Engineer determines that construction defects may have occurred, the contractor shall conduct three-dimensional tomographic surveys of the anomalies, at no additional cost to the Department. If testing cannot be performed because of blockage of the tubes, the contractor shall core-drill or otherwise determine the extent of any defects in the concrete as approved by the Engineer. The contractor shall repair, replace, or supplement the defective work in a manner approved by the Engineer, which may include constructing one or more additional drilled shafts at the locations directed by the Engineer, at no additional cost to the Department.

Concrete volumetric charts shall be completed for every drilled shaft.

After all inspection has been completed, all holes and test pipes in all drilled shaft foundations shall be filled with an approved grout from the bottom up.

609-3.06 Reinforcing Steel, Cage Construction and Placement: of the Standard Specifications is revised to read:

The reinforcing steel cage for the drilled shaft, consisting of longitudinal bars and spiral hooping or lateral ties shall be completely assembled and placed into the shaft as a unit. All reinforcing steel intersections shall be tied as specified herein. The reinforcing steel unit shall be placed in the shaft no sooner than two hours prior to the start of concreting operations, and shall be placed in accordance with the details shown on the plans.

If approved in writing by the Engineer, bundling of vertical or horizontal reinforcing steel may be allowed if necessary to maintain a minimum bar spacing equal to five times the maximum aggregate size of the concrete. Bundling of spiral reinforcing will not be allowed. A maximum of three bars may be bundled. Bundled vertical or horizontal steel shall be spaced uniformly. The contractor shall also make the necessary modifications, in accordance with the appropriate ACI specifications, to the splicing and tying details for the reinforcing steel, and submit these to the Engineer for approval along with the contractor's request for bundling of steel.

The reinforcing cage shall be adequately supported and anchored from the top to prevent movement from the required location during and for four hours after completion of concrete placement. If temporary casing is used, the reinforcing cage shall be supported prior to removing casing, and for four hours following removal of the casing. The rebar cage shall be kept plumb. The rebar cage shall not rest directly on the bottom of the excavation. Spacers shall be at sufficient intervals along the shaft to ensure concentric location of the reinforcing cage for the entire length of shaft. Spacers shall be placed at a maximum vertical spacing of 15 feet, with a minimum of four spacers around the circumference at each vertical elevation. For all drilled shafts of less than six feet in diameter, the spacers shall provide for a minimum of three inches of concrete cover between the reinforcing steel and the excavation wall. For all drilled shafts of six feet in diameter or greater, or for drilled shafts of any diameter constructed with the wet method, the spacers shall provide for a minimum of six inches of concrete cover between the reinforcing steel and the excavation wall. Only spacers approved by the Engineer shall be allowed, and in no case shall "dobies" or other rectangular "blocks" tied to the reinforcing steel be allowed in excavations with the wet method. When "dobies" are used, they shall be made from concrete of the same compressive strength as the concrete used in the drilled shafts.

If the shaft is lengthened and the plans indicate full depth reinforcement, the Engineer shall be notified to determine if extension of the reinforcement is needed. The Engineer will provide details for additional reinforcing if required. Such additional reinforcing will be paid for in accordance with Subsection 109.04.

The contractor shall submit a written request to the Engineer for approval of any variation from the splices for reinforcing steel specified in the contract documents.

All reinforcing cages shall be fabricated and supported to avoid damage during the lifting and placing. Any temporary bracing and supports shall be removed prior to final placement. Equipment used for lifting reinforcing cages shall have adequate capacity and boom length to lift the cage clear of the ground. Reinforcing cages shall not be dragged while being moved. Reinforcing cages shall be placed with splices in the lowest possible position within the excavation.

609-3.07(A) General: the fourth sentence of the first paragraph of the Standard Specifications is revised to read:

Unless otherwise specified in the project documents, or as directed by the Engineer, the slump shall be five \pm one inches for dry, uncased excavations.

609-3.07(A) General: the second sentence of the third paragraph of the Standard Specifications is revised to read:

The inside diameter of the tremie pipe shall be at least ten inches for all drilled shafts four feet or greater in diameter.

609-3.07(A) General: of the Standard Specifications is modified to add:

The concrete mix shall remain in placement for at least two hours before obtaining the initial set as determined in AASHTO T 197 (ASTM C 403).

609-3.07(B) Placement in Dry Excavations: of the Standard Specifications is revised to read:

For placement in dry excavations, concrete may be placed by free fall except in fragile, cohesionless soils where bottom scour is likely to occur, or where other caving conditions exist. The contractor shall prevent concrete from striking either the reinforcing cage or excavation side walls during free fall. Where free fall cannot be used, concrete shall be placed through a suitable clean downpipe.

Concrete vibration for the full height of the shaft is not necessary to achieve proper consolidation of the concrete. However, the shafts shall be vibrated in the top 10 feet. If temporary casing is used, the vibration shall occur after the casing has been removed.

To be considered a dry shafts, the maximum depth of water in the bottom of a drilled shaft excavation at the time of concrete placement shall be no more than three inches.

609-3.07(C) Placement under Slurry or Water: the second sentence of the second paragraph of the Standard Specifications is revised to read:

The procedure shall assure that the opening of the tremie pipe will be deeper than five feet below the surface of the concrete at all times for shaft diameters less than six feet, and deeper than ten feet below the surface of the concrete for shaft diameters six feet and larger.

609-3.07(C) Placement under Slurry or Water: the last sentence of the third paragraph of the Standard Specifications is revised to read:

The concrete flow that comes to the top of the shaft shall be displaced out of the shaft excavation in a continuous flow until clean, fresh concrete is expelled.

609-3.08 Casing Removal: the first paragraph of the Standard Specifications is revised to read:

During removal of any casing, a sufficient head of not less than ten feet of fluid concrete in the tremie pipe shall be maintained above the level of concrete in the shaft (outside the tremie pipe), except at the top of the shaft. All contaminated concrete shall be removed from the shaft. Temporary casings shall be removed while the concrete slump is a minimum of four inches. The contractor shall maintain a minimum five-foot head of concrete for shaft diameters of less than six feet, and a minimum ten-foot head of concrete for shaft diameters six feet or greater, in the casing as it is being removed. Movement of the casing by exerting upward pressure and tapping to facilitate extraction, or extraction with a vibratory hammer will be permitted. Casing extraction shall be at a slow, uniform rate with the force in-line with the shaft axis. The removal method shall prevent the intrusion of water, grout, and soil into the excavation, displacement of the reinforcing steel, and lifting of the concrete.

609-5 Basis of Payment: of the Standard Specifications is revised to read:

The accepted quantities of drilled shafts and rock sockets, measured as provided above, will be paid for at the contract unit price per linear foot for the diameter designated in the bidding schedule, complete in place, including excavation and disposal of spoils; drilling slurry; metal casing; steel reinforcing; Portland cement concrete; any needed forming, curing and finishing; exposing of concrete and the subsequent repair of foundations; furnishing all materials, equipment, and labor for splicing of reinforcing steel; conduit and equipment for sonic cross-hole logging; and all required tests. No additional payment will be made for metal casing that is to remain in place. No additional payment will be made for confirmation shafts or for providing a manufacturer's representative for the drilling slurry, the costs considered to be included in the cost of constructing the drilled shaft foundation.

Payment for belled sections will be at the contract unit price for each type of foundation constructed, including excavation and concrete beyond the diameter of the shaft.

Obstructions will be defined as either material or objects of excessive dimension, which were not recorded in the geotechnical and foundation report, either in the text or boring logs. Drilling tools which are lost in the excavation shall not be considered obstructions. Payment for obstructions will be made in accordance with the provisions of Subsection 109.04.

(701PDMPT, 5/02/07)

SECTION 701 - MAINTENANCE AND PROTECTION OF TRAFFIC:

701-2.01 General: of the Standard Specifications is revised to read:

(A) Conformance:

Except as specified herein, all equipment, procedures used by workers, devices and facilities shall conform to the requirements of the MUTCD and associated ADOT Supplement.

(B) Safety:

(1) General Requirements:

All traffic control devices listed below as Category I and Category II devices shall meet the evaluation criteria for Test Level III per NCHRP (National Cooperative Highway Research Program) Report 350.

At the pre-construction conference the contractor shall submit a letter certifying that all such traffic control devices to be used on the project will meet the above-referenced criteria. The certification shall contain the following:

- (a) A list of all Category I and II traffic control devices to be used on the project.
- (b) The project number.

- (c) A statement verifying that these devices, and their application, meet the requirements of NCHRP Report 350 Test Level III.
- (d) The name, title and signature of a person having legal authority to bind the manufacturer or supplier of the Category I and II devices. The binding authority shall be in accordance with Subsection 106.05(B)(5).

If additional Category I or II devices are required at a later date, the contractor shall provide an amended certification letter to the Engineer specifying that such devices also comply with the requirements of NCHRP Report 350 Test Level III.

For all Category I and Category II devices used on the project the contractor shall also acquire or have access to reports which verify that such devices meet the above-referenced criteria. The reports shall contain the name and model of the tested traffic control devices, detailed drawings or product literature of each, and under what conditions the devices passed. The traffic control devices detailed in the report shall be the complete warning devices, including warning lights, flags, ballast and any other auxiliary attachment allowed. Reports for Category II devices are prepared by the Federal Highway Administration (FHWA). For Category I devices, the supplier is responsible for testing the product and providing a report which verifies that the device meets the criteria of NCHRP Report 350, Test Level III. If requested by the Engineer, the contractor shall provide copies of such reports within one working day.

(2) Category I Devices:

Category I devices are low-mass traffic control devices that will not cause an appreciable change in speed of an impacting vehicle, nor is it likely that any part of the device will intrude into the passenger compartment. The following traffic control devices will be considered Category I devices: rubber or plastic traffic cones, rubber or plastic tubular markers, single piece plastic drums, plastic or fiberglass delineators. No warning lights, signs, flags or other auxiliary devices are allowed on Category I devices. Should any of these attachments be added to a Category I device, the Category I device will be considered a Category II device. Ballast at the base, such as a rubber tire, is an acceptable attachment to Category I devices. The single piece plastic drum refers to the construction of the body of the drum exclusive of a separate base, if any.

(3) Category II Devices:

Category II devices are low-mass traffic control devices that will not cause a significant change in speed of an impacting vehicle. The following traffic control devices will be considered Category II devices: type I, II, and III barricades with or without warning lights; vertical panels with or without warning lights; signs and sign stand (all types) with or without warning lights and/or flags; drums, other than those listed in Category I, with or without warning lights; and any Category I devices with attached warning lights.

701-2.02 Flashing Arrow Panels: the first sentence of the Standard Specifications is revised to read:

Flashing arrow panels shall conform to the requirements of the MUTCD and associated ADOT Supplement with the following additions:

701-2.03 Temporary Concrete Barrier: of the Standard Specifications is revised to read:

Temporary concrete barrier shall be precast sections conforming to the requirements of Signing and Marking Standard Drawing C-3 and Subsections 910-2 and 910-3 of the specifications.

The contractor shall provide, at the preconstruction conference, a letter certifying that any temporary concrete barrier used on the project conforms to Signing and Marking Standard Drawing C-3. The letter shall also include the project number, and the name, title, and signature of a person having legal authority to bind the manufacturer or supplier of the attenuation devices. The binding authority shall be in accordance with Subsection 106.05(B)(5).

701-2.04 Temporary Impact Attenuation Devices: of the Standard Specifications is modified to add:

Temporary Impact attenuation devices shall also meet evaluation criteria for Test Level III per NCHRP (National Cooperative Highway Research Program) Report 350. The contractor shall provide, at the preconstruction conference, a letter certifying that all temporary impact attenuation devices meet the above requirement. The letter shall also include the project number, and the name, title, and signature of a person having legal authority to bind the manufacturer or supplier of the attenuation devices. The binding authority shall be in accordance with Subsection 106.05(B)(5).

701-2.05(A) Temporary Raised Pavement Markers and Chip Seal Pavement Markers: the second and third paragraphs of the Standard Specifications are revised to read:

Temporary Pavement Markers shall be in conformance with Standard Drawings M-19 and M-20, and Subsections 706-2 and 706-3 of these specifications, and will be included on a list of pre-approved products maintained by the Department.

Chip Seal Pavement Markers shall conform to Standard Drawing M-20. The Chip Seal marker body and cover shall be manufactured from a polyurethane material conforming to the following requirements:

701-2.07 Delineators: of the Standard Specifications is revised to read:

Delineators shall be as shown on the plans and shall be in conformance with the Standard Drawings and Subsection 703-2 of these specifications.

701-2.08 Barricades: the first paragraph of the Standard Specifications is revised to read:

Type I barricades having a minimum of 270 square inches of retroreflective area facing traffic, and otherwise conforming to the MUTCD, may be used in lieu of Type II barricades in freeway or other high speed applications, unless specifically excepted in the project plans.

701-2 Materials (Equipment, Workers, Devices and Facilities): of the Standard Specifications is modified to add:

701-2.09 Drums:

Sheeting type for drums shall conform to the requirements for work zone devices shown in Section 1007.

701-3.02 Maintenance and Protection of Traffic: the second sentence of the second paragraph of the Standard Specifications is revised to read:

Scratches, rips, and tears in reflective sheeting, or loss of fluorescence in fluorescent prismatic sheeting, as determined by the Engineer, shall be promptly corrected by the contractor.

701-3.03 Temporary Concrete Barriers: the second sentence of the first paragraph of the Standard Specifications is revised to read:

Sections of temporary barrier shall be fastened together as shown on the Standard Drawings to form a continuous chain.

701-3.07 Truck-Mounted Attenuator: the third sentence of the second paragraph of the Standard Specifications is revised to read:

All truck-mounted attenuators shall meet NCHRP 350 requirements.

701-3.10 Sign Sheatings: of the Standard Specifications is revised to read:

Sign sheeting for orange warning signs, as defined in Part 6 of the MUTCD, and for specialty signs as defined herein, shall be orange fluorescent prismatic sheeting. Orange sign sheeting shall conform to the requirements of Section 1007.

Sign sheeting for other signs shall be Type III/IV, and shall conform to the requirements of Section 1007.

701-3.13 Flagging Services: the last paragraph of the Standard Specifications is revised to read:

The contractor shall furnish verification to the Engineer that all civilian flaggers have completed a recognized training and certification program. Flaggers certified by the American Traffic Safety Services Association (A.T.S.S.A.) or by the National Safety Council shall be acceptable. Certification through other programs offering flagger training must be

approved by the Engineer. Flagger certification must be current. Training and certification shall be required at least once every two years.

701-4.04 Measurement of Work Elements: sub-paragraph (B) of the Standard Specifications is revised to read:

Temporary Impact Attenuators, such as Sand Barrels and Energy Absorbing Terminals, will be measured by the unit for each complete sand barrel array, regardless of the number of barrels, or energy absorbing terminal upon its initial installation (Complete-in-Place) and upon any subsequent re-installations, as defined in Subsection 701-5.02. Temporary Impact Attenuators will be measured by the day for each 24-hour day that a temporary sand barrel array or energy absorbing terminal impact attenuator is in place and functional for the "In-Use" condition.

701-4.04 Measurement of Work Elements: the first sentence of sub-paragraph (L) of the Standard Specifications is revised to read:

Temporary Delineators and Temporary Pavement Markers will be measured as a unit for each delineator and marker furnished, utilized, and subsequently removed from the project site.

701-4.04 Measurement of Work Elements: sub-paragraph (M) of the Standard Specifications is revised to read:

Vertical Panels, Barricades (Types II and III), Tubular Markers, Warning Lights (Types A, B, and C), Traffic Cones (28-inch), High-Level Flag Trees, Drums, Embedded Sign Posts, and Portable Sign Stands (Spring-Type and Rigid), will be measured as a unit for each device furnished and subsequently utilized at the project site for each 24-hour day.

Temporary Signs will be measured as Small (less than 10 square feet) and Large (10 square feet or more), regardless of sheeting type. Temporary Signs will be measured as a unit for each sign furnished and subsequently utilized at the project site for each 24-hour day. Quantities may be determined on a weekly basis for signs in continuous use.

Utilization shall be defined as including those devices ordered to remain on site or covered in accordance with Subsection 701-4.03(D) and approved by the Engineer.

701-4.04 Measurement of Work Elements: sub-paragraph (N) of the Standard Specifications is revised to read:

Specialty Signs are signs which are required on the job, as determined by the Engineer or shown on project plans, and are not reusable as traffic control signs. Specialty Signs shall contain information which is project and location specific. The sign sheeting shall be orange fluorescent prismatic rigid sheeting unless otherwise specified, and the size, type and legend of the Specialty Signs will be determined by the Engineer, unless specified on the project plans. Specialty Signs will be measured for payment by the square foot, inclusive of borders. Any sign over 20 square feet in area shall be considered a Specialty Sign.

701-5.02 Temporary Impact Attenuators (Installation and Removal): the third paragraph of the Standard Specifications is revised to read:

The Engineer will be the sole judge as to whether devices are to be dismantled, picked up and reinstalled or are to be adjusted or realigned. No additional payment will be made for devices which are adjusted or realigned, the cost being considered as included in the bid item price paid for Temporary Impact Attenuator "In-Use."

701-5.08 Temporary Delineators (Standard Drawing 4-M-4.01): the title of the Standard Specifications is revised to read:

701-5.08 Temporary Delineators:

701-6.03(C) Drums: the second paragraph of the Standard Specifications is hereby deleted.

701-6.07 Pilot Services, and Flagging Services: of the Standard Specifications is revised to read:

The accepted quantities of pilot vehicles, measured as provided above, will be paid for at the unit bid price for pilot vehicle with driver, which price shall be full compensation for the work, complete including, but not limited to, furnishing and maintaining the vehicle and furnishing the driver. Overtime hours for pilot vehicles will be paid for at the unit bid price for pilot vehicle with driver. No additional payment will be made for overtime hours, the cost being considered as included in the unit bid price.

The accepted quantities of flagging services provided by local enforcement officers and civilian flaggers, measured as provided in Subsection 701-4.04(F), will be paid for at the unit bid price, which price shall be full compensation for the work, complete, including all overhead costs and fringe benefits. Overtime hours for local enforcement officers and civilian flaggers will be paid for at the respective unit bid prices. No additional payment will be made for overtime hours, the cost being considered as included in the unit bid price for local enforcement officers and civilian flaggers.

No payment will be made when DPS officers and their vehicles are used to provide flagging services.

ITEM 702007 – IMPACT ATTENUATION DEVICE (CRASH CUSHION):

Description:

The work under this item shall consist of furnishing all materials and installing attenuation devices of the types and at the locations and in accordance with the details shown on the project plans and the requirements of these Special Provisions.

Materials:

All materials used for construction of the crash cushion shall be new and conform to the most current specifications and details recommended by the manufacturer of the crash cushion designated for use. Options for the devices are the QuadGuard System as designed and manufactured by Energy Absorption Systems, Incorporated, of Chicago, Illinois; ADIEM as designed and manufactured by Trinity Highway Products of Dallas, Texas; or SCI100GM as designed and manufactured by Work Area Protections Corporation of St. Charles, Illinois. Attenuation devices approved for use are shown on ADOT's Approved Products List (APL). The attenuation devices shall be Test Level 3.

Construction Requirements:

Attenuation devices shall be placed at the locations shown on the project plans or as directed by the Engineer and shall conform to the details shown on the plans and the requirements of the manufacturer.

The soil under the paved pad as required by the manufacturer shall be compacted to not less than 95 percent of the maximum density found in accordance with the applicable test methods of the ADOT Materials Testing Manual, as directed and approved by the Engineer. When installation of the attenuation device is complete, all trash shall be removed from the surrounding area and the surrounding soil surface shall be smoothed to the elevation indicated on the project plans or as directed by the Engineer.

Method of Measurement:

Attenuation devices will be measured as a unit for each device installed.

Basis of Payment:

The accepted quantities of attenuation devices, measured as provided above, will be paid for at the contract unit price for the type designated in these Special Provisions, complete in place. No extra measurement or payment will be made for any concrete, reinforcing steel, hardware, fasteners, structural steel, pavement pad materials, any connection or transition section needed to connect the impact attenuator to guardrail or concrete barriers, grading in the area of the impact attenuator and required only to smooth vehicle approach paths to it, excavation and backfill required immediately adjacent to the barrier, as the cost thereof will be considered as included in the contract unit price for the impact attenuator, complete in place.

(704THRMO, 4/13/02)

SECTION 704 - THERMOPLASTIC PAVEMENT MARKINGS:

704-2.01 General Requirements: of the Standard Specifications is modified to add:

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

(708PPM, 4/02/04)

SECTION 708 - PERMANENT PAVEMENT MARKINGS:

708-2.02(A) General: of the Standard Specifications is modified to add:

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

708-2.02(B)(2) Roundness: of the Standard Specifications is revised to read:

When tested by the method provided in ASTM D 1155 (Procedure B), beads retained on any screen specified in the gradation requirements shall contain a minimum of 75 percent true spheres.

**ITEM 7320291 - ELECTRICAL CONDUIT (QUAD-DUCT) (CITY OF PEORIA STD
DETAIL PE-033)**

Description:

The work under this item shall consist of furnishing and installing the quad duct electrical conduit, per the City of Peoria Standard Detail PE-033, at the locations shown in the plans, including all labor, equipment and materials necessary for installation.

Method of Measurement:

Measurement for ITEM 7320291 ELECTRICAL CONDUIT (QUAD-DUCT) (CITY OF PEORIA STD DETAIL PE-033) will be measured by the linear foot.

Basis of Payment:

Payment for ITEM 7320291 ELECTRICAL CONDUIT (QUAD-DUCT) (CITY OF PEORIA STD DETAIL PE-033) will be paid for at the contract unit price per linear foot, which shall be full compensation for furnishing all labor, equipment and materials for the work, complete in place as shown in the project plans and specified in these specifications.

**ITEM 7320292 - ELECTRICAL CONDUIT (SHARED TRENCH) (QUAD-DUCT) (CITY OF
PEORIA STD DETAIL PE-033)**

Description:

The work under this item shall consist of furnishing and installing the quad duct electrical conduit in a shared trench with ADOT FMS and per the City of Peoria Standard Detail PE-033, at the locations shown in the plans, including all labor, equipment and materials necessary for installation.

Method of Measurement:

Measurement for ITEM 7320292 ELECTRICAL CONDUIT (SHARED TRENCH) (QUAD-DUCT) (CITY OF PEORIA STD DETAIL PE-033) will be measured by the linear foot.

Basis of Payment:

Payment for ITEM 7320292 ELECTRICAL CONDUIT (SHARED TRENCH) (QUAD-DUCT) (CITY OF PEORIA STD DETAIL PE-033) will be paid for at the contract unit price per linear foot, which shall be full compensation for furnishing all labor, equipment and materials for the work, complete in place as shown in the project plans and specified in these specifications.

ITEM 7320293 - ELECTRICAL CONDUIT (JACK AND BORE) (QUAD-DUCT) (CITY OF PEORIA STD DETAIL PE-033)

Description:

The work under this item shall consist of furnishing and installing the quad duct electrical conduit, per the City of Peoria Standard Detail PE-033, at the locations shown in the plans, extending through the Railroad right of way, including all labor, equipment and materials necessary for installation.

Method of Measurement:

Measurement for ITEM 7320293 ELECTRICAL CONDUIT (JACK AND BORE) (QUAD-DUCT) (CITY OF PEORIA STD DETAIL PE-033) will be measured by the linear foot.

Basis of Payment:

Payment for ITEM 7320293 ELECTRICAL CONDUIT (SHARED TRENCH) (QUAD-DUCT) (CITY OF PEORIA STD DETAIL PE-033) will be paid for at the contract unit price per linear foot, which shall be full compensation for furnishing all labor, equipment and materials for the work, complete in place as shown in the project plans and specified in these specifications.

ITEM 7320294 - ELECTRICAL CONDUIT (FUTURE LIGHTING SLEEVE)

Description:

The work under this item shall consist of furnishing and installing the future lighting sleeve, at the locations shown in the plans, including all labor, equipment and materials necessary for installation.

Method of Measurement:

Measurement for 7320294 ELECTRICAL CONDUIT (FUTURE LIGHTING SLEEVE) will be measured by the linear foot.

Basis of Payment:

Payment for 7320294 ELECTRICAL CONDUIT (FUTURE LIGHTING SLEEVE) will be paid for at the contract unit price per linear foot, which shall be full compensation for furnishing all labor, equipment and materials for the work, complete in place as shown in the project plans and specified in these specifications.

**ITEM 7320460 - PULL BOX (INTERCONNECT PRECAST) (CITY OF PEORIA STD
DETAIL PE-034)**

Description:

The work under this item shall consist of furnishing and installing the interconnect precast pull box, per the City of Peoria Standard Detail PE-034, at the locations shown in the plans, including all labor, equipment and materials necessary for installation.

Method of Measurement:

Measurement for 7320460 PULL BOX (INTERCONNECT PRECAST) (CITY OF PEORIA STD DETAIL PE-034) will be made on a per each basis.

Basis of Payment:

Payment for 7320460 PULL BOX (INTERCONNECT PRECAST) (CITY OF PEORIA STD DETAIL PE-034) will be paid for at the contract unit price per each unit, which shall be full compensation for furnishing all labor, equipment and materials for the work, complete in place as shown in the project plans and specified in these specifications.

**ITEM 7320461 - PULL BOX (INTERCONNECT COMMUNICATION VAULT) (CITY OF
PEORIA STD DETAIL PE-036)**

Description:

The work under this item shall consist of furnishing and installing the interconnect precast communication vault, per the City of Peoria Standard Detail PE-036, at the locations shown in the plans, including all labor, equipment and materials necessary for installation.

Method of Measurement:

Measurement for 7320461 PULL BOX (INTERCONNECT COMMUNICATION VAULT) (CITY OF PEORIA STD DETAIL PE-036) will be made on a per each basis.

Basis of Payment:

Payment for 7320461 PULL BOX (INTERCONNECT COMMUNICATION VAULT) (CITY OF PEORIA STD DETAIL PE-036) will be paid for at the contract unit price per each unit, which shall be full compensation for furnishing all labor, equipment and materials for the work, complete in place as shown in the project plans and specified in these specifications.

(733SGNL, 4/27/01)

SECTION 733 - SIGNAL INDICATIONS AND MOUNTING ASSEMBLIES:

733-2.01(A)(4) Backplates: of the Standard Specifications is revised to read:

Louvered backplates shall be furnished and installed on all vehicular signal sections. Anodized aluminum sheet, 16 gage, shall be used. All 12 inch signal faces shall have five inch backplates installed. All eight inch signal faces shall have eight inch backplates installed.

ITEM 7370455 - MISCELLANEOUS ELECTRICAL (AS-BUILT DRAWINGS)

Description:

The contractor shall provide "red line" drawings of all installed electrical equipment on project plan sheets. All measurements made for dimensioning shall be to the nearest 0.1 feet. All as-built drawings shall be 34-inch x 22-inch in size with red ink used to indicate dimensions of electrical items that are not shown on the original plan sheets. As-builts shall be made in such a manner that clear and legible copies can be made.

Underground conduit shall be dimensioned from centerline of roadway with starting and ending point station number.

All pull boxes and foundations shall indicate station number and offset from centerline of roadway. Distance from pull box to pull box and pull box to foundation shall be dimensioned.

Conductor and pole schedule shall reflect any changes made, such as number of conductors, size of conductors, circuit numbers, poles and mast arms.

Four sets of as-built electrical plan sheets shall be submitted to the Engineer prior to final acceptance of electrical equipment. Distribution of as-built plans shall be the following: Field Office, Electrical Design, Electrical Inspection and Electrical Blue Stake.

Method of Measurement:

ITEM 7370455 - MISCELLANEOUS ELECTRICAL (AS-BUILT DRAWINGS) will be measured as a single complete unit of work.

Basis of Payment:

ITEM 7370455 - MISCELLANEOUS ELECTRICAL (AS-BUILT DRAWINGS) will be paid for at the contract lump sum price upon complete submittal to and approval by the Engineer.

SECTION 803 LANDSCAPE PLATING MATERIALS:

803-2.02 Decomposed Granite and Granite Mulch: of the Standard Specifications is modified to add:

Decomposed granite and granite mulch shall be of Light Tan color, matching the existing decomposed granite and granite mulch at the southwest corner of Grand Avenue and 91st Avenue, and shall be of the following gradation:

- 100 percent passing 1 1/4-inch sieve
- 50-75 percent passing 3/4-inch sieve
- 10-20 percent passing No. 40 sieve

The contractor shall submit a 50-lb. sample of the decomposed granite and granite mulch in accordance with Subsection 105.03 of the Standard Specifications.

The Engineer shall approve the color and gradation of the decomposed granite or granite mulch prior to placement.

(808WTDS, 10/12/06)

SECTION 808 WATER DISTRIBUTION:

808-2.01(I)(2) Steel: the first paragraph of the Standard Specifications is revised to read:

Galvanized and black steel pipe shall conform to the requirements of ASTM A 53.

808-3.04 Bedding and Cover Material: the first paragraph of the Standard Specifications is revised to read:

Bedding and cover material for PVC piping, flexible emitter hose and 24-volt wiring shall conform to the following gradation requirements when tested in accordance with Arizona Test Method 201:

| Sieve Size | Percent Passing |
|------------|-----------------|
| No. 4 | 100 |
| No. 16 | 30 - 80 |
| No. 50 | 0 - 30 |
| No. 100 | 0 - 25 |
| No. 200 | 0 - 20.0 |

(810ERCON, 01/23/07)

SECTION 810 - EROSION CONTROL AND POLLUTION PREVENTION:

810-2.02 Straw Bales: the title and text of the Standard Specifications are revised to read:

810-2.02 Compost Stabilization:

Compost stabilization shall consist of composted organic vegetative materials stabilized with a tacking agent and used for erosion control.

Compost material shall be dark brown in color with the parent material composted and no longer visible. The structure shall be a mixture of fine and medium size particles and humus crumbs. The maximum particle size shall be within the capacity of the contractor's equipment for application to the constructed slopes. The odor shall be that of rich humus with no ammonia or anaerobic odors.

Compost shall also meet the following requirements:

| COMPOST MATERIAL | |
|--------------------------------|---|
| Cation Exchange Capacity (CEC) | Greater than 50 meq/100 g |
| Carbon: Nitrogen Ratio | Less than 20:1 |
| PH (of extract) | 6 – 8.5 |
| Organic Matter Content | Greater than 25% |
| Total Nitrogen (not added) | Greater than 1% |
| Humic Acid | Greater than 5% |
| Maturity Index | Greater than 50% on Maturity Index at a 10:1 ratio |
| Stability | Less than 100 mb O ₂ /Kg compost dry solids – hour |

Prior to furnishing on the project, compost mulch samples shall be tested for the specified microbiological and nutrient conditions, including maturity and stability, by a testing laboratory approved for testing of organic materials. Certified laboratory test results shall be submitted to the Engineer for approval.

Tacking agent shall be a naturally occurring organic compound and be non-toxic. It shall be a product typically used for binding soil and mulch in seeding or erosion control operations. Approved types shall consist of mucilage or gum by dry weight as active ingredient obtained from guar or plantago. The tacking agent shall be labeled indicating the type and mucilage purity.

The contractor shall have the tacking agent swell volume tested by an approved testing laboratory using the USP method. The standard swell volume shall be considered at 30 milliliters per gram. Material shall have a swell volume of at least 24 milliliters per gram. Certified laboratory test results shall be furnished to the Engineer for each shipment of homogenous consistency to be used on project areas or as directed by the Engineer. Tacking agent rates shall be adjusted to compensate for swell volume variation. Material tested with lesser volume shall have the tacking agent rate increased by the same percentage of decrease in swell volume from the standard 30 milliliters per gram. Material tested with greater volume may reduce tacking agent rates by the same percentage of increase in swell volume from the standard 30 milliliters per gram. Tacking agent shall be pure material without other starches, bentonite, or other compounds that would alter the swell volume test results of mucilage, or the effectiveness of the tacking.

810-2.03 Riprap and Rock Mulch: the first paragraph of the Standard Specifications is revised to read:

Riprap for cut and fill transitions designated on the plans shall be angular in shape and shall conform to the requirements of Section 913. Unless otherwise specified, riprap for cut and fill transitions shall conform to gradation A or B in the table below, as designated on the project plans.

810-2.03 Riprap and Rock Mulch: the second paragraph of the Standard Specifications is revised to read:

Rock mulch for pipe inlet and outlet protection, headwall and wingwall treatment, and rock check dams shall be angular in shape and shall conform to the requirements of Section 803. Rock mulch shall be in accordance with gradation C below, unless otherwise specified. Section 803 requirements for use of pre-emergent herbicide and for post-placement watering of rock mulch shall not apply to rock mulch applied under Section 810.

810-2 Materials: of the Standard Specifications is modified to add:

810-2.05 Erosion Control Blankets:

(A) General:

Erosion control blankets shall consist of temporary, degradable, rolled erosion-control products of short-term or extended-term duration, composed of natural fibers mechanically or structurally bound together with natural or polymer netting to form a continuous matrix.

Erosion control blankets of short-term duration shall have a minimum one-year degradation period for both the netting and fibers, and be composed of 100 percent virgin aspen excelsior wood fibers or 100 percent agricultural straw. Extended-term erosion control blankets shall have a minimum two-year degradation period for the netting and fibers, and be composed of heavy-duty excelsior blankets, or a mix of 70 percent straw and 30 percent coconut fibers, or 100 percent coconut fibers. Heavy-duty excelsior blankets used in the extended-term category shall have a minimum weight of 0.7 pounds per square yard. All other types of blankets, whether for short-term or extended-term use, shall have a minimum weight of 0.5 pounds per square yard.

Fibers for short-term erosion control blankets shall be encased top and bottom with photodegradable polypropylene or 100-percent biodegradable natural organic fiber netting, as specified on the plans. Should the plans not specify type of netting for short-term blankets, fibers shall be encased with photodegradable polypropylene. Fibers for extended-term blankets shall be encased within either a heavy duty UV-stabilized top netting (black) and bottom netting (green), or two UV-stabilized nettings (black). All netting for extended-term blankets shall be photodegradable polypropylene.

Erosion control blankets shall also conform to the following requirements:

| Property | Test Method | Short-Term Duration | Extend-Term Duration |
|---|-------------|---------------------|----------------------|
| Minimum mass per unit area (ounces/sq. yd.) | ASTM D 6475 | 8 | 8* |
| Minimum Thickness** (inches) | ASTM D 5199 | 0.25 | 0.25 |
| Minimum Tensile Strength (lbs./ft) *** | ASTM D 5035 | 75x75 | 100x100 |

*Heavy duty blankets shall have a minimum mass per unit area of 11 ounces per square yard.
**Numerical value represents total thickness of blanket, including netting.
***Numerical value represents minimum average test result in either direction.

The contractor shall provide Certificates of Analysis, in accordance with Subsection 106.05, for all erosion control blankets.

Fiber color shall be natural unless otherwise specified in the special provisions.

Fibers shall be free of weed seed, and shall be locked in place to form a mat of consistent thickness. Erosion control blankets using straw shall conform to the requirements of Subsection 810-2.05(B). Fibers shall remain evenly distributed over the entire area of the blanket after being placed on the slope.

Erosion control blankets shall be furnished in four-foot to eight-foot wide rolls, and shall be wrapped with suitable material to protect against moisture and extensive ultraviolet exposure prior to placement.

Each roll shall be labeled to provide sufficient identification for quality control purposes.

Staples shall be U-shaped, 11 gauge steel wire, and shall be one inch wide by six inches long or two inches wide by eight inches long.

(B) Straw Certification:

All wheat straw shall be free from noxious weeds in compliance with the standards and procedures of the Arizona Crop Improvement Association (ACIA) or the North American Weed Management Association (NAWMA). The contractor shall provide documentation that the product containing wheat straw was manufactured solely from straw certified as free of noxious weeds by the ACIA or NAWMA. Such certification shall be provided to the Engineer prior to delivery of the products to the project site. Products using wheat straw without such certification will not be acceptable.

810-2.06 Sediment Logs, Sediment Wattles, and Fiber Rolls:

(A) General:

Sediment logs, sediment wattles, and fiber rolls shall be manufactured or constructed rolls of fiber matrix, secured with netting, and used for the purpose of controlling erosion by slowing high flow water velocity and trapping silt sediments. Netting for fiber rolls and sediment wattles shall have a minimum durability of one year after installation, and shall be tightly secured at each end of the individual rolls.

The unit weight for wattles and fiber rolls shall be 0.144 pounds per inch of diameter per linear foot. Sediment log unit weight shall be 0.167 pounds per inch of diameter per linear foot. The minimum weight per linear foot for sediment logs, wattles, and fiber rolls shall be determined by multiplying the specified diameter of the device by the appropriate unit weight, in pounds per inch of diameter per linear foot per, as specified above.

Netting at each end of sediment logs and wattles shall be secured with metal clips or knotted ends to assure fiber containment.

(B) Sediment Logs:

Sediment logs shall be constructed of 100 percent curled-fiber aspen wood excelsior with interlocking barbs, and with 80 percent (± 10 percent) of the fiber at least six inches in length. Netting shall consist of long-term degradable, open weave, plastic or natural fiber containment mesh, with a maximum one-inch by one-inch grid. Sediment logs may also be filled with compost conforming to the requirements of Subsection 810-2.02. Mesh shall be photodegradable or biodegradable with a life expectancy of 12 to 24 months. Sediment logs shall be twenty inches in diameter. Unless approved by the Engineer, sediment logs shall be 10 feet (± 10 percent) in length.

(C) Sediment Wattles:

Sediment wattles shall be manufactured rolls composed of weed-free, 100-percent agricultural wheat or rice straw, or excelsior wood fiber, encased in a tube of long-term photodegradable plastic or biodegradable natural fiber netting with a maximum one-inch by one-inch grid. Sediment wattles shall have nominal diameters of 9, 12, or 18 inches, with lengths from seven to twenty-five feet, as specified on the plans. Fibers shall be evenly distributed throughout the wattle.

Wattles composed of wheat straw shall conform to the requirements of Subsection 810-2.05(B). Wheat straw wattles without the specified certification will not be acceptable.

(D) Fiber Rolls:

Fiber rolls shall be constructed from heavyweight manufactured blankets consisting of wood excelsior, straw, or coconut fibers, or any combination of such fibers, mechanically or structurally bound together with natural or polymer netting to form a continuous matrix. Blankets used to construct fiber rolls shall be between 6.5 and 8 feet wide by approximately 50 feet long. Wood excelsior blankets shall have 80 percent of its fibers equal to or greater than six inches. Blankets used to construct the fiber rolls shall have photodegradable plastic or biodegradable natural netting, with a maximum one-inch by one-inch grid, on at least one side.

Fiber rolls containing any amount of wheat straw shall conform to the requirements of Subsection 810-2.05(B). Fiber rolls with wheat straw that are not certified as specified herein will not be acceptable.

The contractor shall produce fiber rolls by rolling the blankets along their width to produce 50-foot lengths, and securing the rolls with jute twine spaced at 6.5-foot intervals along the roll for the full length and at six inches from each end. If shown on the plans or directed by the Engineer, the contractor shall cut the blankets before rolling to produce completed fiber roll lengths of between 14 and 50 feet. The nominal diameter of the finished rolls shall be 9, 12, or 18 inches, as specified on the plans. Overlapping of more than one blanket may be required to achieve larger diameters. When overlapping is required, the end of one blanket shall overlap six inches onto the end of the next blanket prior to rolling.

810-2.07 Sediment Control Berms:

Sediment control berms shall consist of soil obtained from within the project limits, or compost, or both, as called for on the plans.

Compost and tacking agent used in sediment control berms shall conform to the material requirements of Subsection 810-2.02.

810-3.02 Straw Bales: the title and text of the Standard Specifications are revised to read:

810-3.02 Compost Stabilization:

Compost stabilization shall be applied as shown on the plans or as directed by the Engineer.

810-3 Construction Requirements: of the Standard Specifications is modified to add:

810-3.05 Erosion Control Blankets:

(A) General:

Erosion control blankets shall be installed in accordance with the project plans and details, or as directed by the Engineer in accordance with the manufacturer's instructions.

For slope installations short-term duration blankets, as specified in Subsection 810-2.05, shall be used for slopes from 4:1 (horizontal to vertical) to 2:1. Extended-term blankets shall be used for slopes steeper than 2:1. For channel installations erosion control blankets shall conform to the requirements for extended-term duration.

The contractor shall coordinate with the blanket supplier for a qualified representative of the blanket supplier to be present at the job site at the start of installation to provide technical assistance as needed.

(B) Slope Installations:

Erosion control blankets shall be oriented in vertical strips and anchored with six-inch long staples in cohesive soil and eight-inch long staples in non-cohesive soil. A two-to-five inch overlap, or as required by the manufacturer, shall be required for side seams. A 6-inch overlap, shingle-style, shall be required for blanket ends. The distribution of staples shall be as recommended by the manufacturer. A six-inch deep by six-inch wide trench shall be located at the top of the slope. The erosion control blankets shall be stapled to the bottom of the trench with staples spaced six inches apart across the width of the blanket. The trench shall then be backfilled and compacted.

(C) Channel Installations:

For channel installations, erosion control blankets shall be installed parallel to the flow of water. The first blanket shall be centered longitudinally in mid-channel and anchored with staples, as recommended by the manufacturer. Subsequent blankets shall follow from channel center outward.

The distribution of staples shall be as recommended by the manufacturer.

Successive lengths of erosion control blankets shall be overlapped a minimum of six inches with the upstream end on top. Staple the overlap across the end of the overlapping lengths with staples spaced six inches apart.

A six-inch deep by six-inch wide trench shall be located at the upstream and top of side slope terminations of the blankets. The erosion control blankets shall be stapled to the bottom of the trench, with staples spaced six inches apart across the width of the blanket. The trench shall be backfilled and compacted.

810-3.06 Sediment Logs, Sediment Wattles, and Fiber Rolls:

(A) Sediment Logs:

Sediment logs shall be installed in channel bottoms, around catch basins, as check dams, or on slopes, as shown on the plans or as directed by the Engineer in accordance with the manufacturer's instructions. Sediment logs shall be secured with one-inch by one-inch by 46-inch hardwood stakes placed with a maximum spacing of two feet on center, or as shown on the plans. Each stake shall be intertwined with the netting on the downstream side of the log and driven approximately two feet below finished grade. Unless otherwise specified, soil shall be tamped against the upstream side of the log to assure that storm water is forced to flow through the log rather than under it.

Sediment logs installed in drainage channel bottoms shall be perpendicular to the flow of the water, and shall continue up the channel side slope two feet above the high water flow line. Spacing of the logs shall be as specified in the plans.

When sediment logs are used to construct check dams, the logs placed on the ground shall be buried four to six inches deep as shown on plans.

Logs placed on slopes shall be installed in a two-inch deep by five-inch wide anchor trench. The ends of adjacent logs shall be abutted tightly together so that water cannot undermine the logs.

(B) Sediment Wattles:

Sediment wattles shall be installed on slopes as shown on the plans, and in accordance with the manufacturer's instructions, or as directed by the Engineer. Sediment wattles shall be secured with wooden stakes as shown on the plans. The ends of adjacent wattles shall be abutted tightly together.

(C) Fiber Rolls:

Fiber rolls shall be installed on slopes as shown on the plans, and in accordance with the manufacturer's instructions, or as directed by the Engineer. If no spacing is shown on the plans, fiber rolls shall be placed as specified in the table below. Fiber rolls shall be installed in a two-inch deep by five-inch wide anchor trench. Fiber rolls shall be secured with wooden stakes having a 3/4-inch by 3/4-inch minimum cross-sectional dimension and 3-foot minimum length, or as shown on the plans. Each stake shall be driven through the center of the finished fiber roll, spaced a maximum of three feet apart, and driven approximately two feet into the ground. The ends of adjacent rolls shall be abutted together.

| Fiber Roll Spacing Table | |
|---------------------------------------|-----------------------|
| Slope (Horizontal to Vertical) | Spacing (feet) |
| Less than 6:1 | 50 |
| 6:1 to 4:1 | 25 |
| Greater than 4:1 and less than 2:1 | 17 |
| 2:1 to less than 1:1 | 10 |
| 1:1 and greater | 5 |

810-3.07 Sediment Control Berms:

Sediment control berms shall be installed as shown on the plans. The berm shall be considered a temporary erosion control protection measure. As directed by the Engineer, the contractor shall remove segments of the berm within areas that have been successfully re-vegetated prior to allowing traffic operations.

810-4 Method of Measurement: of the Standard Specifications is revised to read:

Silt Fence will be measured in accordance with Subsection 915-5.

Compost stabilization will be measured by the cubic yard of applied and tacked compost material.

Pipe Inlet/Outlet Treatment, Headwall and Wingwall Treatment, and Rock Check Dams will be measured per cubic yard of rock mulch. Cut and Fill Transitions will be measured per cubic yard of riprap.

Sand bags will be measured per each filled sand bag placed into service.

Erosion control blankets will be measured by the square yard of total ground area covered.

Sediment logs, sediment wattles, and fiber rolls will be measured by the linear foot.

Sediment control berms will be measured by the linear foot along the center line of the berm, parallel to the ground surface.

810-5 Basis of Payment: the second paragraph of the Standard Specifications is hereby deleted.

810-5 Basis of Payment: the last two paragraphs of the Standard Specifications are revised to read:

The accepted quantities of erosion control blankets, measured as provided above, will be paid for at the contract unit price per square yard, which price shall be full compensation for the work, complete in place, including all excavation and preparation; and furnishing, installing, and maintaining the erosion control blankets, as approved by the Engineer. Such

unit bid price shall be considered full compensation for either short-term or extended-term blankets. No additional payment will be made for technical assistance provided by representatives of the blanket supplier, the cost being considered as included in the unit bid price.

The accepted quantities of sediment logs, sediment wattles, and fiber rolls, measured as provided above, will be paid for at the contract unit price per linear foot, which price shall be full compensation for all labor, including excavation, preparation, and installation, and all materials, tools, stakes, equipment, and incidentals necessary for furnishing and installing the devices, complete in place, as approved by the Engineer. No additional payment will be made for sediment logs used as check dams, the cost being considered as included in the unit bid price paid for sediment logs.

The accepted quantities of compost stabilization, measured as provided above, will be paid for at the contract unit price per cubic yard of compost material applied and tacked, as directed by the Engineer. Such price shall be full compensation for the work, complete in place, including all materials, preparation, installation, tacking, maintenance, and removal of the compost-stabilized area.

The accepted quantities of sediment control berms, measured as provided above, will be paid for at the contract unit price per linear foot, regardless of the type of material used. Such price shall be full compensation for the work, complete in place, including all materials, preparation, compaction, installation, and maintenance, and removal of the sediment control berm.

No additional measurement or payment will be made for temporary features subsequently designated by the Engineer as permanent, the cost being considered as included in the unit bid price.

No additional measurement or payment will be made for associated earthwork, ground preparation, overlapping, stakes, silt and debris removal and disposal, or maintenance, the cost being considered as included in the unit bid price.

(905GRDRL, 12/30/05)

SECTION 905 - GUARDRAIL:

905-1 Description: of the Standard Specifications is revised to read:

The work under this section shall consist of furnishing all labor, equipment, and materials to install guardrail, guardrail transitions, tangent and flared guardrail terminals, and end anchors, constructed new, reconstructed, or constructed from salvage in accordance with the locations and details shown on the plans and the requirements of these specifications, including all necessary components and delineation.

905-2 **Materials:** of the Standard Specifications is revised to read:

Materials for guardrail, guardrail transitions, end anchors, and reflector tabs shall conform to the requirements of Section 1012 and the plans.

Materials for tangent and flared guardrail terminals shall conform to the requirements of the approved manufacturer drawings and specifications. Only those tangent and flared guardrail terminals shown on the plans will be allowed.

Prismatic guardrail-mounted barrier markers shall conform to the requirements of Section 1008. Prismatic guardrail-mounted barrier markers shall be ultraviolet-resistant, and shall have a trapezoidal-shaped body in accordance with the Standard Drawings.

Flexible guardrail markers, shall be made of a high quality, impact- and ultraviolet-resistant, flexible, white-colored plastic or similar material with a minimum thickness of 3/16 inch. This material shall be configured into a rectangular body that is flat, curvilinear or tubular with a width of between three and four inches. The minimum reflective area for L-shaped and T-shaped markers, attached to the top of wooden posts, and U-shaped markers, attached to the top of steel I-beam posts, shall be ten square inches. The reflectorized surface for flexible vertical guardrail markers attached to the approach side of posts shall be three inches wide by five inches long.

Adhesive materials for applying reflective sheeting to guardrail terminals, metal or plastic guardrail reflector tabs, and flexible guardrail markers shall be in accordance with the sheeting manufacturer's recommendations.

Guardrail delineator material shall be specifically manufactured to provide roadside delineation. All delineators shall consist of complete units that are pre-cut, pre-drilled as applicable, and ready to be installed in the field. The delineators shall be packaged in such manner as to prevent damage and deterioration during shipping and storage.

Reflective sheeting for object markers on tangent and flared guardrail terminals, and reflective sheeting used for all other guardrail markers, including flexible guardrail markers and reflector tabs, shall conform to the requirements of Section 1007.

Transparent colors, inks, and paints used in fabrication shall be of the type and quality recommended by the sheeting manufacturer. Transparent colors shall be applied with screen mesh P.E. 157 using fill pass.

Tangent and flared guardrail terminals, flexible guardrail markers, reflective sheeting products and inks approved for use are shown on the Department's Approved Products List (APL). Copies of the most current version of the APL are available on the Internet from the Arizona Transportation Research Center (ATRC), through its PRIDE program.

905-3.01 **General:** of the Standard Specifications is revised to read:

The construction of the various types of guardrail, guardrail transitions, tangent and flared guardrail terminals, and end anchors shall include the assembly and erection of all component parts complete at the locations shown on the project plans or as directed by the Engineer. All materials shall be new except as provided for under Subsections 905-3.04 and 905-3.05.

The various types of guardrail shall be constructed with wood blocks on either steel or wood posts, at the option of the contractor, except where the post materials to be used are specified on the plans. The same type of post shall be used in any one continuous length of guardrail.

All metal work shall be fabricated in the shop. No punching, drilling, cutting or welding shall be done in the field, except as provided for under Subsections 905-3.04 and 905-3.05. All metal cut in the field shall be cleaned and painted with two coats of zinc paint, in accordance with Section 1002.

Where field cutting or boring of wood posts and blocks is permitted, the affected areas shall be treated in accordance with the American Wood Preservers Association Standard M4.

Where wood posts with rectangular sections are used, the posts shall be set so that the longest dimension is perpendicular to the rail.

All bolts shall extend beyond the nuts a minimum of two threads, except that all bolts on posts adjacent to pedestrian traffic shall be cut off 1/4 inch from the nut.

All bolts shall be securely tightened unless torque requirements are specified on the plans or manufacturer's drawings.

Guardrail elements shall be spliced by lapping in the direction of traffic in the nearest adjacent lane.

When guardrail is being constructed, or reconstructed under traffic, the contractor shall conduct its operations so as to constitute the least hazard to the public and construction personnel. Traffic control shall be provided in accordance with the requirements of Section 701.

905-3.02 **Roadway Guardrail:** of the Standard Specifications is revised to read:

Guardrail posts shall be set to the line, grade, and spacing shown on the plans. Earthwork placement, grading, compacting, and bituminous surfacing shall be completed prior to installation of the guardrail posts.

Wood posts shall be placed in pre-punched, or pre-drilled pilot holes and driven the final 10 inches to grade, unless otherwise approved by the Engineer. Steel posts shall either be driven full depth, or placed in manually or mechanically dug holes and driven the final 10 inches to grade. Pre-punched post holes, or full depth post driving shall not be used at locations where damage to the curb, gutter, sidewalk, buried items, shoulders or pavement might occur. The Engineer will be the sole judge as to whether driving of posts will be allowed.

Driving of posts shall be accomplished in a manner which will prevent battering, burring, separation of the galvanizing from the steel or distortion of the post. Any post which is bent or otherwise damaged to the extent it is unfit for use in the finished work, as determined by the Engineer, shall be removed and replaced at no additional cost to the Department.

Where curb, gutter, sidewalk, buried items, shoulders or pavement are disturbed in the construction of guardrail, the damage shall be repaired as approved by the Engineer.

Where the top surface of a concrete box culvert is at an elevation which would interfere with full depth post placement, the post shall be placed and anchored in accordance with the requirements of Subsection 905-3.06. Where the top surface of a pipe culvert or other item is at an elevation which would interfere with full depth post placement, the post shall be eliminated and nested steel W-beam shall be placed in accordance with the requirements of Subsection 905-3.09.

The space around and under the posts placed in manually or mechanically dug holes shall be backfilled with moist soils placed in compacted lifts as approved by the Engineer.

Wood blocks shall be toe-nailed to the wood posts with one 16-penny galvanized nail on each side of the top of the block. Blocks shall be set so that the top of the block is no more than 1/2 inch above or below the top of the post, unless otherwise shown on the project plans.

Rail elements shall be spliced at 25-foot intervals or less. Rail elements shall be spliced at posts unless otherwise shown on the project plans. Rail elements at joints shall have full bearing. When the radius of curvature is 150 feet or less, the rail elements shall be shop curved.

905-3.03 **Guardrail End Terminal Assemblies:** the title and text of the Standard Specifications are revised to read:

905-3.03 **Guardrail End Anchors:**

End anchors shall be installed in accordance with the plans. Foundation tubes shall be supplied as part of the end anchor. Foundation tubes shall be installed with an approved driving head. The tubes shall not be driven with the wood post in place. If approved by the Engineer, foundation tubes may also be installed in drilled holes. When foundation tubes are placed in drilled holes, the space around and under the tubes shall be backfilled with moist soils placed in compacted lifts, as approved by the Engineer. The foundation tube shall not protrude more than four inches above the ground as measured along a five foot cord.

905-3.04 Construct Guardrail from Salvage: of the Standard Specifications is revised to read:

Salvaged guardrail, guardrail transitions, end anchors, and other guardrail systems shall be constructed at the locations shown on the project plans and in accordance with the provisions specified herein for new construction.

If any salvaged materials are deemed by the Engineer, to be unsuitable for reuse or if the quantities of salvaged materials are insufficient to complete the work, the contractor shall furnish new materials in sufficient quantities to complete the work and the cost of furnishing such materials will be paid for in accordance with the provisions of Subsection 109.04.

Salvaged foundation tubes for end anchors shall not be reused.

Where new bolt holes in rail elements are required, the holes shall be made by drilling or punching. Flame-cut bolt holes will not be permitted. All metal cut in the field shall be cleaned and painted in accordance with Section 1002.

905-3.05 Reconstruct Guardrail: of the Standard Specifications is revised to read:

Existing guardrail, guardrail transitions, tangent and flared guardrail terminals, end anchors, and other guardrail systems shall be removed and reconstructed at the locations shown on the project plans, and in accordance with the provisions specified herein for new construction.

When reconstruct guardrail is specified, posts shall be completely removed and then reconstructed. When end anchors are removed, the existing concrete foundation shall be fully removed and the hole backfilled with moist soil in compacted lifts, as approved by the Engineer.

All guardrail components requiring removal shall be removed in such a manner as to prevent damage to and minimize the loss of the components.

If any materials designated for reconstruction are deemed by the Engineer to be unsuitable for reuse or if the quantities of existing materials are insufficient to complete the work, the contractor shall furnish new materials in sufficient quantities to complete the work and the cost of furnishing such materials will be paid for in accordance with the provisions of Subsection 109.04. Reconstructed tangent and flared guardrail terminals and end anchors shall be installed with new foundation tubes.

Items designated to be reused which are lost, damaged or destroyed as a result of the contractor's operations shall be repaired or replaced by the contractor at no additional cost to the Department.

Existing posts, blocks, rail elements or hardware which are not required for guardrail reconstruction or which the Engineer deems unsuitable for reconstruction, shall be removed and disposed of as directed by the Engineer.

Where new bolt holes in reused rail elements are permitted and approved by the Engineer, the holes shall be made by drilling or punching. Flame-cut bolt holes will not be permitted. All metal cut in the field shall be cleaned and painted in accordance with Subsection 905-3.01.

905-3.06 Bolted Guardrail Anchors: of the Standard Specifications is revised to read:

Bolted guardrail anchors shall consist of bolting two steel brackets to the shortened post and to the box culvert roof as shown on the plans.

Where the elevation of the top surface of a concrete box culvert or other similar installation prevents the placement of a post of the specified length, the posts shall be shortened and anchored in accordance with the details shown on the plans.

Where field-cutting or boring of wood posts or blocks is required, the affected areas shall be treated in accordance with Subsection 905-3.01.

905-3.10 Guardrail Terminals: the title and text of the Standard Specifications are revised to read:

905-3.10 Tangent and Flared Guardrail Terminals:

Tangent and flared guardrail terminals shall be installed in accordance with the manufacturer's specifications and approved drawings. When shown on the plans as alternatives, all tangent-type or flare-type terminals shall be from the same manufacturer without mixing brands. Prior to starting work, the contractor shall submit the current version of the manufacturer's approved drawings and installation manuals for each type of guardrail terminal to be installed on the project. In case of discrepancy or conflict, the current manufacturer's specifications and approved drawings shall govern. Manufacturer's dimensions relative to the finished surface shall be measured along a five-foot cord.

Earthwork placement, grading, compacting, and bituminous surfacing shall be completed prior to installation of posts for guardrail terminals. The contractor shall install the posts in a manner that prevents heaving or other damage to the surface material. If the Engineer determines that heaving or other damage has occurred, the contractor shall remove and replace surface material at no additional cost to the Department.

905-3.11 Guardrail Delineation: is hereby added to the Standard Specifications:

(A) General:

Flexible guardrail markers shall be either L-shaped, U-shaped (for steel I-beam posts), or T-shaped delineators, or flexible vertical delineators. Flexible L-shaped, U-shaped, and T-shaped delineators shall be installed on the top of the posts, and shall be placed as close as possible to the roadway edge of the post with the retroreflective surface facing oncoming traffic of the nearest traveled lane. Flexible vertical delineators shall be installed on the side of the post facing oncoming traffic, level and true, with the retroreflective sheeting 38 inches above the roadway surface.

When nails are used to secure delineation to the top of wood posts, a minimum of two nails shall be driven at an angle to prevent the post from splitting. Side-mounted flexible vertical delineators shall be secured to wood posts with two 1/8-inch diameter by two-inch long galvanized lag screws and flat washers. Side mounted delineation shall be secured to metal posts by drilling two holes through the post and attaching with two galvanized 1/8-inch diameter by 3/4-inch long bolts, flat washers, and lock nuts.

The color of the retroreflective portion of the barrier markers and flexible delineators shall conform to the color of the adjacent edge line. Silver-faced guardrail reflector tabs shall be installed on the right hand side of all roadways and ramps. Yellow-faced tabs shall be installed on the left-hand side of one-way roadways and ramps. Field application of retroreflective sheeting will not be allowed. The manufacturer shall apply all sheeting in the factory.

The contractor shall remove and replace damaged delineation at no additional cost to the Department.

(B) Guardrail Delineation:

Guardrail reflector tabs shall be installed on the W-beam at every sixth post, beginning with the post number shown in Table 905-1. On radial sections of guardrail, the reflector tabs shall be placed on the W-beam at every other post.

In addition to the guardrail reflector tabs, flexible guardrail markers shall also be installed when the average project elevation, as shown on the plans, is greater than 4,000 feet. Flexible guardrail markers shall be installed on every 18th guardrail post beginning with the post number shown in Table 905-1.

The slotted part of reflector tabs shall be installed under the guardrail bolt head with the reflector facing oncoming traffic. The exposed ends of the slotted part of the tab shall be bent up against and then over the top of the bolt head.

(C) Tangent and Flared Guardrail Terminal Delineation:

Delineation for tangent and flared guardrail terminals shall be compatible with the average project elevation and traffic direction shown on the plans. The contractor shall maintain consistency within the project limits by selecting the same type of delineation for all similar installations.

For tangent and flared guardrail terminals used on a project with an average elevation of less than 4,000 feet, the contractor shall use either prismatic barrier markers, L-shaped or T-shaped markers, or flexible vertical delineators on the posts shown in table 905-1.

For tangent and flared guardrail terminals used on a project with an average elevation of greater than 4,000 feet, the contractor shall use either L-shaped or T-shaped markers, or flexible vertical delineators on the posts shown in table 905-1. Prismatic barrier markers shall not be used for projects greater than 4,000 feet in elevation.

When using L-shaped or T-shaped markers with the ET-PLUS in asphalt pavement areas, or with the SRT-350 regardless of pavement surface, the contractor shall substitute U-shaped markers or flexible vertical delineators (for steel I-beam posts) for post number two, regardless of project elevation.

The configuration of reflective sheeting object markers on the approach faces of the ET-PLUS, SKT-350, and FLEAT-350 shall conform to Standard Drawings. The dimensions of the object marker decals for the approach faces of the FLEAT-350, SKT-350, and ET-PLUS shall be modified as needed to fully cover the head configuration. The configuration and type of reflective sheeting object markers on the departure sides of the ET-PLUS, SKT-350, or FLEAT-350 shall conform to Standard Drawings.

The configuration of reflective sheeting on the approach side of the SRT-350 end-piece shall consist of three diamond shapes, each with side dimensions of four inches, vertically stacked corner-to-corner, and placed in the center of the approach face.

| TABLE 905-1 GUARDRAIL DELINEATION POST PLACEMENT | | |
|--|---------------------------------------|---|
| Terminal Type | Prismatic Barrier Marker Post Numbers | Begin Reflector Tabs and Flexible Markers* With Post Number |
| ET-PLUS or SKT-350 | 2, 4, 6, 8 | 10 |
| SRT-350 or FLEAT-350 | 2, 4, 6 | 8 |
| *Flexible markers shall only be used for elevations 4000 feet and above. | | |

905-4 Method of Measurement: of the Standard Specifications is revised to read:

The limits of measurement for the various guardrail items are shown on the plans.

Guardrail, of the type shown on the project plans, will be measured by the linear foot along the face of the rail element from center to center of the end posts, exclusive of tangent and flared guardrail terminals, end anchors, and guardrail transitions.

Tangent and flared guardrail terminals will be measured by the unit each, including all components and delineation required for a complete installation as shown on the plans and in the approved manufacturer's drawings and installation manual.

Guardrail end anchors will be measured by the unit each, including foundation tubes, delineation, and all other components required for a complete installation as shown on the plans.

Guardrail transitions will be measured by the unit each, including delineation, and all other components required for a complete installation as shown on the plans.

Rub rail will be measured by the unit for each rail installed.

Nested guardrail, Type 1, 2, or 3, installed as an appurtenance to new guardrail, shall be measured by the linear foot of additional steel W-beam attached to the guardrail W-beam, using guardrail hardware required for a complete installation, as shown on the plans.

Bolted anchors for guardrail will be measured by the unit for each post anchored as shown on the plans. One unit will consist of the cut and fitted guardrail post, brackets and hardware.

Constructing the various types of guardrail, guardrail transitions, and end anchors from salvage will be measured by the linear foot, or by the unit each, using the limits of measurement specified for new construction.

Reconstructing the various types of guardrail, guardrail transitions, tangent and flared guardrail terminals, and end anchors will be measured by the linear foot, or by the unit each, using the limits of measurement specified for new construction.

905-5 **Basis of Payment:** of the Standard Specifications is revised to read:

The accepted quantities of guardrail, measured as provided above, will be paid for at the contract unit price per linear foot for the types of guardrail installation designated in the bidding schedule, complete in place, including all guardrail delineation, excavation, backfill and disposal of surplus material.

The accepted quantities of tangent and flared guardrail terminals, measured as provided above, will be paid for at the contract unit price each, complete in place, including all components and delineation as required, excavation, backfill and disposal of surplus material.

The accepted quantities of guardrail end anchors, measured as provided above, will be paid for at the contract unit price each, complete in place, including all guardrail components and delineation as required, excavation, backfill, disposal of surplus material, and installation of foundation tubes.

The accepted quantities of guardrail transitions to concrete barriers, measured as provided above, will be paid for at the contract unit price each, complete in place, including guardrail, posts, blocks, hardware, terminal connection, excavation, backfill and disposal of surplus material. Concrete barrier that is constructed with a guardrail transition shall be measured and paid for in accordance with the requirements of Section 910 for concrete barrier transition.

Payment for furnishing and placing earthwork and surfacing material for pavement widening associated with new guardrail and at the flares of guardrail terminals will be measured and paid for under the respective contract items.

The accepted quantities of rub rail, measured as provided above, will be paid for at the contract unit price each, complete in place, including rub rail, back blockouts, and hardware as required.

The accepted quantities of nested guardrail, Type 1, 2, or 3, attached to the guardrail W-beam, and measured as provided above, will be paid for at the contract unit price per linear foot, complete in place.

The accepted quantities of bolted guardrail anchors, measured as provided above, will be paid for at the contract unit price each, and shall be full compensation for the work, complete in place, including steel brackets, hardware, excavation, backfill, removing and replacing surfacing, cutting and fitting steel beam posts or timber posts, drilling anchor bolt holes in steel posts, timber posts and box culverts, and disposal of surplus materials.

The accepted quantities of construct guardrail, guardrail transitions, and end anchors from salvage; or reconstruct guardrail, guardrail transitions, tangent and flared guardrail terminals, and end anchors; measured as provided above, will be paid for at the contract unit price, complete in place, including all new guardrail delineation, removal of existing delineation as necessary, excavation, backfill and disposal of surplus or unusable materials. Payment for reconstructing end anchors will include all costs for providing and installing new foundation tubes.

The contractor will be paid in accordance with the provisions of Subsection 109.04 for furnishing new posts, blocks, rail elements or hardware to replace components deemed by the Engineer unsuitable for reuse, or to supplement insufficient existing quantities for reconstructing the various types of guardrail, or for constructing the various types of guardrail from salvage.

(908CGSD, 07/21/05)

SECTION 908 - CONCRETE CURBS, GUTTERS, SIDEWALKS AND DRIVEWAYS:

908-1 **Description:** of the Standard Specifications is revised to read:

The work under this section shall consist of furnishing all materials and constructing Portland cement concrete curb, curb and gutter, ramp curb, sidewalk, sidewalk ramps, driveways, and valley gutters at the locations shown on the project plans in accordance with the details shown on the plans and the requirements of these specifications.

908-2 **Materials:** of the Standard Specifications is modified to add:

908-2.04 **Detectable Warning Strip:**

Detectable warning strips shall consist of a pre-fabricated mat with truncated domes aligned in a square grid matrix on a flat substrate, or other pre-fabricated materials meeting the requirements of the Standard Drawings. Detectable warning strips shall contrast visually with the sidewalk ramp, and shall conform to the current requirements of the Americans with Disabilities Act Accessibility Guidelines (ADAAG). Detectable warning strips shall be pre-fabricated from durable material approved by the Department. All detectable warning strips installed within the project limits shall be the same type, unless shown otherwise on plans or approved by the Engineer.

Only those pre-fabricated detectable warning strips shown on the Department's Approved Products List (APL) shall be used. Copies of the most current version of the APL are available on the internet from the Arizona Transportation Research Center (ATRC), through its PRIDE program.

908-3 Construction Requirements: the second paragraph of the Standard Specifications is revised to read:

Prior to placing concrete curb, curb and gutter, driveway, valley gutter, sidewalk ramp, or sidewalk, the material on which they are to be placed shall be compacted to a depth of at least six inches to a density of not less than 95 percent of the maximum density determined in accordance with the requirements of the applicable test methods of the ADOT Materials Testing Manual as directed and approved by the Engineer.

908-3 Construction Requirements: of the Standard Specifications is modified to add:

The top surface of detectable warning strips, exclusive of the truncated domes, shall be within $\pm 1/16$ inch of the sidewalk ramp surface in accordance with the requirements of the ADAAG. Detectable warning strips shall be installed in accordance with manufacturer's instructions and current industry practice. In case of discrepancy the manufacturer's instructions shall govern.

908-4 Method of Measurement: the first paragraph of the Standard Specifications is revised to read:

Concrete single curb and curb and gutter will be measured by the linear foot along the flow line. Lengths of depressed curb and depressed curb and gutter at driveway and sidewalk ramp locations will be included in the measurement. Lengths occupied by catch basins will be excluded from the measurement. No measurement will be made for ramp curb.

908-4 Method of Measurement: of the Standard Specifications is modified to add:

Concrete sidewalk ramps, of the type shown on the plans, will be measured as a unit for each sidewalk ramp constructed, including detectable warning strip. The limits of measurement for the various sidewalk ramp types will be as shown on the plans.

908-5 Basis of Payment: the second paragraph of the Standard Specifications is revised to read:

The accepted quantities of sidewalk ramps, measured as provided above, will be paid for at the contract unit price each, which price shall be full compensation for the work, complete in place, including furnishing and placing embankment material, excavating, removing unsuitable material, backfilling and compacting, surface finishing, and furnishing and installing the detectable warning strip. No separate measurement or payment will be made for the ramp curb along the back edge or side of sidewalk ramps, nor for the detectable warning strip, the costs being considered as included in the price of contract items. No

separate payment will be made for the curb along the back edge of sidewalk connecting sidewalk ramps at an intersection, the cost being considered as included in the price of contract items.

(910CNBR, 4/13/04)

SECTION 910 - CONCRETE BARRIERS:

910-2 **Materials:** the first paragraph of the Standard Specifications is revised to read:

Unless otherwise shown on the plans, concrete shall be Class S Portland cement concrete conforming to the requirements of Section 1006 with a compressive strength of at least 4,000 pounds per square inch at 28 days.

(922UCMC, 4/13/04)

SECTION 922 UTILITY CONCRETE FOR MISCELLANEOUS CONSTRUCTION:

922-3 **Construction Requirements:** the third paragraph of the Standard Specifications is revised to read:

The minimum cement content per cubic yard of concrete shall be 470 pounds.

If approved by the Engineer, the contractor may substitute commercially available sacks of redi-mix concrete, suitable for the intended purpose. Should such substitution be approved, the cement content specified herein and the requirements of Subsection 922-2 shall not apply.

(923TRN, 1/20/05)

ITEM 9230001 - PROVIDE ON-THE-JOB TRAINING:

The contractor shall provide on-the-job training aimed at developing full journeymen in the type of trade or job classification involved.

The number of trainees to be trained under this project shall be at least X, and the required number of training hours is XXXX; however, the contractor shall make every possible effort to provide additional trainees with training and shall see that all trainees are afforded every opportunity to participate in as much training as is practically possible to provide. Due to turnover and attrition of trainees in any one trainee slot, it is expected that continuous trainee replacements may be necessary during the contract work period.

In the event that a contractor subcontracts a portion of the contract work, he shall determine how many, if any, of the trainees are to be trained by the subcontractor, provided, however, that the contractor shall retain the primary responsibility for meeting the training requirements imposed by this special provision. The contractor shall also insure that this training special provision is made applicable to such subcontract. Where feasible, 25 percent of apprentices or trainees in each occupation shall be in their first year of apprenticeship or training.

The number of trainees shall be distributed among the work classifications on the basis of the contractor's needs and the availability of journeymen in the various classifications within a reasonable area of recruitment. Prior to commencing construction, the contractor shall submit to the Highways Division for approval the number of trainees to be trained in each selected classification and training program to be used. Furthermore, the contractor shall specify the starting time for training in each of the classifications. The contractor will be credited for each trainee employed by him on the contract work who is currently enrolled or becomes enrolled in an approved program and will be reimbursed for such trainees as provided hereinafter.

Training and upgrading of minorities and women toward journeyman status is a primary objective of this Training Special Provision. Accordingly, the contractor shall make every effort to enroll minority trainees and women (e.g., by conducting systematic and direct recruitment through public and private sources likely to yield minority and women trainees) to the extent that such persons are available within a reasonable area of recruitment. The contractor will be responsible for demonstrating the steps that he has taken in pursuance thereof, prior to a determination as to whether the contractor is in compliance with this Training Special Provision. This training commitment is not intended, and shall not be used, to discriminate against any applicant for training, whether a member of a minority group or not.

No employee shall be employed as a trainee in any classification in which he has successfully completed a training course leading to journeyman status or in which he has been employed as a journeyman. The contractor shall satisfy this requirement by including appropriate questions in the employee application or by other suitable means. Regardless of the method used, the contractor's records shall document the findings in each case.

The minimum length and type of training for each classification will be as established in the training program selected by the contractor and approved by the Highways Division and the Federal Highway Administration. The Highways Division and the Federal Highway Administration will approve a program if it is reasonably calculated to meet the equal employment opportunity obligations of the contractor and to qualify the average trainee for journeyman status in the classification concerned by the end of the training period. Furthermore, Apprenticeship programs registered with the U.S. Department of Labor, Employment and Training Administration, Bureau of Apprenticeship and Training, or with a State apprenticeship agency recognized by the Bureau and training programs approved but not necessarily sponsored by the U.S. Department of Labor, Bureau of Apprenticeship and Training will also be considered acceptable provided they are being administered in a manner consistent with the equal employment obligations of Federal-aid highway construction contracts. Specifically, union apprenticeship programs, Associated Builders and Contractor's apprenticeship program and Associated General Contractor's Arizona

Training program may be used. Additionally, in-house training programs are approved on a case-by-case basis. Approval or acceptance of a training program shall be obtained from the Highways Division prior to commencing work on the classification covered by the program. It is the intention of these provisions that training is to be provided in the construction crafts rather than clerk-typists or secretarial-type positions. Training is permissible in lower level management positions such as office engineers, estimators, timekeepers, etc., where the training is oriented toward construction applications. Training in the laborer classification may be permitted provided that significant and meaningful training is provided and approved by the Federal Highway Administration. Some off site training is permissible as long as the training is an integral part of an approved training program and does not comprise a significant part of the overall training.

Except as otherwise noted below, the contractor will be reimbursed 80 cents per hour of training given an employee on this contract in accordance with an approved training program. As approved by the engineer, reimbursement will be made for training persons in excess of the number specified herein. This reimbursement will be made even though the contractor receives additional training program funds from other sources, provided such other source does not specifically prohibit the contractor from receiving other reimbursement. Reimbursement for off site training indicated above may only be made to the contractor where he contributes to the cost of the training, provides the instruction to the trainee or pays the trainee's wages during the off site training period.

No payment will be made to the contractor if either the failure to provide the required training, or the failure to hire the trainee as a journeyman, is caused by the contractor and evidences a lack of good faith on the part of the contractor in meeting the requirements of this Training Special Provision. It is normally expected that a trainee will begin his training on the project as soon as feasible after start of work utilizing the skill involved and remain on the project as long as training opportunities exist in his work classification or until he has completed his training program. However, when such training opportunities are suspended or interrupted under the contract which the trainee was designated, the contractor may continue training under other ADOT contracts regardless of their funding, except that no reimbursement for such training shall be made on non-federal aid contracts, under this training special provision. It is not required that all trainees be on board for the entire length of the contract. A contractor will have fulfilled his responsibilities under this Training Special Provision if he has provided acceptable training to the number of trainees specified. The number trained shall be determined on the basis of the total number enrolled on the contract for a significant period.

Trainees will be paid at least 60 percent of the appropriate minimum journeyman's rate specified in the contract for the first half of the training period, 75 percent for the third quarter of the training period, and 90 percent of the last quarter of the training period, unless apprentices or trainees in an approved existing program are enrolled as trainees on this project. In that case, the appropriate rates approved by the Departments of Labor or Transportation in connection with the existing program will apply to all trainees being trained for the same classification who are covered by this Training Special Provision.

The contractor shall furnish the trainee a copy of the program he will follow in providing the training. The contractor shall provide each trainee with a certification showing the type and length of training satisfactorily completed.

The contractor shall provide for the maintenance of records and furnish periodic reports documenting his performance under this Training Special Provision.

The contractor shall submit a weekly training report to the Engineer. The report shall be prepared on forms obtained from the Civil Rights Office, 1135 N. 22nd Avenue (second floor), mail drop 154A, Phoenix, Arizona 85009, phone (602) 712-7761.

At the preconstruction conference, the contractor shall submit a schedule which will indicate each trainee's name, social security number, sex, race/ethnicity, the program in which the trainee is enrolled, the approximate number of hours each trainee will be trained in each phase of the work, the crafts to which the trainees belong and the estimated period of time that they will be employed as trainees. A supplemental schedule shall be submitted to the Engineer when a revision in the original schedule is necessary. At the time each trainee is scheduled to begin work, the contractor shall submit to the Engineer each trainee's name, social security number, sex, and race/ethnicity. The contractor must also submit proof that the trainee is enrolled in an approved training program.

At the conclusion of the project or at the end of each calendar year for multi-year projects, the contractor must submit to the Affirmative Action Office and to the project office, the same information described hereinbefore for each trainee that worked on the project. Additionally, the contractor must indicate if the trainee graduated from the program, was terminated due to cause, or was transferred to another project to continue his/her training.

If, at the preconstruction conference, the contractor does not provide a schedule containing the specified information, the Engineer will notify the contractor of the infraction. Failure to provide the schedule within 15 calendar days from the date of notification shall be considered as willful non-compliance. The Engineer will cause to be withheld from the contractor's monthly payments additional retainage in the amounts specified below. The amount withheld from the monthly payment shall be held until an acceptable schedule or supplemental schedule has been submitted.

The Engineer will monitor the use of trainees based on the contractor's schedule, supplemental schedules, and weekly training report. If the use of trainees is not in conformance with the schedule or supplemental information, the Engineer will cause to be withheld from the contractor's monthly payments additional retainage in the amounts specified below. Conformance with the schedule will be considered acceptable when the cumulative number of trainee hours earned to date under the Item 9230001 - PROVIDE ON-THE-JOB TRAINING is at least 90 percent of that shown on the schedule, for the work performed to date.

ADDITIONAL RETAINAGE

| | |
|--|-----------------------|
| First and Second monthly payments following infraction | \$1,000.00 each month |
| Third monthly payment and thereafter | \$5,000.00 each month |

The amount withheld from the monthly payment shall be held until an acceptable schedule or supplemental schedule has been submitted and until conformance with the schedule has been determined.

If, at the completion of the contract, the Department is holding additional retainage in accordance with this specification, the retainage will become the property of the Department, not as penalty but as liquidated damages.

(924CQC, 01/22/07)

ITEM 9240170 - CONTRACTOR QUALITY CONTROL:

1.0 Description:

The work under this section shall consist of furnishing all personnel, materials, supplies, facilities and equipment necessary to perform all certification of test equipment, sampling, testing, and other control actions. The work shall also include the preparation of linear control charts, Weekly Quality Control Reports, and other reports and records as described in Subsection 106.04(C) of the Specifications.

2.0 Method of Measurement:

Contractor quality control will be measured for payment on a lump sum basis as a single unit of work.

3.0 Basis of Payment:

3.1 General:

The accepted quantities of contractor quality control, measured as provided above, will be paid at the contract lump sum price, which price shall be full compensation for the work, complete, as described and specified herein.

Partial payments under this item will be made in accordance with the following provisions:

(a) The first partial payment price will be the lesser of twenty five percent of the contract lump sum price for contractor quality control, or one percent of the original total contract bid amount.

(b) The remaining portion of the lump sum price will be prorated over the duration of the original contract on a monthly basis, and monthly progress payments will be made.

If adjustments to pay items covered under Contractor Quality Control are approved by supplemental agreement, an equitable adjustment to the lump sum amount for Contractor Quality Control may be made. Any adjustment to Contractor Quality Control shall be included in the supplemental agreement and the adjusted amount, less previous payments, will be prorated equally over the remaining contract period, including any related time extensions.

3.2 Delinquent Reports:

Failure of the contractor to submit Weekly Quality Control Reports, current to the most recent Wednesday submittal date, will be grounds for the Engineer to deduct monies from the contractor's progress payment.

For each Weekly Quality Control Report that is not submitted to the Engineer by the Wednesday submittal date specified in Subsection 106.04(C)(6), the Department will deduct \$1,000.00 from the progress payment for current month.

For each delinquent quality control report submitted to the Engineer within 10 business days of the original Wednesday due date, \$500.00 will be returned on the next regular estimate, provided all of the requirements specified herein and in Subsection 106.04(C)(6) have been met. No deducted monies will be returned for reports submitted more than 10 business days beyond the Wednesday due date.

All deducted monies which are retained by the Department, as specified above, are liquidated damages.

ITEM 9240010 - FORCE ACCOUNT WORK (ELECTRICAL SERVICE):

Description:

A force account has been established to provide the necessary final electrical service for the lighting. The purpose of the force account is to create a funding source for any necessary permits, hook up fees, transformers, service conductors, etc required by APS as part of establishing the final electrical service. The contractor shall be reimbursed for the exact amount paid to APS for the designated electrical service and electrical service installation. No supplemental markup or taxes will be allowed.

Method of Measurement:

ITEM 9240010 - FORCE ACCOUNT WORK (ELECTRICAL SERVICE) will be measured as a single complete unit of work.

Basis of Payment:

ITEM 9240010 - FORCE ACCOUNT WORK (ELECTRICAL SERVICE), as measured above, will be paid for at the contract lump sum price, upon complete submittal to and approval by the Engineer.

ITEM 9240052 - MISCELLANEOUS WORK (MAINTAIN AND RESTORE NEW RIVER TRAIL)

Description:

Work under this item shall include maintenance and restoration of the City of Peoria's trail along New River. The contractor shall be responsible for maintaining the trail during portions of the work that do not require closure of the trail due to construction conflicts. The trail shall be maintained as long as the Grand Avenue widening work does not impede or present an unsafe condition for patrons using the trail. Upon completion of the work, the trail shall be restored to as good as or better condition as existed prior to construction as determined by the Engineer. The Engineer shall direct the contractor to make any necessary repairs or alterations required to restore the trail.

Construction Requirements:

The contractor shall be required to notify the City of Peoria 30 days prior to the trail system closure. Appropriate advance signing shall be installed and maintained during the closure period. The City of Peoria will provide the locations for the advance signing. A permit from the City may be required to install the signing. There will be no permit fees required. The trail shall be barricaded at the project site to keep the public from entering the construction area.

Upon completion of the work, the trail shall be restored to working order with surfaces replaced to a condition equal to or better than existed prior to construction.

Materials:

Materials for repairing/restoring the trail shall be in accordance with the Standard Specifications for the item required.

Method of Measurement:

MISCELLANEOUS WORK (MAINTAIN AND RESTORE NEW RIVER TRAIL) shall be measured as a lump sum unit and shall include all items required to maintain and restore the trail to a condition equal to or better than existed prior to construction. The Engineer will determine the acceptability of the final condition of the trail after construction has been completed.

Basis of Payment:

The basis of payment for MISCELLANEOUS WORK (MAINTAIN AND RESTORE NEW RIVER TRAIL) as measured above will be a single lump sum and shall include all related items required to complete the work as specified herein.

(925SRVY, 01/23/07)

SECTION 925 - CONSTRUCTION SURVEYING AND LAYOUT:

925-1 **Description:** the first paragraph of the Standard Specifications is revised to read:

The work under this section shall consist of furnishing all materials, personnel, and equipment necessary to perform all surveying, staking, establishment of all pit boundaries, laying out of haul roads, and verification of the accuracy of all existing control points which have been provided by the Department. The control point verification process shall include locating and making ties to all section line, right-of-way, and roadway monuments in the vicinity of the proposed work. Included in this work shall be all calculations required for the satisfactory completion of projects, including grade and drain, overlay, safety, landscape, rest areas, structures, surfacing projects, or combinations thereof, in conformance with the plans and these specifications. The work shall include establishing and marking 'as-built' elevations on bridges and culverts. The work shall be done under the direction of a registered professional engineer or a registered land surveyor employed by the contractor. The crew chief shall be NSPS Certified Level III, NICET Certified Level III, or a registered Land Surveyor-in-Training. A minimum of 50 percent of the survey crew shall be either NSPS Certified Level II or NICET Certified Level II.

When construction of new right-of-way monuments is included with the project, the Department will establish all initial right-of-way monuments prior to construction and forward a right-of-way staking plan to the contractor. Prior to completion of the construction project, as directed by the Engineer, the Department will supply, install, and stamp the final right-of-way markers.

All other existing cadastral corners, such as section corners, quarter corners, intersecting street centerline monuments, and property corners that are destroyed by the contractor shall be re-established by a registered land surveyor employed by the contractor.

925-3 **Construction Requirements:** of the Standard Specifications is revised to read:

925-3.01 **General:**

Prior to beginning any survey operations, the contractor shall furnish to the Engineer, for approval, a written outline detailing the method of staking, marking of stakes, grade control for various courses of materials, referencing, structure control, pavement markings, and any other procedures and controls necessary for survey completion. A part of this outline shall also be a schedule which will show the sequencing of the survey and layout work, throughout the course of the contract, listing a percentage of completion for each month. Section 1150, Chapter 11 of the ADOT Construction Manual shall be used by the contractor as a guide in the preparation of this outline. The ADOT Construction Manual is available on the Department's website, through the Construction Group.

The Department will provide either traverse or control points for establishing an accurate construction centerline and will establish bench marks adjacent to this line for the proper layout of the work as described herein. Control points will be located on centerline at the beginning and ending of the project, and at all points of curve (P.C.), points of tangent (P.T.), tangents to spiral (T.S.), spirals to tangent (S.T.), and angle points. On long tangents, additional points will be provided for continuity of line.

Traverse points, when provided, will be as follows:

For horizontal control, the Department will run a traverse from which construction centerline can be established. The control points, delineated by iron pins, marks in concrete, or similar devices, will be located to minimize the likelihood of their destruction during construction activities. Coordinates of these points and/or ties to construction centerline will be provided.

For vertical control, the Department will establish bench marks the entire length of the project at horizontal intervals not to exceed 2,500 feet.

Traverse or control points set by the Engineer will be identified in the field to the contractor.

The contractor shall verify the accuracy of the traverse or control points established by the Engineer prior to use. The contractor shall, as part of the control point verification process, locate and make ties to any section line, right-of-way, and roadway monuments which will be affected by the proposed work. After verification of these points, the contractor shall notify the Engineer in writing of the results of the verification.

The established initial right-of-way monuments shall be protected in place and re-established by the contractor, at no additional cost to the Department, if disturbed.

For locating and establishing ties to section line, right-of-way, and roadway monuments, the contractor shall follow the standards listed in Subsection 925-3.02(B).

Throughout the work, the contractor shall set all stakes including centerline stakes; offset stakes; reference point stakes; slope stakes; pavement lines, curb lines and grade stakes; stakes for sewers, roadway drainage, pipe, under drains, clearing, paved gutter, guardrail, fence, survey monuments and culverts; blue tops for subgrade, subbase and base courses; control points for bridges, bridge piers, abutments, footings, pile cutoff, pile layout, pier caps, bridge seats, bridge beams, girder profiles and screed elevations; supplemental bench marks; permanent as-built elevation marks; and all other horizontal or vertical controls necessary for complete and accurate layout and construction of the work. Regardless of the staking method, construction stakes shall be marked in such a manner that all construction personnel can easily identify the stake location, elevation, and other appropriate information. The coordinates of any new control points established by the contractor during the course of the work shall be given to the Engineer within five working days of control point establishment.

If errors are discovered during the verification process, and control points do not agree with the geometrics shown in the plans, the contractor shall promptly notify the Engineer in writing, and explain the problem in detail. The Engineer will advise the contractor within five working days of any corrective actions which may be deemed necessary.

Directed changes to the work shall be reimbursed under Subsection 925-5 and additional contract time may be considered for any delays.

The contractor shall be responsible for the proper layout and accuracy of all property markers which are required by the project plans.

Structure sites shall be accurately profiled and cross-sectioned, and structure control points shall be set and checked to assure the proper construction or installation of each structure. Profiles shall be approved by the Engineer prior to constructing or installing each structure. All profile survey data shall be entered in furnished field books and preserved as a permanent project record.

The contractor shall exercise care in the preservation of stakes, references and bench marks and shall reset them when any are damaged, lost, displaced or removed.

On all projects, the centerline layout for the final surface course shall be established by instrument survey by the contractor and shall serve as marks for permanent traffic centerline striping. On projects requiring contractor striping, the contractor shall set points at intervals of not greater than 50 feet for each traffic lane at the beginning and ending of each yellow stripe, and at the beginning and ending of gores and tapers.

The contractor shall also provide control points on the roadway, satisfactory to the Engineer, corresponding to the locations of all transition points for all lines of striping, including the beginnings, ends, breaks, and changes in the striping, including all tapers in the striping and pavement edges.

A minimum of two weeks prior to any paving activities, the contractor, the contractor's surveyors, the pavement marking subcontractor, and the Engineer shall meet to discuss the survey control for the applications of all temporary and permanent striping. At this meeting the contractor shall provide a written plan, satisfactory to the Engineer, to provide survey control and layout of the temporary and permanent striping in a timely manner.

On projects that include no-passing zones, the contractor shall also coordinate the survey layout of such zones with the ADOT No Passing Zone Crew. The contractor shall contact the ADOT No Passing Zone Crew at the phone number provided on the project plans at least five working days before placement of the related pavement marking.

On projects where traffic is being carried through the work zone, pavements shall be marked for traffic centerline delineation before the end of each work shift. Temporary pavement markings shall conform with the requirements set forth under Subsection 701-3.05 of these specifications and any subsequent modifications thereto.

Any discrepancies in grade, alignment, earthwork quantities, locations or dimensions detected by the contractor shall immediately be brought to the attention of the Engineer. No changes in the project plans will be allowed without the approval of the Engineer. Requests for verification of earthwork quantities shall be in accordance with Subsection 203-2.01.

The Department reserves the right to make inspections and random checks of any portion of the staking and layout work. If, in the Engineer's opinion, the work is not being performed in a manner that will assure proper controls and accuracy, the Engineer will order any or all of the staking and layout work redone at no additional cost to the Department.

If any portion of the contractor's staking and layout work is ordered redone, resulting in additional rechecking by the Department, the Department shall be reimbursed for all costs for such additional checking. The amount of such costs will be deducted from the contractor's monthly estimate.

Inspection of the contractor's layout by the Engineer and the acceptance of all or any part of it shall not relieve the contractor of its responsibility to secure the proper dimensions, grades and elevations of the several parts of the work.

925-3.02 Resetting Monuments:

(A) General:

The contractor shall be responsible to maintain all existing monumentation, including section line, right-of-way, and roadway monumentation. Monumentation disturbed during construction shall be re-established by the contractor, and recorded at the appropriate county recorder's office, at no additional cost to the Department.

(B) Monumentation Standards:

Section corner, quarter corner, and property corner monuments shall be re-established following the procedures in the Manual of Surveying Instructions 1973, published by the U.S. Department of the Interior, Bureau of Land Management, and all applicable statutes and requirements specified in the current Arizona State Board of Technical Registration's "Arizona Boundary Survey Minimum Standards." The contractor shall also follow the ADOT Right-of-Way Standards when re-establishing right-of-way monuments.

(C) Procedures:

Section line, right-of-way, and roadway monumentation re-established by the contractor shall bear the registration number of the Land Surveyor in responsible charge of the location.

Monuments used to define section lines shall be stamped in accordance with Manual of Surveying Instructions 1973, published by the Department of Interior, Bureau of Land Management. Roadway monumentation shall be stamped in accordance with the requirements of the appropriate municipal jurisdiction. Right-of-way monuments shall be stamped in accordance with the ADOT Right-of-Way Standards.

Monuments that are re-established shall be recorded at the appropriate county recorder's office, and a copy of the Corner Recordation documentation shall be submitted to the Engineer within five working days of recordation.

925-3.03 Office Survey Work:

The contractor shall be compensated for office work associated with project survey under the following circumstances:

- (A) When the project plans fail to provide sufficient information to lay out the project or any part thereof.
- (B) When the contractor performs office survey work based on erroneous plans information which results in the duplication of work.
- (C) If the Department should change any plans information for which the contractor has already performed office work which results in the duplication of that work.

The contractor shall not be due compensation for any office survey work:

- (A) When information provided in the plans is sufficiently complete to allow any additional information necessary for the complete layout of the project to be routinely calculated.
- (B) When the contractor fails to inform the Engineer of discovered plan errors prior to the performance of any extra office survey work.
- (C) That is included in any other existing pay item.

The contractor shall inform the Engineer in a timely manner of any omissions, ambiguities, or errors which the contractor feels may result in extra office survey work, so as not to delay the project or create any unnecessary calculations.

All office survey work shall be documented by the contractor and verified by the Engineer for compensation. Documentation shall consist of at least a detailed office diary specifically addressing the work involved in the alleged problem area. The contractor may be required to provide the calculations, charts, graphs, drawings, or any other physical evidence which will verify the extra work.

925-3.04 Survey Manager:

The contractor shall be compensated for a survey manager when deemed necessary for extra work ordered by the Engineer. The use of a survey manager, along with all survey manager duties required as a result of the additional work, must be authorized in advance by the Engineer. The survey manager shall be a Registered Land Surveyor in the State of Arizona.

925-4 Method of Measurement: of the Standard Specifications is revised to read:

Construction surveying and layout will be measured as a single complete unit of work.

One-, two-, and three-person survey parties, survey managers, and office survey technicians will be measured by the hour to the nearest half hour.

925-5 **Basis of Payment:** the first two sentences of the second paragraph of the Standard Specifications are revised to read:

If additional staking and layout are required as a result of additional work ordered by the Engineer, such work will be paid under ITEM 9250101 - ONE-PERSON SURVEY PARTY at the predetermined rate of \$65 per hour, ITEM 9250102 - TWO-PERSON SURVEY PARTY at the predetermined rate of \$100 per hour, ITEM 9250103 - THREE-PERSON SURVEY PARTY at the predetermined rate of \$135 per hour, ITEM 9250106 - SURVEY MANAGER at the predetermined rate of \$100 per hour, and ITEM 9250105 - OFFICE SURVEY TECHNICIAN at the predetermined rate of \$70 per hour.

925-5 **Basis of Payment:** the third paragraph of the Standard Specifications is revised to read:

The amount per hour for a one-person, two-person, or three-person survey party includes the cost of all work necessary to complete the extra work.

925-5 **Basis of Payment:** the sixth paragraph of the Standard Specifications is revised to read:

The amount per hour for a survey manager and an office survey technician shall include all necessary office supplies and equipment, such as calculators and computers.

925-5 **Basis of Payment:** of the Standard Specifications is modified to add:

Unless otherwise directed by the Engineer, requests for payment for additional survey work performed shall be submitted prior to the end of the monthly estimate billing period during which the work is performed.

(1003EPOX, 10/01/01)

SECTION 1003 - REINFORCING STEEL:

1003-1 **General Requirements:** the first sentence of the second paragraph of the Standard Specifications is revised to read:

When reinforcing steel is delivered to the site of the work, the contractor shall furnish the Engineer with a copy of all shipping documents.

1003-5.02 **Epoxy for Coating:** the fifth paragraph of the Standard Specifications is revised to read:

The coating manufacturer shall supply the purchaser with a certificate of compliance conforming to the requirements of Subsection 106.05 which properly identifies the batch

and/or lot number, material, quantity of batch, date of manufacture, name and address of manufacturer, and a statement that the material is the same composition as the initial sample prequalified for use. The certificate shall also state that production bars and prequalification bars have been identically prepared and applied with epoxy powders.

1003-5.03 Application of Coating: the second sentence of the fifth paragraph of the Standard Specifications is revised to read:

After curing, the coating thickness shall be ten ± two mils.

(1005PG, 01/03/06)

SECTION 1005 BITUMINOUS MATERIALS FOR SURFACING: the title of the Standard Specifications is revised to read:

SECTION 1005 BITUMINOUS MATERIALS:

1005-3.01 Asphalt Cement: the first paragraph of the Standard Specifications is revised to read:

Asphalt cement shall be a performance grade (PG) asphalt binder conforming to the requirements of AASHTO M 320. The pressure aging temperature shall be as specified below:

| PG Asphalt Binder | Pressure Aging Temperature |
|---------------------------------|----------------------------|
| PG 76-XX or PG 70-XX | 110 °C |
| PG 64-XX, PG 58-XX, or PG 52-XX | 100 °C |

If PG 76-22 TR+ asphalt binder is used, it shall conform to the requirements of Table 1005-1a.

1005-3.01 Asphalt Cement: the first sentence of the second paragraph of the Standard Specifications is revised to read:

A minimum of seven working days prior to the start of asphaltic concrete production, the contractor shall provide the Engineer a one-gallon sample of the proposed asphalt binder and a Certificate of Analysis, conforming to the requirements of Subsection 106.05, showing complete asphalt binder testing.

1005-3.01 Asphalt Cement: the first three sentences of the third paragraph of the Standard Specifications are revised to read:

If, during asphaltic concrete production, it is determined by testing that asphalt cement fails to meet the requirements for the specified grade, the asphaltic concrete represented by the corresponding test results shall be evaluated for acceptance. Should the asphaltic concrete be allowed to remain in place, the contract unit price for asphalt cement will be adjusted by

the percentage shown in Table 1005-1. Should the asphalt cement be in reject status, the contractor may, within 15 days of receiving notice of the reject status of the asphalt cement, supply an engineering analysis of the expected performance of the asphaltic concrete in which the asphalt cement is incorporated.

1005-3.03 Emulsified Asphalt: of the Standard Specifications is revised to read:

Emulsified asphalt shall conform to the requirements of Table 1005-3 for Anionic Rapid Set (RS-1, RS-2), Anionic Slow Set (SS-1), Cationic Rapid Set (CRS-1, CRS-2) and Cationic Slow Set (CSS-1).

Polymerized Cationic Rapid Set (CRS-2P) emulsified asphalt shall conform to the requirements of Table 1005-3a.

Polymerized High Float (HFE-150P) and (HFE-300P) emulsified asphalt shall conform to the requirements of Table 1005-3b.

Emulsified asphalts shall be homogeneous. If emulsified asphalt has separated, it shall be thoroughly mixed to insure homogeneity. If emulsified asphalt has separated due to freezing, it shall not be used. Emulsified asphalt shall not be used after 30 days from delivery.

The contract unit price will be adjusted, to the nearest cent, for quantities of emulsified asphalt which do not meet the specified minimum percent residue. The adjusted contract unit price will be determined by the following:

$$\left[\begin{array}{c} \text{Adjusted Contract} \\ \text{Unit Price} \end{array} \right] = \frac{\left[\begin{array}{c} \text{Percent Residue} \\ \text{From Testing} \end{array} \right]}{\left[\begin{array}{c} \text{Specified Minimum} \\ \text{Percent Residue} \end{array} \right]} \times \left[\text{Contract Unit Price} \right]$$

1005-3.06 Emulsified Recycling Agents: of the Standard Specifications is modified to add:

The contract unit price will be adjusted, to the nearest cent, for quantities of emulsified recycling agent which do not meet the specified minimum percent residue. The adjusted contract unit price will be determined by the following:

$$\left[\begin{array}{c} \text{Adjusted Contract} \\ \text{Unit Price} \end{array} \right] = \frac{\left[\begin{array}{c} \text{Percent Residue} \\ \text{From Testing} \end{array} \right]}{\left[\begin{array}{c} \text{Specified Minimum} \\ \text{Percent Residue} \end{array} \right]} \times \left[\text{Contract Unit Price} \right]$$

TABLE 1005-1: ASPHALT BINDER PAY ADJUSTMENT TABLE: of the Standard Specifications is revised to read:

| TABLE 1005-1 ASPHALT BINDER PAY ADJUSTMENT TABLE | | | |
|---|-----------------------|---------------|---|
| Test Property | AASHTO Test Method | Test Result | Percent of Contract Unit Price Allowed |
| Dynamic Shear of Original Binder: G*/Sin δ, kPa | T 315 | ≥ 1.00 | 100 |
| | | 0.90 - 0.99 | 95 |
| | | 0.70 - 0.89 | 85 |
| | | < 0.70 | 70 (1) |
| Dynamic Shear of RTFO Binder: G*/Sin δ, kPa | T 315 | ≥ 2.20 | 100 |
| | | 2.00 - 2.19 | 95 |
| | | 1.60 - 1.99 | 85 |
| | | < 1.60 | 70 (1) |
| Dynamic Shear of PAV Binder: G*Sin δ, kPa | T315 | ≤ 5000 | 100 |
| | | 5001 - 5500 | 95 |
| | | 5501 - 7000 | 85 |
| | | 7001 - 8000 | 75 |
| | | > 8000 | 65 (1) |
| Creep Stiffness of PAV Binder: S, Mpa | T 313 | ≤ 300 | 100 |
| | | 301 - 330 | 95 |
| | | 331 - 450 | 85 |
| | | 451 - 600 | 75 |
| | | > 600 | 65 (1) |
| m-value at 60 sec. | T 313 | ≥ 0.300 | 100 |
| | | 0.270 - 0.299 | 95 |
| | | 0.230 - 0.269 | 80 |
| | | < 0.230 | 65 (1) |
| (1) Reject Status: The pay adjustment applies if allowed to remain in place. | | | |
| <p>Notes:</p> <p>Specified properties in AASHTO M 320 for flash point, viscosity at 135 °C, and mass loss are not considered performance related. Specification deficiencies for these properties shall be cause for a work stoppage until specification properties are met, but will not be cause for a pay adjustment.</p> <p>Should the bituminous material be deficient on more than one property, the pay adjustment will be the greatest reduction to the contract unit price specified considering individual test results.</p> <p>The information presented in this table does not apply to asphalt cement used for tack coats.</p> | | | |

TABLE 1005-1a: PG 76-22 TR+ ASPHALT BINDER: is hereby added to the Standard Specifications:

| TABLE 1005-1a PG 76-22 TR+ ASPHALT BINDER | | | | |
|---|--------------|-------------|-------------------------|--|
| Test Property | Test Method | Requirement | Test Result | Percent of Contract Unit Price Allowed |
| Solubility in Trichloroethylene, %, minimum | ASTM D 2042 | 97.5 | ----- | ----- |
| Softening Point, °C, minimum | AASHTO T 53 | 60 | ≥ 60 57 – 59 < 57 | 100 85 70 (1) |
| Elastic Recovery, @ 10 °C, %, minimum | AASHTO T 301 | 55 | ≥ 55 50 – 54 < 50 | 100 85 70 (1) |
| Phase Angle (δ), @ 76 °C @ 10 rad/sec, degrees, maximum | AASHTO T 315 | 75 | ≤ 75 76 – 83 > 83 | 100 85 65 (1) |

(1) Reject Status: The pay adjustment applies if allowed to remain in place.

Notes:

PG 76-22 TR+ asphalt binder shall contain a minimum of 8% crumb rubber and a minimum of two percent SBS (styrene-butadiene-styrene) polymer.

PG 76-22 TR+ asphalt binder shall conform to the requirements of AASHTO M 320 and, in addition, shall meet the requirements specified above.

Table 1005-1 will also apply for PG 76-22 TR+ asphalt binder.

Should the bituminous material be deficient on more than one of the properties listed in Tables 1005-1 and 1005-1a, the pay adjustment will be the greatest reduction to the contract unit price specified considering individual test results.

The pressure aging temperature for PG 76-22 TR+ asphalt binder shall be 110 °C.

The crumb rubber shall be derived from processing whole scrap tires or shredded tire materials. The tires from which the crumb rubber is produced shall be taken from automobiles, trucks, or other equipment owned and operated in the United States. The processing shall not produce, as a waste product, casings or other round tire material that can hold water when stored or disposed of above ground.

TABLE 1005-2: MC LIQUID ASPHALT: the title, header, and footnote "(1)" of the Standard Specifications are revised to read:

| TABLE 1005-2 MC LIQUID ASPHALT PAY ADJUSTMENT TABLE | | |
|--|---|--|
| Grade | Kinematic Viscosity (AASHTO T 201): Centistokes, Deviations | Percent of Contract Unit Price Allowed |
| (1) Reject Status: The pay adjustment applies if allowed to remain in place. | | |

TABLE 1005-3: EMULSIFIED ASPHALTS: Note (4) of the Standard Specifications is revised to read:

- (4) Residue will be obtained in accordance with the requirements of Arizona Test Method 504 and shall conform to all the requirements of AASHTO M 320 for PG 64-16, except that for CRS-2 the dynamic shear ($G^*/\sin \delta$) on the original residue shall be a minimum of 1.00 kPa and a maximum of 1.50 kPa.

TABLE 1005-3a: POLYMERIZED CATIONIC RAPID SET (CRS-2P) EMULSIFIED ASPHALT: is hereby added to the Standard Specifications:

| TABLE 1005-3a POLYMERIZED CATIONIC RAPID SET (CRS-2P) EMULSIFIED ASPHALT (1) | | |
|---|-------------|-------------|
| Tests on Emulsion: | Test Method | Requirement |
| Viscosity, Saybolt Furol seconds @ 50 °C (122 °F), range | AASHTO T 59 | 100 - 400 |
| Storage Stability, 24 hours, % maximum | AASHTO T 59 | 1 |
| Demulsibility, 35 mL of 0.8 % DSS, % minimum | AASHTO T 59 | 40 |
| Particle Charge Test | AASHTO T 59 | Positive |
| Sieve Test, retained on 850 µm (No. 20), % maximum | AASHTO T 59 | 0.10 |
| Residue from Distillation to 176.7 °C (350 °F), % minimum | AASHTO T 59 | 66 |
| Oil Distillate to 176.7 °C (350 °F), Volume of Emulsion, % maximum | AASHTO T 59 | 0.5 |

| TABLE 1005-3a (CON'T.) POLYMERIZED CATIONIC RAPID SET (CRS-2P) EMULSIFIED ASPHALT (1) | | |
|--|--------------|----------|
| Tests on Residue from Distillation: | | |
| Penetration, 25 °C (77 °F), 100 grams, 5 seconds, range in 0.1 mm | AASHTO T 49 | 40 - 100 |
| Ductility, 4 °C (39.2 °F), 10 mm/minute, cm, minimum | AASHTO T 51 | 35 |
| Elastic Recovery by means of Ductilometer, 25 °C (77 °F), % minimum | AASHTO T 301 | 55 |
| (1) The introduction of polymer must occur before emulsification. | | |

TABLE 1005-3b: POLYMERIZED HIGH FLOAT EMULSIFIED ASPHALT: is hereby added to the Standard Specifications:

| TABLE 1005-3b POLYMERIZED HIGH FLOAT EMULSIFIED ASPHALT (1) | | | |
|--|--------------------|--------------------|----------|
| Tests on Emulsion: | Test Method | Requirement | |
| | | HFE-150P | HFE-300P |
| Viscosity, Saybolt Furol seconds @ 50 °C (122 °F), range | AASHTO T 59 | 50 - 400 | 50 - 400 |
| Sieve Test, retained on 850 µm (No. 20), % maximum | AASHTO T 59 (2) | 0.10 | 0.10 |
| Storage Stability, 24 hours, % maximum | AASHTO T 59 | 1 | 1 |
| Residue from Distillation to 204.4 °C (400 °F), % minimum | AASHTO T 59 | 65 | 65 |
| Oil Distillate to 176.7 °C (350 °F), Volume of Emulsion, % maximum | AASHTO T 59 | 7.0 | 7.0 |

| TABLE 1005-3b (CON'T.) POLYMERIZED HIGH FLOAT EMULSIFIED ASPHALT (1) | | | |
|---|--------------------|--------------------|----------|
| Tests on Residue from Distillation: | Test Method | Requirement | |
| | | HFE-150P | HFE-300P |
| Penetration, 25 °C (77 °F), 100 grams, 5 seconds, range in 0.1 mm | AASHTO T 49 | 150 - 300 | 300 + |
| Float Test at 60 °C (140 °F), seconds, minimum | AASHTO T 50 | 1200 | 1200 |
| Ductility, 25 °C (77 °F), 5 cm/minute, cm, minimum | AASHTO T 51 | 100 | N/A |
| Elastic Recovery by means of Ductilometer, 4 °C (39.2 °F), % minimum | AASHTO T 301 | 25 | 25 |

(1) The introduction of polymer must occur before emulsification.

(2) Distilled water will be used instead of two percent sodium oleate solution.

TABLE 1005-4: RECYCLING AGENTS: of the Standard Specifications is revised to read:

| TABLE 1005-4 RECYCLING AGENTS | | | | | | | | | |
|---|------------------------|--------------------|------|------|------|-------|------|-------|-------|
| Test On Recycling Agent | Test Method | Requirement | | | | | | | |
| | | RA-1 | | RA-5 | | RA-25 | | RA-75 | |
| | | Min. | Max. | Min. | Max. | Min. | Max. | Min. | Max. |
| Viscosity: 140 °F, centistokes | AASHTO T 201 | 100 | 200 | 200 | 800 | 1000 | 4000 | 5000 | 10000 |
| Flash Point: Cleveland Open Cup, °F, minimum | AASHTO T 48 | 340 | | 375 | | 425 | | 450 | |
| Saturate by weight: % | ASTM D 2007 | | 30 | | 30 | | 30 | | 30 |
| Test on Residue: (1) Weight Change, % | | | 6.5 | | 4 | | 3 | | 2 |
| Viscosity Ratio: (2) | | | 3 | | 3 | | 3 | | 3 |

| TABLE 1005-4 (CON'T.) RECYCLING AGENTS | |
|---|--|
| Notes: | |
| (1) Residue will be obtained in accordance with the requirements of AASHTO T 240. | |
| (2) Viscosity Ratio: | |
| $\frac{\text{Viscosity of residue at 140 }^\circ\text{F, centistokes}}{\text{Viscosity of recycling agent at 140 }^\circ\text{F, centistokes}}$ | |

TABLE 1005-6: OTHER REQUIREMENTS: the header, "Paving Asphalt", and "Emulsified Asphalt" of the Standard Specifications are revised, and a footnote is added:

| TABLE 1005-6 OTHER REQUIREMENTS | | | |
|--|--|--|--|
| Grade of Asphalt Specification Designation | Range of Temperatures for Application by Spraying, °F (Not applicable for Plant Mixing) | Range of Aggregate Temperatures for Plant Mixing, °F | Basis of Conversion, Average Gallons Per Ton at 60 °F |
| Paving Asphalt | 275 – 400 | ----- | |
| PG 76-XX | | | 232 |
| PG 70-XX | | | 233 |
| PG 64-XX | | | 235 |
| PG 58-XX | | | 236 |
| PG 52-XX | | | 238 |
| PG 76-22 TR+ | | | 229 |
| Emulsified Asphalt | | ----- | 240 |
| RS-1 | 70 – 140 | | |
| CRS-1 | 125 – 185 | | |
| RS-2 | 125 – 185 | | |
| CRS-2 | 125 – 185 | | |
| CRS-2P | 125 – 185 (1) | | |
| SS-1 | 70 – 160 | | |
| CSS-1 | 70 – 160 | | |
| HFE-150P | ----- | | |
| HFE-300P | ----- | | |
| (1) Or as directed by the Engineer. | | | |

(1006PCC, 02/20/07)

SECTION 1006 PORTLAND CEMENT CONCRETE: of the Standard Specifications is revised to read:

1006-1 General Requirements:

Portland cement concrete shall consist of a mixture of hydraulic cement, fine aggregate, coarse aggregate, and water. It may also contain air-entraining admixtures, chemical admixtures, and a supplementary cementitious material.

The contractor shall determine the mix proportions and shall furnish concrete which conforms to the requirements of these specifications. All concrete shall be sufficiently workable, at the slump proposed by the contractor within the specified range, to allow proper placement of the concrete without harmful segregation, bleeding, or incomplete consolidation. It shall be the responsibility of the contractor to proportion, mix, place, finish, and cure the concrete properly in accordance with the requirements of these specifications.

1006-2 Materials:

1006-2.01 Hydraulic Cement:

Hydraulic cement shall consist of either Portland cement or Portland-pozzolan cement.

Portland cement shall conform to the requirements of ASTM C 150 for Type II, III, or V. However, at the option of the manufacturer, processing additions may be used in the manufacture of the cement, provided such processing additions have been shown to meet the requirements of ASTM C 465, and the total amount of such material used does not exceed one percent of the weight of the Portland cement clinker.

Portland-pozzolan cement shall conform to the requirements of ASTM C 595 for Type IP (MS).

Hydraulic cement shall not contain more than 0.60 percent total alkali. The word alkali as used in these specifications shall be taken as the sum of sodium oxide and potassium oxide calculated as sodium oxide.

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

Cement of different types or brands shall not be intermingled or used in the same batch. The contractor shall provide suitable means for storing and protecting the cement against dampness. Cement which for any reason has become partially set or which contains caked lumps shall not be used.

The use of either sacked cement or bulk cement is permissible. The use of fractional bags of sacked cement will not be permitted unless the contractor elects to weigh the cement into each batch.

1006-2.02 Water:

The water used shall be free from injurious amounts of oil, acid, alkali, clay, vegetable matter, silt or other harmful matter. Water shall contain not more than 1,000 parts per million of chlorides as Cl and not more than 1,000 parts per million of sulfates as SO₄.

Water shall be sampled and tested in accordance with the requirements of AASHTO T 26. Potable water obtained from public utility distribution lines will be acceptable.

1006-2.03 Aggregates:

(A) General Requirements:

When concrete is to be placed at elevations above 4,500 feet, the fine and coarse aggregate shall be subject to five cycles of the sodium sulfate soundness test in accordance with the requirements of AASHTO T 104. The total loss shall not exceed 10 percent by weight of the aggregate as a result of the test. Tests for soundness may be waived when aggregates from the same source have been approved and the approved test results apply to the current production from that source.

When aggregates show potential for alkali silica reaction (ASR), as indicated by expansions of 0.10% or greater at 16 days after casting when tested in accordance with ASTM C 1260, sufficient mitigation for the expansion shall be determined in accordance with ASTM C 1567.

Mill tailings or material from mine dumps shall not be used in the production of fine or coarse aggregate.

The handling and storage of concrete aggregate shall be such as to minimize segregation or the intermixing and contamination with foreign materials. The Engineer may require that aggregates be stored separately. Different sizes of aggregate shall be separated by bulkheads or stored in separate stockpiles sufficiently removed from each other to prevent the material from becoming intermixed.

When aggregates are stored on the ground, the sites for the stockpiles shall be clear of all vegetation and level. The bottom one-foot layer of aggregate shall not be disturbed or used.

The handling and storage of concrete aggregate for Class P concrete at the job site shall be such as to minimize segregation. Stockpiles shall be neat and regular in form and shall occupy as small an area as possible. Stockpiles shall be constructed by first distributing the aggregate over the entire base and then building upward in successive layers not more than five feet in depth. Aggregate shall not be dumped or spilled over the side of the pile. When a conveyor is used to stockpile aggregate, it shall be equipped with an adequate rock tremie or rock ladder to reduce segregation and it shall be moved continuously across the stockpile. The distance the material drops from the tremie shall not exceed 10 feet. Aggregate shall be distributed over the stockpile so that the formation of conical piles higher than 10 feet is prevented.

Contamination of concrete aggregate for Class P concrete by contact with the ground at the job site shall be positively prevented. The contractor shall take the necessary measures to prevent such contamination. Such preventive measures shall include, but not necessarily be limited to, placing aggregate on hardened surfaces consisting of Portland cement concrete, asphaltic concrete, or cement treated material.

The contractor shall maintain at least two full days worth of production of fine and coarse aggregate stockpiled at the batch plant for Class P concrete prior to starting and throughout the duration of Portland cement concrete paving operations. This requirement is waived for the last two days of production.

The following test methods will be used to evaluate the quality of aggregates for concrete:

| | |
|---|-------------------------|
| Sampling | Arizona Test Method 105 |
| Reducing field samples to testing size | AASHTO T 248 |
| Potential for Alkali Silica Reaction (ASR) | ASTM C 1260 & C 1567 |
| Clay lumps and friable particles | AASHTO T 112 |
| Lightweight particles | AASHTO T 113 (See Note) |
| Organic impurities | AASHTO T 21 |
| Aggregate gradation | Arizona Test Method 201 |
| Soundness (Sodium Sulfate) | AASHTO T 104 |
| Mortar Strength | AASHTO T 71 (See Note) |
| Sand equivalent | AASHTO T 176 |
| L.A. abrasion | AASHTO T 96 |
| Fractured Coarse Aggregate Particles | Arizona Test Method 212 |
| Note: AASHTO T 113 and T 71 are modified as specified in Subsections 1006-2.03 (B) and (C). | |

1006-2.03(B) Fine Aggregate:

Fine aggregate shall be a natural sand, or other approved inert material with similar characteristics, composed of clean, hard, strong, durable, uncoated particles. The aggregate shall be washed and shall conform to the requirements of AASHTO M 6, with the following exceptions:

The amount of deleterious substances in the washed fine aggregate shall not exceed the following limits by dry weight, when tested in accordance with the following test methods:

| | | |
|--|--|---|
| Clay lumps and friable particles | AASHTO T 112 | 0.5% |
| Lightweight particles | AASHTO T 113 (Except that the percent of lightweight particles shall be reported to the nearest 0.01%.) | 1.25% (0.25% Max. Coal and Lignite*) |
| * Only material that is brownish-black, or black, shall be considered coal or lignite. | | |

The total amount of all deleterious substances listed in the table above shall not exceed 1.25 percent by dry weight.

Fine Aggregate shall meet the following gradation requirements when tested in accordance with Arizona Test Method 201.

| Sieve Size | Percent Passing |
|------------|-----------------|
| 3/8 in. | 100 |
| No. 4 | 95 - 100 |
| No. 16 | 45 - 80 |
| No. 50 | 0 - 30 |
| No. 100 | 0 - 10 |
| No. 200 | 0 - 4.0 |

Fine aggregate shall have a sand equivalent value of not less than 75.

Fine aggregates shall be subjected to testing under AASHTO T 21 for organic impurities. Aggregates producing a color darker than the standard color shall be rejected unless the material passes the mortar strength specified in the following paragraph:

Fine aggregate shall be made into mortar and subjected to testing under AASHTO T 71, except that the mortar shall develop a compressive strength at seven and 28 days of not less than 90 percent of that developed by a mortar prepared in the same manner with the same Type II cement and graded Ottawa sand having a fineness modulus of 2.40 ± 0.10 .

1006-2.03(C) Coarse Aggregate:

Coarse aggregate shall consist of crushed stone, gravel, crushed gravel, or other approved inert material of similar characteristics, including cinders when specified, having hard, strong and durable pieces free of clay and other deleterious substances. The aggregate shall be washed. The aggregate gradation, when tested in accordance with Arizona Test Method 201, shall conform to the appropriate size designation of AASHTO M 43, except as shown below.

The amount of deleterious substances in the washed coarse aggregate shall not exceed the following limits by dry weight, when tested in accordance with the following test methods, except as noted:

| | | |
|--|--|---|
| Clay lumps and friable particles | AASHTO T 112 | 0.3% |
| Lightweight particles | AASHTO T 113 (Except that the percent of lightweight particles shall be reported to the nearest 0.01%.) | 1.25% (0.25% Max. Coal and Lignite*) |
| Material passing No. 200 sieve | Arizona Test Method 201 | 1.0% |
| * Only material that is brownish-black, or black, shall be considered coal or lignite. | | |

The total amount of all deleterious substances listed in the table above shall not exceed 1.25 percent by dry weight.

The percent of wear of coarse aggregate at 500 revolutions, when tested in accordance with the requirements of AASHTO T 96, shall not exceed 40.

1006-2.04 Admixtures:

(A) General Requirements:

The contractor shall furnish Certificates of Compliance conforming to the requirements of Subsection 106.05 for each type of admixture furnished.

Calcium chloride as a separate admixture shall not be acceptable.

All concrete admixtures shall be stored in suitable containers in accordance with the manufacturer's recommendations. All liquid admixtures shall be protected from freezing. Liquid admixtures that have frozen shall not be used.

Admixtures shall be uniform in properties throughout their use in the work.

If more than one admixture is used, the admixtures shall be compatible with each other so that the desired effects of all admixtures used will be realized.

(B) Air-Entraining Admixtures:

Air-entraining admixtures shall conform to the requirements of ASTM C 260.

Only those air-entraining admixtures shown on the Department's Approved Products List (APL) shall be used. Copies of the most current version of the APL are available on the internet from the Arizona Transportation Research Center (ATRC), through its PRIDE program.

Air-entraining admixtures having a chloride concentration of 10,000 parts per million (one percent by mass of the admixture) or less, as determined in accordance with Arizona Test Method 738, are acceptable unless otherwise specified.

(C) Chemical Admixtures:

Chemical admixtures shall conform to the requirements of ASTM C 494.

Only those chemical admixtures shown on the Department's Approved Products List (APL) shall be used. Copies of the most current version of the APL are available on the internet from the Arizona Transportation Research Center (ATRC), through its PRIDE program.

Chemical admixtures having a chloride concentration of 10,000 parts per million (one percent by mass of the admixture) or less, as determined in accordance with Arizona Test Method 738, are acceptable unless otherwise specified.

(D) Supplementary Cementitious Material (Fly Ash, Natural Pozzolan, and Silica Fume):

Supplementary cementitious materials shall be approved prior to their use in accordance with Materials Policy and Procedure Directive "Certification and Acceptance of Hydraulic Cement, Fly Ash, Natural Pozzolan, and Silica Fume".

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

Silica fume shall conform to the requirements of ASTM C 1240.

When a supplemental cementitious material with a calcium oxide content greater than 15 percent is used, or when the Special Provisions specify sulfate resistant concrete, the cement intended to be used shall be tested for sulfate expansion in accordance with ASTM C 1157 and ASTM C 1012. For moderate sulfate resistance, the maximum expansion shall be 0.10 percent at six months. For high sulfate resistance, the maximum expansion shall be 0.05 percent at six months and 0.10 percent at one year.

When Class C fly ash is used, the cement intended to be used shall be tested for sulfate expansion in accordance with ASTM C 1157 and ASTM C 1012 and shall have a maximum expansion of 0.05 percent at six months and 0.10 percent at one year.

1006-2.05 Concrete Curing Materials:

Liquid membrane forming compound shall conform to the requirements of AASHTO M 148. Type 2 compound with either a Class A or Class B vehicle shall be used for concrete pavement, bridge decks, and approach slabs. Type 1-D compound with either a Class A or Class B vehicle shall be used for other concrete items.

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

1006-3 Design of Mixtures:

1006-3.01 Design Criteria:

Portland cement concrete shall conform to the requirements specified in Table 1006-A for each of the classes listed therein.

TABLE 1006-A

| Class of Concrete | Minimum 28-Day Compressive Strength Required: psi (See Note 1) | Hydraulic Cement Content: Lbs per Cu Yd Minimum - Maximum (See Notes 2, 3, & 4) | Maximum Water/Cement Ratio | Slump Range: Inches |
|--------------------------|---|--|-----------------------------------|----------------------------|
| B | 2,500 | 470 - 658 | None | (See Note 6) |
| S or E | 2,500 | 520 - 752 | 0.55 | |
| | 3,000 | | | |
| | 3,000 (See Note 5) | | | |
| | 3,500 | | | |
| | 4,000 | | | |
| | 4,500 and greater | 564 - 752 | 0.50 | |
| P | 4,000 | 564 - 658 | None | 0 - 4.5 |
| H | High performance concrete as specified in project special provisions. | | | |

Note 1: Testing for compressive strength of cylinders for all classes of concrete shall be in accordance with the requirements of Arizona Test Method 314.

Note 2: A supplementary cementitious material (fly ash, natural pozzolan, or silica fume) conforming to the requirements of Subsection 1006-2.04(D) may be used at the option of the contractor only when Portland cement is used. The use of a supplementary cementitious material is not allowed for replacement of cement when Portland-pozzolan cement [Type IP (MS)] is used. A maximum of 25 percent of the required weight of Portland cement may be replaced with fly ash or natural pozzolan. A maximum of 10 percent of the required weight of Portland cement may be replaced with silica fume, or a maximum of 10 percent silica fume may be added to the required weight of Portland cement. When supplemental cementitious material is used as a replacement for Portland cement, the replacement shall be made on a 1.0 pound to 1.0 pound basis. If performance enhancement of the concrete, such as the mitigation of an alkali silica reaction or for increased sulfate resistance is necessary, additional quantities of fly ash or natural pozzolan may be incorporated into the concrete without a corresponding Portland cement replacement, if approved by the Engineer.

Note 3: The hydraulic cement content shall be as shown unless otherwise specified.

Note 4: Concrete to be placed under water, tremie concrete, shall conform to the requirements for the class and strength required except the minimum hydraulic cement content shall be increased by 50 pounds per cubic yard of concrete.

Note 5: Unless otherwise shown on the plans.

Note 6: The proposed slump shall be chosen by the contractor. Concrete at the proposed slump shall be sufficiently workable to allow proper placement without harmful segregation, bleeding, or incomplete consolidation.

Air-entraining admixtures will be required for all classes of concrete placed at an elevation of 3,000 feet or above. The amount of entrained air in the concrete mixture shall not be less than four percent nor more than seven percent by volume. However, no air-entrainment will be required for minor precast structures, precast pipe, and precast, prestressed structural members supporting a concrete deck slab or impervious overlay. Also, no air-entrainment will be required for any precast items constructed using the dry pack or no-slump method.

For elevations below 3,000 feet, air-entraining admixtures may be used at the option of the contractor. If air-entraining admixtures are used, the amount of entrained air in the concrete shall not exceed seven percent by volume.

Concrete that fails to conform to the entrained air content requirements listed above for the respective elevation as determined by the Engineer, shall be rejected prior to placement.

Unless specifically required, water-reducing admixtures may be used at the option of the contractor.

The coarse aggregate size designation for Class S, Class B, and Class E concrete shall be chosen by the contractor and approved by the Engineer and shall conform to the size designation and grading requirements of AASHTO M 43. In choosing the size designation, the maximum size of coarse aggregate shall not be larger than one fifth of the narrowest dimension between sides of adjacent forms, or two thirds of the minimum clear spacing between reinforcing bars, or one third the depth of the slab, whichever is least. If two or more stockpiles are utilized to manufacture an AASHTO M 43 size designation, at the time of proportioning for mixing, the aggregate from each stockpile shall be measured by weight and proportioned so that the resulting mixture of coarse aggregate meets the requirements for the chosen size designation. The percent of fractured coarse aggregate particles shall be at least 30 when tested in accordance with the requirements of Arizona Test Method 212.

Coarse aggregate for Class P concrete used to construct Portland cement concrete pavement without load transfer dowels shall be separated into two stockpiles. At the time of proportioning for mixing, the aggregate from each stockpile shall be measured by weight and proportioned so that the resulting mixture of coarse aggregate meets the requirements for size designation No. 467, as specified in AASHTO M 43. The percent of fractured coarse aggregate particles for this coarse aggregate composite shall be at least 30 when tested in accordance with the requirements of Arizona Test Method 212.

Coarse aggregate for Class P concrete used to construct Portland cement concrete pavement with load transfer dowels and adjacent shoulders shall meet the requirements for size designation No. 57, as specified in AASHTO M 43. The percent of fractured coarse aggregate particles shall be at least 30 when tested in accordance with the requirements of Arizona Test Method 212.

Coarse aggregate for Class P concrete placed in pavement ramp tapers not exceeding a width of 10 feet and in pavement gore areas may be size designation No. 57, as specified in AASHTO M 43. The use of size designation No. 57 coarse aggregate may be used in concrete placed in other inaccessible pavement areas when approved in writing by the Engineer.

1006-3.02 Design Procedures:

At least two weeks prior to the appropriate concreting operation, the contractor shall furnish a mix design for each class of concrete and each strength of Class S and Class E concrete for review and approval. More than one mix design for each class of concrete and each strength of Class S and Class E concrete may be submitted for approval provided specific items and locations of intended uses accompany the mix design. The contractor shall substantiate each mix design by furnishing test data and providing all details of the mixtures proposed for use. The mix design shall be prepared under the direct supervision of, and signed by, a registered professional engineer, a NICET Level III or higher certified technician in the concrete subfield, or an ACI certified Concrete Laboratory Testing Technician Grade II. Individuals preparing and submitting mix designs shall have experience in the development of mix designs and mix design testing.

The complete solid volume mix designs submitted for approval shall include all weights and volumes of all ingredients. The brand, type, and source of hydraulic cement and admixtures, the coarse aggregate size number designation, source of aggregates, the specific gravities of all ingredients, the proposed slump, the water/cement ratio, a product code to identify the mix design, and the intended use of each mix design shall be an integral part of each mix design.

The use of new and previously used mix designs, and the requirements for trial batches, will be as required by the Materials Policy and Procedure Directive "Submittal and Approval of Portland Cement Concrete Mix Designs".

Changes in approved mix designs may be made by the contractor with the approval of the Engineer.

In no case shall the approval of a mix design relieve the contractor of the responsibility for the results obtained by the use of such approved mix design.

A new mix design shall be submitted for approval any time the test results of an approved mix design indicate that the concrete does not meet the required compressive strength.

When approved by the Engineer, concrete from trial batches may be used in the work at locations where concrete of a lower strength is required and such concrete will meet the requirements of the class of concrete at that location. The basis of payment for such concrete shall be that which applies to the concrete required at that location.

1006-4 Concrete Production:

1006-4.01 General Requirements:

The contractor may obtain concrete for each class of concrete and for each strength of Class S and Class E concrete from a source approved by the Engineer in lieu of establishing a batch plant at the project site.

For each class of concrete and each strength of Class S and Class E concrete, except for Class P concrete produced in a batch plant at the site and used exclusively for Class P work, the contractor shall furnish a delivery ticket for each batch of concrete. The minimum information to be shown on each delivery ticket shall be the date, time batched, truck identification number, name or identification of batch plant, name of contractor, name and location of project, the quantity of concrete, the batch weights or mix design product code, the amount of permissible additional water to meet the design water/cement ratio, and the number of revolutions that the concrete has been mixed at mixing speed in a truck mixer. An authorized representative of the contractor shall be responsible for each delivery ticket and shall sign each delivery ticket accepting the contractor's responsibility for the concrete. The representative shall immediately furnish the delivery ticket to the Engineer.

1006-4.02 Proportioning:

(A) Hydraulic Cement:

A separate scale shall be used to weigh the hydraulic cement. A load indicating device, positioned so as to be easily visible to the Engineer and accurate to ± 0.2 percent of scale capacity, shall be provided to weigh all hydraulic cement. The batching accuracy shall be within ± 1.0 percent of the required weight. Load-indicating devices for the scale, or a load cell providing a digital printed readout will be required when weighing all hydraulic cement.

The cement shall be conveyed by means of an enclosed conveying system and the weighing hopper shall be equipped with one or more vibrators as required to ensure the complete discharge of all cement from the hopper after each batch is weighed.

(B) Water:

Water shall be measured by volume or by weight. Measurement by volume will be by metering.

Scales shall be accurate within ± 0.2 percent of scale capacity. Volumetric measuring devices shall have an accuracy of ± 1.5 percent. The batching devices shall be capable of routinely batching water within ± 1.5 percent.

(C) Aggregates:

All aggregates shall be proportioned by weight.

Suitable scales shall be provided by the contractor to weigh each size of aggregate. Load indicating devices for the scales shall be positioned so as to be easily visible to the Engineer and accurate to ± 0.2 percent of scale capacity. The batching accuracy shall be within \pm two percent of the target weight. The weighing equipment shall be arranged so as to permit the convenient removal of excess material from the weighing hopper and the equipment shall be arranged to enable the operator to have convenient access to all controls. The scales and load indicating devices shall be so graduated and equipped that the weights of materials can be accurately determined. Necessary efforts shall be made to obtain and preserve uniform moisture content in the coarse and fine aggregates. The moisture content shall not vary more than three percent during any day's concrete

production. The estimated percent of free moisture in each of the coarse and fine aggregates shall be determined by the contractor using acceptable test methods.

The moisture content of the aggregate shall be such that no free drainage of water from the aggregate will be visible during transportation from the stockpile to the point of mixing. Aggregate containing excess moisture shall be stockpiled prior to use until it is sufficiently dry to meet the above requirement.

In the event that either the coarse or fine aggregate has a moisture absorption rate of more than 1.5 percent, the materials shall be thoroughly prewetted and allowed to drain in advance of use until the moisture content is stable.

(D) Admixtures:

The equipment and the procedures used to measure admixtures and dispense them into the concrete batch shall be approved by the Engineer prior to use.

Dry admixtures shall be measured by weight with a separate scale. A load indicating device for the scale shall be positioned so as to be easily visible to the Engineer and accurate to within ± 1.0 percent of the amount being weighed. Paste or liquid admixtures shall be measured either by weight or by volume. Only mechanical dispensing equipment shall be used for adding admixtures. Dosage rates shall conform to the manufacturer's recommendations or approved rates, or as determined from field trial batches.

Dispensers for admixtures shall have sufficient capacity to measure at one time the full quantity required for each batch. Admixtures shall be added in accordance with the manufacturer's recommendations and in a manner such that the admixture is incorporated uniformly in the concrete mixture. The amount of liquid admixtures shall not vary from the required amount by more than ± 3.0 percent.

Equipment for measurement shall be designed for convenient confirmation of measurement accuracy. If more than one liquid admixture is used, each admixture shall be dispensed by separate equipment unless otherwise permitted in writing by the Engineer.

When a supplementary cementitious material (such as fly ash, natural pozzolan, or silica fume) is specified in the mix design, it may be weighed cumulatively with the hydraulic cement on the same scale. If the same scale is used, the hydraulic cement shall be weighed first, then the supplementary cementitious material. If the same scale is not used, a separate scale with a load-indicating device, positioned so as to be easily visible to the Engineer and accurate to ± 0.2 percent of scale capacity, shall be provided to weigh the supplementary cementitious material.

When the quantity of hydraulic cement exceeds 30 percent of the full capacity of the scale, the batching accuracy of mixtures containing supplementary cementitious material shall be such that the quantity of the hydraulic cement, and the cumulative quantity of the hydraulic cement plus the supplementary cementitious material, is within ± 1.0 percent of the sum of their designated batch weights.

Supplementary cementitious material shall be conveyed by means of an enclosed conveying system, and the weighing hopper shall be equipped with one or more vibrators as required to ensure the complete discharge of the supplementary cementitious material from the hopper after each batch is weighed.

1006-4.03 Mixing:

(A) General Requirements:

The concrete may be mixed in a stationary mixer, either at a central mixing plant or at the site or it may be mixed in a truck mixer, either at a central mixing plant or at the site. Concrete may be mixed in a mobile mixer at the site for Class S, Class B, and Class E concrete, provided written permission of the Engineer is granted.

Each mixer shall meet the specified requirements for type and size and shall have attached in a prominent place a manufacturer's plate showing the gross volume of the mixer and the recommended speeds of the mixer for mixing and for agitating.

Each batch plant shall be equipped to control the time when the water enters the mixer during the mixing cycle. Batch and mixing time shall be from the time hydraulic cement is combined with water.

Mixers shall be cleaned at suitable intervals. Water used for cleaning the mixer shall be discharged prior to further batching.

Equipment having components made of aluminum or magnesium alloys, which would have contact with plastic concrete during mixing and transporting, shall not be used.

All concrete shall be homogeneous and thoroughly mixed, and there shall be no lumps or evidence of un-dispersed cement.

(B) Mixing in a Stationary Mixer:

The volume of concrete mixed per batch shall not exceed the capacity of the mixer as shown on the manufacturer's plate. No spillage of concrete will be allowed during the process of mixing.

While mixing, the mixer shall be operated at the speed shown on the manufacturer's plate as the mixing speed.

The mixing time shall not be less than 60 seconds per batch on Class P concrete and the mixing time shall be increased if directed by the Engineer. The mixing time shall be not less than 60 seconds for one cubic yard and shall be increased 15 seconds for each additional cubic yard or fraction thereof for Class S, Class B, and Class E concrete.

The mixers shall have an automatic timing device which locks the discharge equipment until the required mixing time has been completed. The mixer shall be operating at mixing speed at the time that all ingredients enter the mixer to ensure the immediate beginning of the mixing cycle. Mixing time shall end when the discharge chute opens. The contents of the mixer shall be completely discharged before the succeeding batch is placed in the mixer.

Any concrete discharged before the mixing time is completed shall be disposed of by the contractor at no additional cost to the Department.

Stationary mixers shall be equipped with automatic batch meters for counting the batches for Class P concrete. The contractor shall furnish the batch count daily to the Engineer.

Mixed concrete shall be transported in truck mixers, truck agitators or in nonagitating trucks having special bodies.

When truck mixers or truck agitators are used, the concrete shall be continuously agitated from the time of loading until the time of discharge. Agitation shall be by rotation of the drum at the speed shown on the manufacturer's plate as agitating speed.

The truck mixer or truck agitator shall be loaded and operated within a capacity not to exceed 80 percent of the gross volume of the drum. The rate of discharge shall be controlled by the speed of rotation of the drum in the discharge direction with the discharge gate fully opened.

Discharge from the truck mixer or truck agitator shall be completed within 90 minutes from the time batched, unless otherwise noted in the mix design and approved by the Engineer.

Bodies of non-agitating trucks shall be smooth, mortar-tight, metal containers and shall be capable of discharging the concrete at a satisfactory controlled rate without segregation. If discharge of concrete is accomplished by tilting the body, the surface of the load shall be retarded by a suitable baffle. Covers shall be provided when needed for protection.

Discharge from non-agitating trucks shall be completed within 45 minutes from the time concrete is batched.

Concrete hauled in open-top vehicles shall be protected against rain. When the ambient temperature exceeds 85 degrees F, the concrete shall be covered if it will be exposed to the sun for more than 30 minutes.

(C) Mixing in Truck Mixers:

Truck-mixed concrete shall be mixed entirely in the truck mixer and shall be mixed at the batch plant or at the site.

Truck mixers shall be operated within a capacity not to exceed 63 percent of the gross volume of the drum and at speeds shown on the manufacturer's plate as mixing and agitating speeds.

Each batch of concrete shall be mixed for not less than 70 nor more than 100 revolutions of the drum at mixing speed after all materials have been loaded into the drum, except that when approved by the Engineer, the maximum of 100 revolutions may be increased. Any revolving of the drum beyond the maximum number of revolutions shall be at the agitating speed. Mixing shall begin within 10 minutes after the cement has been combined with either the aggregate or water.

The truck mixer shall be equipped with an electrically or mechanically activated revolution counter by which the number of drum revolutions may be verified. The counter shall accurately register the number of revolutions. It shall be mounted on the truck mixer or just inside the truck cab, so that it may be safely and conveniently read from beside the truck. The revolution counter shall be reset to zero after all materials have been loaded into the drum.

Discharge from the truck mixer shall be completed within 90 minutes from the time batched, unless otherwise noted in the mix design and approved by the Engineer.

If additional mixing water is required to maintain the mix design water/cement ratio, the concrete shall be mixed by a minimum of 30 revolutions of the drum at mixing speed after the water has been added, prior to discharge of any concrete for placement. Any additional mixing water and required mixing revolutions shall be recorded on the delivery ticket specified in Subsection 1006-4.01. This additional mixing may be in excess of the maximum revolutions previously specified.

1006-4.03(D) Mixing in Mobile Mixers:

Concrete mixing in mobile mixers for Class S, Class B, and Class E concrete shall be performed in accordance with the requirements of AASHTO M 241.

1006-4.04 Consistency:

The contractor shall furnish Class P Concrete having a slump within the range specified in Table 1006-A.

The contractor shall furnish Class S, Class B, and Class E concrete having the slump shown on the approved mix designs with a permissible variation of \pm one inch; however, the permissible variation will be \pm two inches when an approved high range water reducing chemical admixture (ASTM C 494, Type F or Type G) conforming to the requirements of Subsection 1006-2.04 is used.

Concrete that fails to conform to the consistency requirements will be rejected.

When concrete is pumped, samples for consistency will be taken both as the concrete leaves the mixer and at the pump hose discharge. If the Engineer determines that there is a good correlation between the results of consistency tests on samples obtained from the mixer and from the pump hose, the Engineer may discontinue sampling from one of the sources; however, the Engineer may take periodic samples from both sources to verify the correlation of test results.

1006-5 Weather Limitations:

1006-5.01 General Requirements:

Under rainy conditions, placing of concrete shall be stopped before the quantity of surface water is sufficient to cause a flow or wash of the concrete surface or have a detrimental effect on the finished concrete and acceptance parameters.

Placing of concrete shall immediately cease if the hauling vehicles or any equipment or pedestrian traffic tracks mud on the prepared base or changes the allowable subgrade dimensional tolerances for Class P concrete and slabs placed on subgrade for Class S, Class B, and Class E concrete.

1006-5.02 Hot Weather Concreting:

The temperature of the concrete mixture immediately before placement shall not exceed 90 degrees F.

Forms, subgrade and reinforcing steel, shall be sprinkled with cool water just prior to placement of concrete.

Mix water may be cooled by refrigeration, liquid nitrogen, or well-crushed ice of a size that will melt completely during the mixing operation. Crushed ice may be substituted for part of the mix water on a pound for pound basis.

1006-5.03 Cold Weather Concreting:

The temperature of the mixed concrete immediately before placing shall not be less than 50 degrees F.

Concrete shall not be placed on or against ice-coated forms, reinforcing steel, structural steel, conduits or construction joints, nor on or against snow, ice, or frozen earth materials.

Concrete operations shall be discontinued when a descending air temperature in the shade and away from artificial heat falls below 40 degrees F nor shall concrete operations be resumed until an ascending air temperature in the shade and away from artificial heat reaches 35 degrees F unless otherwise approved by the Engineer.

Mixing and placing concrete shall continue no later in any day than that time which will allow sufficient time to place and protect the concrete already poured before the air temperature drops to 35 degrees F.

Concrete operations may be allowed although the air temperature at any time during the cure period in the shade and away from artificial heat is below the limit permitted above. Where concrete operations are thus allowed, the contractor shall use equipment to heat the aggregates or water, or both, prior to mixing. If aggregates are heated, the minimum temperature shall be 60 degrees F and the aggregates shall have no chunks of ice or frozen aggregate present. Equipment used to heat the aggregates shall be such that consistent temperatures are obtained throughout the aggregate within each batch and from one batch

to another. Water shall not be heated in excess of 150 degrees F unless the water is mixed with the aggregate prior to the addition of cement to the batch.

When concreting operations are allowed when the air temperature falls below the limits permitted in the shade and away from artificial heat, the contractor shall provide adequate insulation or heat, or both, to protect the concrete after placement. This protection shall be to the extent required to maintain a concrete surface temperature of not less than 50 degrees F for a period of 72 hours after placement and at not less than 40 degrees F for an additional 96 hours. When artificial heating is required, the heating units shall not locally heat or dry the surface of the concrete. A written outline of the proposed protection method shall be submitted to the Engineer for approval.

The placing of concrete will not be permitted until the Engineer is satisfied that all the necessary protection equipment and materials are on hand at the site and in satisfactory working condition.

Concrete requiring cold weather protection shall have such protection removed at the end of the required period in a manner that will permit a gradual drop in the concrete temperature.

1006-6 Curing Concrete:

1006-6.01 Curing Cast-in-Place Concrete:

(A) General Requirements:

All cast-in-place concrete shall be cured by one or by a combination of more than one of the methods specified herein and curing shall begin immediately after completion of machine or hand finishing of the fresh concrete.

Curing shall be continued for a period of at least seven days after placing if either Type II Portland cement or Portland pozzolan cement has been used, or for at least three days if Type III Portland cement has been used.

Surfaces requiring a Class II finish shall not be cured by the Liquid-Membrane Forming Compound Method until after the finishing operations are completed.

No traffic, hauling, storing of material or other work shall be allowed on any concrete surface during the required curing periods.

(B) Water Curing Method:

All surfaces not covered by reasonably waterproof forms shall be kept damp by applying water with a nozzle that so atomizes the flow of the water that a fog mist and not a spray is formed until the surface of the concrete is covered with a curing medium or sprinkling of the surface is permitted. The moisture from the nozzle shall not be applied under pressure directly upon the concrete and shall not be allowed to accumulate on the concrete in a quantity sufficient to cause a flow or wash the surface.

If a curing medium is used, the concrete shall be kept continuously wet by sprinkling with water for the entire curing period. Burlap, rugs, carpets, or earth or sand blankets may be used as a curing medium to retain the moisture during the curing period. Application of the curing medium shall not begin until such time that placement can be made without marring the surfaces of the concrete.

If a curing medium is not used, the entire surface of the concrete shall be kept damp by the application of water with an atomizing nozzle as specified above until the concrete has set, after which the entire surface of the concrete shall be sprinkled continuously with water for the entire curing period.

In no case shall curing be interrupted by more than one hour during the curing period.

(C) Liquid-Membrane Forming Compound Method:

All surfaces not covered by reasonably waterproof forms shall be cured by the liquid-membrane forming compound method. The curing compound shall be applied to the concrete immediately following the surface finishing operation in one or more applications totaling a rate of not less than one gallon per 100 square feet.

The curing compound shall form a continuous unbroken surface.

If the membrane film is broken during the curing period, the broken area shall be given a new application of compound at a rate sufficient to assure uniform coverage.

In no case shall curing be interrupted by more than one hour during the curing period.

(D) Forms in Place Method:

Formed surfaces of concrete may be cured by retaining the forms in place. The forms shall remain in place for the entire curing period.

All joints in the forms and the joints between the end of forms and concrete shall be kept moisture-tight during the curing period.

Cracks in the forms and cracks between the forms and the concrete shall be resealed by methods approved by the Engineer.

1006-6.01(E) Curing Bridge Decks, Approach Slabs, and Anchor Slabs:

The top surface of bridge decks, approach slabs, and anchor slabs shall be cured by the liquid-membrane forming compound method and by the water curing method. The curing compound shall be applied progressively immediately following the surface finishing operation. Liquid-membrane forming compound shall be applied at a rate of one gallon per 100 square feet. The curing compound shall form a continuous unbroken surface.

Water curing shall be applied not later than four hours after the completion of the surface finishing operations and shall be applied as specified herein.

The top surface of bridge decks, approach slabs, and anchor slabs that will be covered with a special riding surface or waterproofing membrane shall be cured by the water curing method only. Water curing shall be applied progressively immediately following the surface finishing operation as specified herein.

1006-6.02 Curing Precast Concrete:

(A) General Requirements:

The contractor may cure precast concrete in accordance with the requirements specified above for curing cast-in-place concrete or if it elects, the curing of precast concrete may be performed by external heating. This may be accomplished by the use of low-pressure steam or radiant heat with moisture.

If curing of the concrete is accomplished by low-pressure steam or radiant heat with moisture, curing will be considered completed after termination of steam or radiant heat curing. Rapid temperature changes in the concrete shall be avoided during the cooling period.

If curing of the concrete is accomplished by the water curing method, the liquid-membrane forming compound method, or the forms-in-place method, such curing shall be continued for a period of at least seven days after placement of the concrete. The curing time may be reduced to a minimum of three days when a Type III Portland cement has been used.

(B) Low-Pressure Steam Curing:

After placement of the concrete, precast items shall be held for a minimum two-hour presteaming period. If the ambient air temperature is below 50 degrees F, steam shall be applied during the presteaming period to hold the air surrounding the precast item at a temperature between 50 and 90 degrees F.

To prevent moisture loss on exposed surfaces during the presteaming period, precast items shall be covered as soon as possible after casting or the exposed surfaces shall be kept wet by fog spray or wet blankets.

Enclosures for steam curing shall allow free circulation of steam about the member and shall be constructed to contain the live steam with a minimum moisture loss. The use of tarpaulins or similar flexible covers will be permitted, provided they are kept in good repair and secured in such a manner to prevent the loss of steam and moisture.

Steam at the jets shall be low pressure and in a saturated condition. Steam jets shall not impinge directly on the concrete, test cylinders or forms. During application of the steam, the ambient air temperature rise within the enclosure shall not exceed 40 degrees F per hour. The average curing temperature throughout the enclosure shall not exceed 160 degrees F and shall be maintained at a constant level for a sufficient length of time so as to ensure the development of the required compressive strength by the age of 28 days in concrete items which are not be prestressed. For items which are to be prestressed, the constant temperature shall be maintained for sufficient time necessary to develop the concrete compressive strength required for prestressing. The ambient curing temperature

shall not exceed 175 degrees F at any point. Control cylinders shall be covered to prevent moisture loss and shall be placed in a location where temperature is representative of the average temperature of the enclosure.

Temperature recording devices that will provide an accurate continuous permanent record of the ambient curing temperature shall be provided. A minimum of two temperature recording devices or one for every 200 feet of continuous bed length will be required for checking temperature.

In the event the side forms are removed before the precast unit has attained the required release compressive strength, the curing method shall be continuous in maintaining the temperature and moisture level as described above, within the enclosure, as nearly as practical. There shall not be a delay in re-covering the girder or prestress member.

(C) Radiant Heat With Moisture:

Radiant heat shall be applied by means of pipes circulating steam, hot oil or hot water, or by heating elements or electric blankets on the forms. Pipes, blankets or elements shall not be in contact with the concrete surfaces.

Moisture shall be applied in such a manner as to keep the top surface of the precast unit continuously moist during the curing period by fogging or spraying. Moisture shall be maintained by a cover of burlap or cotton matting and further covered by a waterproof tarpaulin with an insulating cover.

Temperature limits and the use of recording thermometers shall be the same as curing with low-pressure steam. Application of the heat cycle may be accelerated to meet climatic conditions upon the approval of the Engineer. A temperature sensing device shall be placed two \pm 1/2 inches from the heated form.

1006-7 Acceptance Sampling and Testing:

1006-7.01 General:

Rejection of concrete will occur due to improper temperature, slump, and/or air content for the concrete mixture delivered to the site. The Engineer may allow failed concrete mixture already placed to remain in place subject to acceptance by compressive strength or may require its removal.

Rejection of concrete will also occur due to insufficient compressive strength. Concrete compressive strength requirements consists of the specified strength which the concrete shall attain before various loads or stresses are applied and a minimum strength at 28 days.

Acceptance and penalties for placed concrete which meets the above mixture requirements or is allowed to remain in place shall be determined by the results of the 28-day compressive strength, and additionally in the case of Class P concrete, on the measured thickness of concrete pavement in place according to Section 401. Sampling and testing for compressive strength will be performed on all classes of concrete furnished, including each strength specified on the project plans for Class S or Class E concrete.

1006-7.02 Sampling and Testing of Concrete:

A sample of concrete for determination of temperature, slump, and air content (when required) as well as for fabrication of test cylinders for compressive strength determination at 28 days will be taken at random at the specified sampling frequency for each type of concrete.

Samples of concrete shall be of sufficient size to perform all the required tests and fabricate the necessary test cylinders. The samples shall be taken in accordance with the requirements of AASHTO T 141, except as follows:

- (1) Concrete for Class S, Class B, or Class E shall be sampled only once during discharge in the middle portion of the batch. At the discretion of the Engineer, a sample may be obtained at the beginning of the discharge if, in the Engineer's opinion, the properties of the concrete do not appear to be within the specification limits for slump or temperature.
- (2) Concrete for Class P shall be sampled immediately before going into the paver or forms, or as otherwise directed by the Engineer.

If concrete is pumped to facilitate placement, at the discretion of the Engineer, samples may be taken from the truck and pump hose discharge to determine that the compressive strength specifications are met in the structure, and to correlate temperature, slump and air content results. If the correlation is satisfactory and meets with the approval of the Engineer, sampling may continue from the most convenient location with occasional re-testing for correlation. Rejection of concrete due to improper temperature or slump may occur at either the truck or pump hose discharge; however, rejection of concrete due to improper air content will only occur due to a failing test for a sample obtained at the final point of discharge.

Temperature of the concrete mixture will be determined in accordance with ASTM C 1064. Slump of the concrete mixture will be determined in accordance with AASHTO T 119. Air content of the concrete mixture will be determined in accordance with AASHTO T 152. All compressive strength test cylinders will be made, cured, handled, protected, and transported in accordance with the requirements of AASHTO T 23. Testing for compressive strength of cylinders shall be in accordance with the requirements of Arizona Test Method 314.

For Class S concrete with a compressive strength requirement less than 4000 psi, or Class B concrete, a strength test will consist of the average strength of two test cylinders. However, if the compressive strengths of the two test cylinders differ by more than 10 percent from the average of the two, the strength test result shall be the cylinder with the highest compressive strength.

For Class S concrete with a compressive strength requirement equal to or greater than 4000 psi, or Class P concrete, the compressive strength of each sample shall be determined by averaging the results of the three test cylinders fabricated as specified in Subsection 1006-7.03. However, if the compressive strength of any one of the three test

cylinders differs by more than 10 percent from the average of the three, its result shall be discarded and the compressive strength shall be the average of the remaining two cylinders. Should the individual compressive strength of any two of the three test cylinders differ by more than 10 percent from the average of the three, the results of both will be discarded and the compressive strength shall be the strength of the remaining cylinder.

1006-7.03 Sampling Frequency for Cast-In-place Concrete:

(A) Class S and Class B Concrete:

For Class S concrete with a compressive strength requirement less than 4000 psi, or Class B concrete, a sample of concrete for the required tests, as specified in Subsection 1006-7.02, will be taken on a daily basis for each 100 cubic yards, or fraction thereof, of continuously placed concrete from each batch plant. For Class S concrete with a compressive strength requirement equal to or greater than 4000 psi, a sample of concrete for the required tests, as specified in Subsection 1006-7.02, will be taken on a daily basis for each 50 cubic yards, or fraction thereof, of continuously placed concrete from each batch plant. For Class S or Class B concrete placed at elevations of 3,000 feet or above, air content testing shall be performed for each 50 cubic yards placed, regardless of the compressive strength requirement. An additional sample or samples for any of the required tests may be taken at an interval of less than the sampling frequency specified above, at the discretion of the Engineer on any batch or load of concrete. A sample for the required tests on daily placements of 10 cubic yards or less may be taken at the discretion of the Engineer.

(B) Class E Concrete:

Class E concrete shall be sampled and tested for compressive strength by the sub-lot. A sub-lot will be 30 cubic yards or an accumulation of quantities of a specified strength of concrete to total 30 cubic yards. A sample will be obtained for each portion of concrete between 10 and 30 cubic yards, inclusive, for each specified strength of concrete. For each specified concrete strength, the quantity of concrete represented by four samples will be defined as a lot. However, for a continuous pour of greater than 120 cubic yards of a specified strength of concrete, the total amount of concrete in that pour will be considered to be a lot, and four samples will be taken at randomly selected locations as directed by the Engineer. The Engineer may exclude certain locations from random sampling should the Engineer determine that the location of the work precludes normal construction operations. Three test cylinders shall be fabricated from each sample and tested for 28-day compressive strength in accordance with Subsection 1006-7.02.

Class E concrete shall be sampled and tested for temperature and slump for each 30 cubic yards. For concrete placed at an elevation of 3000 feet or above, a sample will be taken for each 30 cubic yards for testing of air content. For quantities of concrete less than 30 cubic yards, the sampling and testing frequency for temperature, slump, and air content may be reduced with the concurrence of the Engineer. Additional samples for any of the required tests may be taken at the discretion of the Engineer.

(C) Class P Concrete:

Class P concrete shall be sampled and tested for compressive strength by the lot. A lot shall be considered to be one shift's production; however, a new lot shall begin when the mix design is changed. For partial shifts due to weather or other reasons, more than one day's production may be included in a lot. When such partial shifts occur, the contractor and the Engineer will jointly determine the lot limits. Five samples shall be obtained from each lot at random locations as directed by the Engineer. The Engineer may exclude certain locations from random sampling should the Engineer determine that the location of the work precludes normal construction operations. Three test cylinders shall be fabricated from each sample and tested for 28-day compressive strength in accordance with Subsection 1006-7.02.

Class P concrete shall be sampled and tested for temperature, slump, and air content (if applicable) a minimum of five times per lot. The frequency may be reduced for partial shifts with the concurrence of the Engineer. Additional samples for any of the required tests may be taken at the discretion of the Engineer.

1006-7.04 Sampling Frequency for Precast Concrete:

A sample of concrete for the required tests as specified in Subsection 1006-7.02 will be taken for either each precast concrete member or for each day's production at the discretion of the Engineer, when the method of measurement is by the unit.

An additional sample or samples for any of the required tests may be taken at the discretion of the Engineer. The Engineer will determine the quantity of concrete represented by each sample of concrete for any test performed.

When a sample of concrete for the required compressive strength test is taken to represent a single day's production and not each precast member, the degree of acceptance for all precast concrete members in that day's production will be established by the results of such compressive strength test.

1006-7.05 Testing for Minor Precast Concrete Structures:

A strength test on each precast unit produced will consist of the average rebound number as determined from readings taken on the precast unit with a rebound hammer. The average rebound number will be determined in accordance with the requirements of ASTM C 805.

The compressive strength of the concrete will be determined from the average rebound number and the calibration chart established for the specific rebound hammer being used. The calibration chart will be established from rebound readings taken on concrete test cylinders fabricated at the precast plant and the actual compressive strength of the cylinders. The test cylinders will be fabricated in accordance with the requirements of AASHTO T 23. Testing for compressive strength of cylinders shall be in accordance with the requirements of Arizona Test Method 314.

1006-7.06 Acceptance for Compressive Strength:

(A) Class P Concrete:

Class P concrete will be accepted for compressive strength in accordance with the provisions of Section 401. All concrete failing to meet the compressive strength requirement or otherwise rejected in accordance with Section 401 or Subsection 1006-7.01, shall be replaced with concrete meeting the requirements of these specifications.

If the contractor chooses to contest the compressive strength results of any sample for purposes of acceptability or improving a negative pay factor, the contractor may elect to rely on the results of compressive strengths of cores. Three cores shall be obtained at no additional cost to the Department, at the approximate location where the contested test cylinders were obtained. Such cores shall be obtained and tested in accordance with Arizona Test Method 317. Cores must be obtained under the observation of an ADOT representative and delivered to the Engineer in time to allow complete testing within 48 days of placement. The contractor may elect to have a representative present during testing. Compressive strength shall be the average of the results of the three cores. However, if the compressive strength of any one of the three cores differs by more than 10 percent from the average of the three, its result shall be discarded and the compressive strength shall be the average of the remaining two cores. Should the individual compressive strength of any two of the three cores differ by more than 10 percent from the average of the three, the results of both shall be discarded and the compressive strength shall be the result of the remaining core. Results of the core testing will be binding on both the contractor and the Department, and will replace the results of the test cylinders for that sample.

(B) Class S and Class B Concrete:

Class S and Class B concrete will be accepted for compressive strength and paid for in accordance with the following table. Concrete will be paid for by the linear foot or by the cubic yard, complete in place, except that an adjustment in the contract unit price, to the nearest cent, will be made for the quantity of concrete represented by 28-day compressive strength test results less than the specified requirement.

| Adjustment in Contract Unit Price For Compressive Strength of Class S and Class B Concrete | | | | | |
|--|---|---|---|---|---|
| 3000 psi and Below | | 3500 psi | | 4000 psi and Above | |
| Percent of Specified 28-Day Compressive Strength Attained, to the Nearest One Percent | Percent Reduction in Contract Unit Price (See Note 1) | Percent of Specified 28-Day Compressive Strength Attained, to the Nearest One Percent | Percent Reduction in Contract Unit Price (See Note 1) | Percent of Specified 28-Day Compressive Strength Attained, to the Nearest One Percent | Percent Reduction in Contract Unit Price (See Note 1) |
| 100 or More | 0 | 100 or More | 0 | 100 or More | 0 |
| 97 - 99 | 3 | 98 - 99 | 2 | 99 | 1 |
| 94 - 96 | 6 | 96 - 97 | 4 | 98 | 2 |
| 91 - 93 | 9 | 94 - 95 | 6 | 97 | 3 |
| 88 - 90 | 12 | 92 - 93 | 8 | 96 | 4 |
| 85 - 87 | 15 | 90 - 91 | 10 | 95 | 5 |
| Less than 85 | 30 (See Note 2) | Less than 90 | 30 (See Note 2) | Less than 95 | 30 (See Note 2) |
| Note 1: For items measured and paid for by the cubic yard, the reduction shall not exceed \$150.00 per cubic yard. | | | | | |
| Note 2: If allowed to remain in place. | | | | | |

Concrete failing to meet at least 85 percent of the 28-day compressive strength for specified strengths of 3,000 pounds per square inch and below, 90 percent for a specified strength of 3,500 pounds per square inch, or 95 percent for specified strengths of 4,000 pounds per square inch and above, or any concrete failing to meet the other requirements of Subsection 1006-7.01, will be rejected and removed in accordance with the provisions of Subsection 106.11 at no additional cost to the Department, unless the contractor 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 and be allowed to remain in place.

If such evidence consists of cores, the contractor shall obtain three cores from the concrete represented by the failing cylinder strength test. The cores shall be obtained at no additional cost to the Department, under the observation of an ADOT representative, and delivered to the Engineer in time to allow complete testing of such cores within 48 days after the placement of the concrete. All cores shall be obtained and tested in accordance with the requirements of Arizona Test Method 317. The contractor may elect to have a representative present during testing. The concrete represented by the cores will be considered for acceptance, in accordance with the requirements of the table above. If the average compressive strength does not meet the specified requirement, all concrete so represented shall be removed at no additional cost to the Department unless permitted to remain in place by the Engineer. Results of the core testing will be binding on both the contractor and the Department, and will replace the results of the test cylinders for that sample.

(C) Class E Concrete:

Class E concrete will be accepted for compressive strength in accordance with the provisions of Section 611. All concrete failing to meet the compressive strength requirement or otherwise rejected in accordance with Section 611 or Subsection 1006-7.01, shall be replaced with concrete meeting the requirements of these specifications.

If the contractor chooses to contest the compressive strength results of any sample for purposes of acceptability or improving a deficiency in compressive strength, the contractor may elect to rely on the results of compressive strengths of cores. Three cores shall be obtained at no additional cost to the Department, at the approximate location where the contested test cylinders were obtained. Such cores shall be obtained and tested in accordance with Arizona Test Method 317. Cores must be obtained under the observation of an ADOT representative and delivered to the Engineer in time to allow complete testing within 48 days of placement. The contractor may elect to have a representative present during testing. Compressive strength shall be the average of the results of the three cores. However, if the compressive strength of any one of the three cores differs by more than 10 percent from the average of the three, its result shall be discarded and the compressive strength shall be the average of the remaining two cores. Should the individual compressive strength of any two of the three cores differ by more than 10 percent from the average of the three, the results of both shall be discarded and the compressive strength shall be the result of the remaining core. Results of the core testing will be binding on both the contractor and the Department, and will replace the results of the test cylinders for that sample.

1006-8 Method of Measurement and Basis of Payment:

The method of measurement and basis of payment will be made as specified herein and under the provisions specified in the various sections of the specifications covering construction requiring the use of concrete.

SECTION 1007 - RETROREFLECTIVE SHEETING: of the Standard Specifications is revised to read:

1007-1 General Requirements:

Retroreflective sheeting shall consist of a retroreflective system having a smooth outer surface. The sheeting shall have a pre-coated adhesive on the back side protected by an easily removable liner, except for self-supporting products having a Class V backing, such as roll-up signs and some types of traffic cone collars. Sheeting shall conform to criteria listed in ASTM D 4956-04 for the applicable type and class, unless otherwise specified. All references herein to ASTM D 4956 shall refer to ASTM D 4956-04.

Only those retroreflective sheeting, inks, and film products that are currently shown in the Department's Approved Product List (APL) shall be used. Copies of the APL are available on the internet from the Arizona Transportation Research Center (ATRC), through its PRIDE program.

A Certificate of Compliance, conforming to the requirements of Subsection 106.05, shall be submitted. The Certificate of Compliance shall identify the retroreflective sheeting type, backing class, make of sheeting, inks, and film intended for use in all manufactured devices, including signs, channeling devices, mileposts, object markers, guard rail markers, delineators and reference markers. The Engineer may accept all materials based on the certification or may require the contractor to furnish additional information or laboratory test results. Additionally, the Engineer may perform measurements on materials to determine their compliance with these specifications. Signs and other devices that have sheeting, inks or films that do not meet these requirements shall be rejected and shall be replaced at no additional cost to the Department.

1007-2 Material Types:

Sheeting material types for warning signs, regulatory signs, and guide sign backgrounds will be as shown on the plans.

The type of sheeting material to be used in other applications will be as specified herein.

For barricades, channelizers and other work zone devices, ASTM sheeting Types IV, VIII, IX, or X shall be used.

ASTM sheeting Types VIII, IX, or X shall be used for route marker signs and auxiliaries (stand alone), and for milepost markers.

Sheeting for orange work zone signs (fluorescent) shall be ASTM Types VI, VIII, IX, or X. Roll-up orange work zone signs shall use ASTM Type VI sheeting.

For direct-applied characters, demountable characters and shields on guide signs, ASTM sheeting Types VIII, IX, or X shall be used.

ASTM sheeting Types V, VIII, IX, or X shall be used for object markers, guardrail markers, and delineators. Object markers for guardrail end treatments, and impact attenuators (fluorescent) shall use ASTM Types VIII, IX, or X.

Sheeting for Adopt-A-Highway signs and logo signs shall be ASTM Type I.

When more than one sheeting type is allowed, the contractor may use any of the types listed, provided that materials used for a particular application shall be of the same ASTM type, manufacturer, and product for all signs of the same type in the project.

Opaque films used with sheeting shall be acrylic type films.

Direct-applied and demountable black characters shall be non-reflective.

1007-3 Visual Appearance, Luminance and Color Requirements:

Except as specified herein, the color of the sheeting, ink or film shall conform to the ADOT Manual of Approved Signs, the Manual on Uniform Traffic Control Devices (MUTCD), and the plans.

All warning signs with yellow backgrounds shall use fluorescent yellow sheeting.

All work zone signs with orange backgrounds shall use fluorescent retroreflective orange sheeting, except that non-reflective sign materials may be used for temporary work zone signs where the signs will be clearly visible under available natural light.

All sheeting, inks and film used shall be uniformly colored so there is no visual variation in their appearance on the same sign or from sign to sign of the same colors.

Standard colors specified for sheeting, processing inks, and films shall, as applicable, match visually and be within the color tolerance limits required by Highway Tolerance Charts issued by the Federal Highway Administration. Additionally, for the retroreflective sheeting, unless otherwise noted, the Luminance Factor (Daytime Luminance) and Color Specification Limits (Daytime) shall conform to the applicable requirements of ASTM D 4956.

In addition to the luminance and color requirements, fluorescent orange sheeting shall have the capacity to effectively fluoresce outdoors under low light conditions. For all applications requiring fluorescent orange sheeting, the contractor shall provide a letter to the Engineer from the manufacturer certifying that the sheeting to be used is fluorescent.

1007-4 Coefficient of Retroreflection:

The coefficient of retroreflection shall meet the minimum requirements of ASTM D 4956 for the type of retroreflective sheeting specified.

All black opaque films shall have a maximum coefficient of retroreflection of 1.0 or less at an observation angle of 0.2 degrees and entrance angle of -4.0 degrees.

1007-5 Color Processing:

Transparent and opaque inks used for post or pre-screen printing of signs shall be of a type and quality specified by the sheeting manufacturer, and shall conform to the applicable requirements of the MUTCD and the Federal Highway Administration for traffic signs. The inks shall be applied in a manner, and with equipment, that is consistent with the ink manufacturer's recommendations. Additionally, the signs produced shall have a uniform legend of consistent stroke width and sharply defined edges, without blemishes that would negatively impact appearance, color or required retroreflectivity.

For sheeting applications using black ink, the maximum coefficient of retroreflection shall be 1.0 or less at an observation angle of 0.2 degrees and entrance angle of -4.0 degrees.

1007-6 Adhesive:

Reflective sheeting and film adhesives shall be either Class I or II as specified in ASTM D 4956 and as modified herein.

Pressure sensitive adhesive shall be an aggressive tack type that requires no heat, solvent or other pre-application preparation of the sheeting or film for its adhesion to clean aluminum, plywood, or reflective sheeting surfaces. Pretreatment of plastic surfaces shall be done as recommended by the sheeting manufacturer.

Heat-activated adhesives shall allow positioning under normal working conditions and temperatures without damage to the materials or application surface. This type of adhesive shall be activated by applying heat in excess of 150 degrees F to the material using a heat vacuum process. No pre-treatment of the heat activated adhesive shall be necessary.

The adhesive shall form a tight weatherproof durable bond that shall endure under all weather conditions for the required time of durability for that material. During this period the material shall remain bonded to its surface without discoloration, cracking, crazing, peeling, blistering, dimensional change or alignment change.

1007-7 Weather Testing:

For the evaluation of sign sheeting products the Department has adopted a desert environment, 45 degree, south-facing outdoor acceleration test method. Sheeting will be tested for the time periods specified in Subsection 1007-8. The Department's test method will be considered to produce a two to one time-acceleration ratio for equivalent vertical exposure.

1007-8 Durability Requirements:

Sheeting stability will be determined using a durability rating which shall be equal to twice the testing periods listed below. Sheeting must be warranted by the manufacturer against the defects listed below for a period equal to the specified durability rating for each type of sheeting product. Only those sheeting products which provide the specified warranty will be acceptable.

Type IV, VIII, IX, X, and XI sheeting shall be weather-tested, as specified above, for a period of 60 months. Orange colored sheeting used for construction zone signing, barricades, and channeling devices shall be weather-tested for a period of 18 months. All other sheeting shall be weather-tested for a period of 30 months. In all cases the related inks and films shall be tested along with the respective sheeting, and shall be subject to the same durability requirements as the sheeting.

Type IV, VIII, IX, X, and XI sheeting, related inks and films shall have a minimum ten year durability rating. All orange sign sheeting shall have a minimum durability rating of three years. All other sheeting, films, and inks shall have a minimum durability rating of five years.

After weather testing for the periods specified above, sheeting and related inks and films shall show no significant degradation or reduced performance. Unacceptable degrees of degradation and reduced performance are as listed below:

- (1) Bubbles, wrinkles, cracks or breaks on any portion of the applied materials greater than three inches in length that result in a negative appearance or concerns of additional degradation.
- (2) Significant shrinkage that causes the material to curl or to pull away from the background.
- (3) Significant delaminating of any material or layer (sheeting to substrate, sheeting to sheeting, sheeting to film, ink to sheeting, film to sheeting or film to film).
- (4) Significant visible discoloration, including clouding or chalking.
- (5) A loss of transparency of any transparent sheeting, ink or film.
- (6) A loss in opaqueness of any opaque ink or film.
- (7) Significant cracking, blistering, ripping, flaking, curling or chipping of any sheeting, ink or film.
- (8) A loss of nighttime retroreflectivity as observed at night under normal conditions, or as defined and measured with a portable retroreflectometer at an observation angle of 0.2 degrees and entrance angle of -4.0 degrees. The measured coefficient of retroreflection shall be consistent with what would be expected of the type of material being measured, normal manufacturing variations, the time that the material has been in the field, and FHWA requirements.

Those sheeting products which have been evaluated for the time periods specified above using the Department's own testing and evaluation program, and that have been shown to meet the durability requirements listed herein, are included on the Approved Products List.

Manufacturer's guarantees or warranties on all traffic sign material shall be transferred to the Department upon completion and acceptance of the project in accordance with the requirements of Subsection 106.13.

1007-9 Application:

The sheeting, inks, clear coats (if required), and films shall be applied as specified by the manufacturer. The applied sheeting or film shall not have bubbles, wrinkles or foreign materials beneath the reflective sheeting, ink or film.

(1009ASRM, 07/13/05)

SECTION 1009 ASPHALT-RUBBER MATERIAL: of the Standard Specifications is revised to read:

1009-1 Description:

The work under this section shall consist of furnishing, proportioning and mixing all the ingredients necessary to produce an asphalt-rubber material. Asphalt-rubber material is also referred to as crumb rubber asphalt (CRA).

1009-2 Materials:

1009-2.01 Asphalt-Rubber:

(A) Asphalt Cement:

Asphalt cement shall be a performance grade (PG) asphalt binder conforming to the requirements of Section 1005.

(B) Crumb Rubber:

Crumb rubber shall meet the following gradation requirements when tested in accordance with Arizona Test Method 714.

| Sieve Size | Percent Passing | |
|-------------------|------------------------|---------------|
| | Type A | Type B |
| No. 8 | 100 | |
| No. 10 | 95 - 100 | 100 |
| No. 16 | 0 - 10 | 65 - 100 |
| No. 30 | | 20 - 100 |
| No. 50 | | 0 - 45 |
| No. 200 | | 0 - 5 |

The crumb rubber shall have a specific gravity of 1.15 ± 0.05 and shall be free of wire or other contaminating materials, except that Type A crumb rubber shall contain not more than 0.1 percent fabric and Type B crumb rubber shall contain not more than 0.5 percent fabric. Calcium carbonate, up to four percent by weight of the crumb rubber, may be added to prevent the particles from sticking together.

Certificates of Compliance conforming to Subsection 106.05 shall be submitted. In addition, the certificates shall confirm that the rubber is a crumb rubber, derived from processing whole scrap tires or shredded tire materials; and the tires from which the crumb rubber is produced are taken from automobiles, trucks, or other equipment owned and operated in the United States. The certificates shall also verify that the processing does not produce, as a waste product, casings or other round tire material that can hold water when stored or disposed of above ground.

1009-2.02 Asphalt-Rubber Proportions:

The asphalt-rubber shall contain a minimum of 20 percent crumb rubber by the weight of the asphalt cement.

1009-2.03 Asphalt-Rubber Properties:

Asphalt-rubber shall conform to the following:

| TABLE 1009-2 | | | |
|---|--------------------|-------------------|-------------------|
| Property | Requirement | | |
| | CRA Type 1 | CRA Type 2 | CRA Type 3 |
| Grade of base asphalt cement | PG 64-16 | PG 58-22 | PG 52-28 |
| Rotational Viscosity*: 350 °F; Pascal-seconds | 1.5 - 4.0 | 1.5 - 4.0 | 1.5 - 4.0 |
| Penetration: 39.2 °F, 200 g, 60 sec. (ASTM D 5); 0.1 mm, minimum | 10 | 15 | 25 |
| Softening Point: (ASTM D 36); °C, minimum | 57 | 54 | 52 |
| Resilience: 77 °F (ASTM D 5329); %, minimum | 25 | 20 | 15 |
| <p>* The viscotester used must be correlated to a Rion (formerly Haake) Model VT-04 viscotester using the No. 1 Rotor. The Rion viscotester rotor, while in the off position, shall be completely immersed in the binder at a temperature from 350 to 355 degrees F for a minimum heat equilibrium period of 60 seconds, and the average viscosity determined from three separate constant readings (± 0.5 Pascal-seconds) taken within a 30 second time frame with the viscotester level during testing and turned off between readings. Continuous rotation of the rotor may cause thinning of the material immediately in contact with the rotor, resulting in erroneous results.</p> | | | |

If, during production, it is determined by testing that asphalt-rubber fails to meet the above requirements for the specified type, the material in which the asphalt-rubber is incorporated and represented by the corresponding test results shall be evaluated for acceptance. Should the material in which the asphalt-rubber is incorporated be allowed to remain in place, the contract unit price for asphalt-rubber will be adjusted by the percentage shown in Table 1009-3. Should the asphalt-rubber be in reject status, the contractor may, within 15 days of receiving notice of the reject status of the asphalt-rubber, supply an engineering analysis of the expected performance of the material in which the asphalt-rubber is incorporated. The engineering analysis shall detail any proposed corrective action, and the anticipated effect of such corrective action on the performance. Within three working days, the Engineer will determine whether or not to accept the contractor's proposal. If the

proposal is rejected, the material in which the asphalt-rubber is incorporated shall be removed and replaced with material meeting the requirements of the applicable specifications at no additional cost to the Department. If the contractor's proposal is accepted, the material in which the asphalt-rubber is incorporated shall remain in place at the applicable percent of contract unit price allowed, and any necessary corrective action shall be performed at no additional cost to the Department.

| TABLE 1009-3 ASPHALT-RUBBER PAY ADJUSTMENT TABLE | | | | | | |
|---|------------|--------------------------------|------------|--------------------------------|------------|--------------------------------|
| Test Property | CRA Type 1 | | CRA Type 2 | | CRA Type 3 | |
| | Test Value | Percent of Contract Unit Price | Test Value | Percent of Contract Unit Price | Test Value | Percent of Contract Unit Price |
| Penetration | ≥ 10 | 100 | ≥ 15 | 100 | ≥ 25 | 100 |
| | 8 – 9 | 85 | 13 – 14 | 85 | 23 – 24 | 85 |
| | < 8 | 70* | < 13 | 70* | < 23 | 70* |
| Softening Point | ≥ 57 | 100 | ≥ 54 | 100 | ≥ 52 | 100 |
| | 55 – 56 | 85 | 52 – 53 | 85 | 50 – 51 | 85 |
| | < 55 | 70* | < 52 | 70* | < 50 | 70* |
| Resilience | ≥ 25 | 100 | ≥ 20 | 100 | ≥ 15 | 100 |
| | 20 – 24 | 85 | 15 – 19 | 85 | 10 – 14 | 85 |
| | 15 – 19 | 70 | 10 – 14 | 70 | 6 – 9 | 70 |
| | < 15 | 50* | < 10 | 50* | < 6 | 50* |

* Reject Status: The pay adjustment applies if allowed to remain in place.

Should the asphalt-rubber be deficient on more than one property, the pay adjustment will be the greatest reduction to the contract unit price specified considering individual test results.

1009-2.04 Asphalt-Rubber Design:

At least two weeks prior to the use of asphalt-rubber, the contractor shall submit an asphalt-rubber design prepared by an approved laboratory. The design shall be formulated using asphalt cement and crumb rubber that are representative of the materials to be utilized in production, and shall meet the requirements specified herein. The design shall show the values obtained from the required tests, along with the following information: percent, grade and source of the asphalt cement used; and percent, gradation and source(s) of crumb rubber used.

1009-3 Construction Requirements:

During production of asphalt-rubber, the contractor shall combine materials in conformance with the asphalt-rubber design unless otherwise approved by the Engineer.

1009-3.01 Mixing of Asphalt-Rubber:

The temperature of the asphalt cement shall be between 350 and 400 degrees F at the time of addition of the crumb rubber. No agglomerations of crumb rubber particles in excess of two inches shall be allowed in the mixing chamber. The contractor shall document that the amount of crumb rubber used does not deviate more than plus or minus 1.0% from the percentage specified in the accepted asphalt-rubber mix design. The temperature of the asphalt-rubber immediately after the initial dispersion of the crumb rubber into the asphalt cement shall be between 325 and 375 degrees F. The contractor shall ensure that the crumb rubber and asphalt cement are thoroughly mixed prior to the beginning of the reaction period. The reaction period shall be a minimum of one-hour, during which time the asphalt-rubber is continued to be mixed while a temperature between 325 and 375 degrees F is maintained. The reaction period shall be completed before the asphalt-rubber is used. The contractor shall demonstrate that the crumb rubber particles have been uniformly incorporated into the mixture and that they have been "wetted." The occurrence of crumb rubber floating on the surface or agglomerations of crumb rubber particles shall be evidence of insufficient mixing.

Prior to use, the viscosity of the asphalt-rubber shall be tested by the use of a rotational viscotester, which is to be furnished by the contractor or supplier.

1009-3.02 Handling of Asphalt-Rubber:

Once the asphalt-rubber has been mixed, it shall be kept thoroughly agitated to prevent settling of the crumb rubber particles. The temperature of the asphalt-rubber shall be maintained between 325 and 375 degrees F.

If in the first ten hours after the completion of the reaction period the temperature of the asphalt-rubber drops below 325 degrees F, it may be reheated to a temperature between 325 and 375 degrees F.

In no case shall the asphalt-rubber be held at a temperature between 325 to 375 degrees F for more than 10 hours after the completion of the reaction period. Asphalt-rubber held for more than 10 hours shall be allowed to cool and gradually reheated to a temperature between 325 and 375 degrees F before use.

The reheating of asphalt-rubber that has cooled below 325 degrees F shall not be allowed more than one time.

Asphalt-rubber shall not be held at temperatures above 250 degrees F for more than four days after the completion of the reaction period.

For each load or batch of asphalt-rubber, the contractor shall provide the Engineer with the following documentation:

- (1) The source, grade, amount, and temperature of the asphalt cement prior to the addition of crumb rubber.

- (2) The source and amount of crumb rubber, and the crumb rubber content expressed as percent by the weight of the asphalt cement.
- (3) Times and dates of the crumb rubber additions and resultant viscosity test.
- (4) A record of the temperature, with time and date reference for each load or batch. The record shall begin at the time of the addition of crumb rubber and continue until the load or batch is completely used. Readings and recordings shall be made at every temperature change in excess of 20 degrees F, and as needed to document other events which are significant to batch use and quality.

(1012GRDRL, 05/18/05)

SECTION 1012 GUARDRAIL MATERIALS:

1012-1 General Requirements: of the Standard Specifications is revised to read:

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

References to ARTBA in this section shall hereinafter refer to AASHTO-AGC-ARTBA "A GUIDE TO STANDARDIZED HIGHWAY BARRIER HARDWARE", 1995 edition.

1012-2 Fasteners, Elements, Posts and Blocks: of the Standard Specifications is revised to read:

Guardrail fasteners, posts, blocks, and other components shall conform to the requirements of ARTBA.

Unless otherwise specified, all surfaces of guardrail elements which are exposed to traffic shall present a uniform, pleasing appearance and shall be free of scars, stains or corrosion.

1012-3 Miscellaneous Materials: of the Standard Specifications is revised to read:

Nails shall be 16-penny common, galvanized. Nails for retainer strap shall be 10-penny common, galvanized.

The metal used to manufacture reflector tabs shall be either 3003-H14 aluminum strip 0.063 ± 0.004 inches thick, or steel strip 0.078 ± 0.008 inches thick galvanized in accordance with ASTM A 653 coating designation G 90. The reflector material shall be high-reflectivity sheeting, either silver-white or yellow and shall conform to the requirements of Section 1007. Adhesive for sheeting attachment to the metal tab shall be of the type and quality recommended by the sheeting manufacturer.

Nuts, bolts, and washers to be used in installations for which the details are not shown on the plans nor in the ARTBA publication shall conform to the requirements of ASTM F 568 or A 307; be galvanized in accordance with the requirements of ASTM A 153, Class C; and conform to the dimensional requirements of the American National Standards Institute.

Structural steel shapes, plates, bars and strips used in fabrication of hardware and all miscellaneous steel shall conform to the requirements of ASTM A 36 and shall be galvanized in conformance with the appropriate requirements of AASHTO M 111 and M 232. They shall meet the dimensional requirements of The American Institute of Steel Construction.

Round and square structural steel tubing shall conform to the material requirements of either ASTM A 500 or A 501 and shall be galvanized in accordance with the requirements of AASHTO M 180, Type 1.

The tubular thrie beam shall be fabricated from thrie beam elements conforming to the requirements of ARTBA.

Where galvanizing has been damaged, the coating shall be repaired by painting with two coats of zinc paint, in accordance with Section 1002.

1012-4 Timber Guardrail, Posts and Blocks:

Timber for posts and blocks shall be rough sawn (unplaned) or S4S with the nominal dimensions indicated. Any species or group of woods graded in accordance with the requirements for Timber and Posts of the Western Wood Products Association may be used.

Timber shall be No. 1 or better, and the stress grade shall be as follows:

| | |
|-----------------------------------|-----------|
| 6 inch by 8 inch Post and Block | 1,200 psi |
| 8 inch by 8 inch Post and Block | 900 psi |
| 10 inch by 10 inch Post and Block | 900 psi |

When the plans show guardrail systems using eight-inch by eight-inch timber posts and blocks, the contractor may use 8-1/4 inch by 8-1/4 inch nominal size posts and blocks with a stress grade of 825 pounds per square inch.

At the time of installation, the dimensions of timber posts and blocks shall vary no more than $\pm 1/2$ inch from the nominal dimensions as hereinbefore specified.

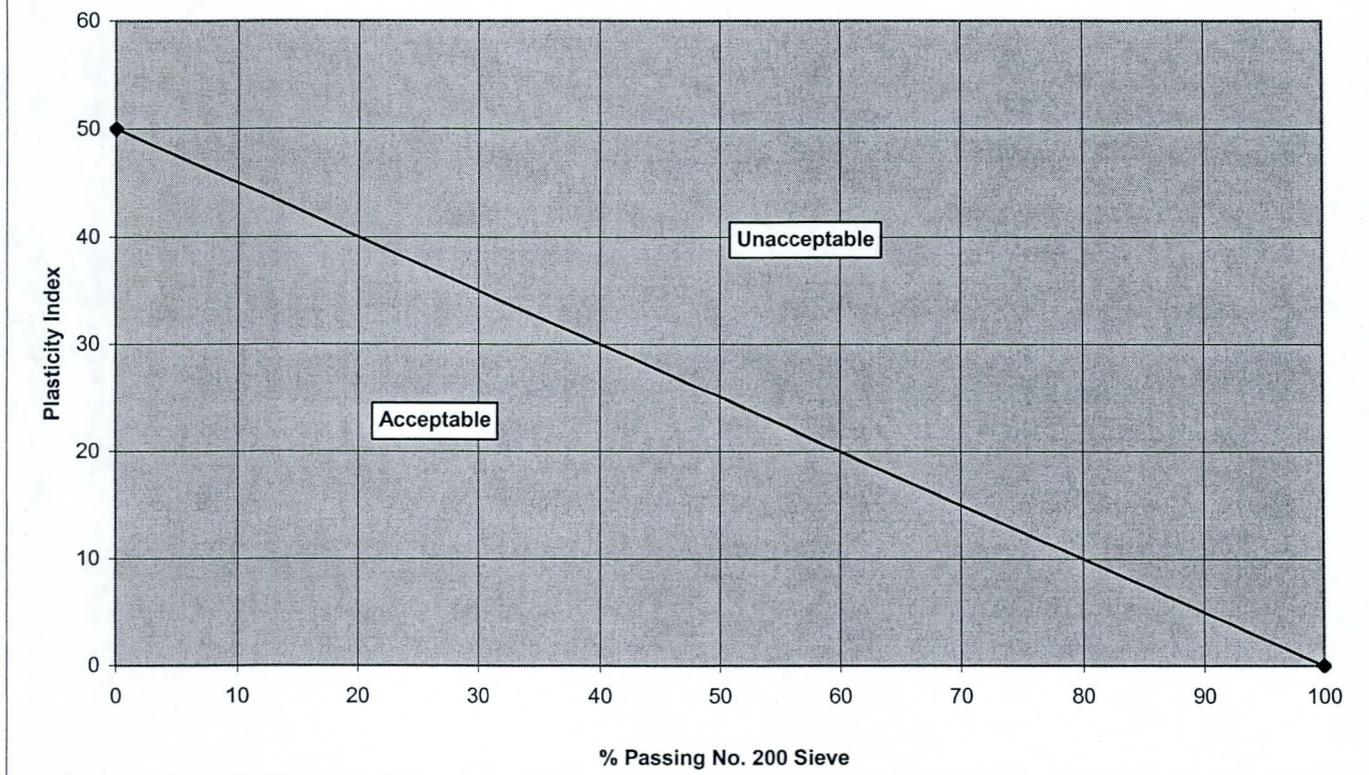
The size tolerance of rough sawn blocks in the direction of the bolt holes shall vary no more than $\pm 3/8$ inch. Only one type of post and block shall be used for any one continuous length of guardrail.

All timber shall have a preservative treatment in accordance with the requirements of AASHTO M 133.

Attachment A

Subgrade Acceptance Chart

Materials Subgrade Acceptance Chart



NEED the Design R-Value and the Construction R-value as noted in the ADOT Materials Design Review Consultant Projects, dated July 12, 2007, Section 1, item 5.

Attachment B

Burlington Northern and Sante Fe Railway Company (BN & SF RY)

Attachment C

Flood Control District of Maricopa County Permit Application